Safety Manual

“Nobody Gets Hurt”

2nd Edition May 2014

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Management Policy

The management of VRC Protx is dedicated to providing active support to ensure a safe working environment for all employees and for the contracting employers. However, the support of each employee is also vital towards the goal of preventing all safety incidents. There are two basic guidelines for our safety policy:

1. There are no jobs so important that we cannot take the necessary steps and time to perform in a safe manner.
2. The first priority is the safety of people, not property.

General Policies

1 VRC Protx does not allow alcohol, drugs or firearms of any type on the property of the company or the property of any contracting employer. Any employee caught with these substances on company property or contracting employer property shall be subject to immediate termination.

2 Any safety issues that come up during the normal course of work should be immediately brought to the attention of the local supervisor.

3 The policies of the contracting employer shall always be followed. The steps taken to follow all safety policies are an integral part of doing business. Coordination and cooperation with the contracting employer during safety meetings and safety training is highly encouraged and is part of the teamwork that minimizes safety incidents.

4 VRC Protx shall maintain good housekeeping at all times.

5 In case of emergency, the proper response is to leave the facility and go to the predetermined meeting location, contact the contracting employer immediately, ensure that all contract personnel are accounted for, and call for medical help if needed. As stated above – Protect People First.

6 PSM – VRC Protx will comply with all requirements of OSHA PSM regulations. Specifically, VRC Protx shall

   a) Assure that each contract employee is trained in the work practices necessary to perform his/her job.
   b) Assure that each contract employee is aware of the process hazards related to their job
   c) Assure that each contract employee knows how to respond in case of emergency (see #5 above)
   d) Assure that each contract employee is properly trained, with adequate documentation
   e) Assure that each contract employee understands the safety rules of the contracting employer and the safety rules of the specific facility in which they are working
   f) Advise the contracting employer of any unique hazards presented by the contractor's work.
   g) Advise the contracting employer if sub-contractors are being used and ensure they are properly trained to perform their tasks.

Management of Change

Purpose: To demonstrate clear parameters to the involvement of VRC Protx role in the process of Management of Change as it applies to dealing with our customers' needs.

Responsibility: It is the responsibility of VRC Protx management to ensure that all customer requirements are met pertaining to Management of Change when providing new materials or components to be used or installed in our customers facility.

Statement: It is the policy of VRC Protx to provide as much data, information and educated advice/recommendations as our customers require when they are making an informed decision dealing with their Management of Change issues at their facility. VRC Protx will not, however take on the onus of the eventual outcome of the customers' process when doing their Management of Change. It is impractical and ill-advised to try to tailor a Management of Change policy that will encompass all of the possible scenarios that VRC Protx could encounter in the dealings with our customers. Our policy ensures that our customer's requirements when pertaining to Management of Change issues will be decided by our customer's authorized representative.

Policy

VRC Protx has as its policy to conform with, and follow the Emergency Response / Evacuation plans / systems that are implemented as part of our customer's Safety Orientation, Contractor Orientation and Site Specific training we are given when our employees are performing work and/or visiting on the customer site. Due to the complex nature of the varied terrain, processes and environments it is impractical for VRC Protx to create such a plan that would be "all inclusive" and applicable to all situations.

HAZARDOUS COMMUNICATIONS

HazCom Program

The purpose of this program is to inform interested persons, including employees, that VRC Protx, LLC is complying with the OSHA Hazard Communication Standard, Title 29 Code of Federal Regulations 1910.1200, by compiling a hazardous chemicals list, using safety data sheets (SDSs), ensuring that containers are labeled or provided other forms of warning, and training our employees. This written program, along with an inventory of hazardous materials and material safety data sheets will be available from the VRC Protx office for review by employees, their representatives, OSHA, and contractors, or employees of contractors, at multi-employer job sites doing work in and around our work area.

This program applies to all work operations in our company where employees may be exposed to hazardous chemicals under normal working conditions or during an emergency situation. Under this program, our employees will be informed of the contents of the Hazard Communication Standard, the hazards of chemicals with which they work, safe handling procedures, and measures to take to protect themselves from these chemicals, among other training elements.

Darren H. Cameron Director of Safety and Technical Services, the Hazard Communication Program Coordinator, has overall responsibility for the program, including to review and update the program, as necessary. Copies of this written program may be obtained from Operations Manager or Area supervisor who keeps the program in a location that is accessible to each employee at all times. Moreover, all employees, or their designated representatives, may obtain further information about this written program, the Hazard Communication Standard, applicable SDSs, and our chemical list from Darren H. Cameron Director of Safety and Technical Services.

Finally, if after reading this program, you find that improvements can be made, please contact Darren H. Cameron Director of Safety and Technical Services. We encourage all suggestions because we are committed to the success of our written Hazard Communication Program. We strive for clear understanding, safe behavior, and involvement in the program from every level of the company.

List of Hazardous Chemicals

Our “chemical inventory” is a list of product identifiers of hazardous chemicals known to be present at our workplace. Anyone who comes in contact with the hazardous chemicals on the list needs to know what those chemicals are and how to protect themselves. That is why it is so important that hazardous chemicals are identified, whether they are found in a container or generated in work operations (for example, welding fumes, dusts and exhaust fumes). The hazardous chemicals on the chemical inventory can cover a variety of physical forms including liquids, solids, gases, vapors, fumes, and mists. Sometimes hazardous chemicals can be identified using purchase orders. Identification of other chemicals may require an actual survey of the workplace.

Operation Manager or Area Manager updates the hazardous chemical inventory as necessary. This will be accomplished by keeping a log of all chemicals used at the location and when a new chemical is introduced it will be added to the chemical inventory and listed on the log with the date it was introduced with the initials of the person that updated the log. Then the SDS sheet will be added to the SDS book.

The chemical inventory is attached to this written Hazard Communication Program. However, the Program Coordinator also keeps a copy of the chemical inventory list located on the main office bulletin Board where it is accessible during work hours. The chemical inventory serves as a list of every hazardous chemical for which an SDS must be maintained.

HAZARDOUS COMMUNICATIONS

Safety Data Sheets (SDSs)

SDSs are basically fact sheets for chemicals that pose a physical or health hazard in the workplace. These sheets provide our employees with specific information on the chemicals in their work areas.

Operations manager or Area manager is responsible for obtaining and maintaining the SDSs at our workplace and will contact the chemical manufacturer or vendor if additional research is necessary. All new procurements for the company must be cleared by Darren H. Cameron Director of Safety and Technical Services.

SDSs are kept readily accessible to all employees during each work shift at the following location(s): There will be an SDS station located at each facility in an easily accessible location. Employees may obtain access to them by: locating the SDS book at the SDS station.

The procedure followed if the SDS is not received with the first shipment is as follows: The Operations Manager or Area Manager will contact the chemical manufacture or their representative and request the current SDS sheet.

Labels and Other Forms of Warning

Hazardous chemical containers at the workplace must be clearly labeled, tagged, or marked in accordance with the Hazard Communication Standard, either with:

- The product identifier, signal word, hazard statement(s), pictogram(s), and precautionary statement(s); or
- The product identifier and words, pictures, symbols, or combination thereof, which provide at least “general” information regarding the hazards of the chemicals, and which, in conjunction with the other information immediately available to employees under the Hazard Communication Program, will provide employees with the “specific” information regarding the physical and health hazards of the hazardous chemical.

While not required for in-house labeling, the name and address of the manufacturer, importer, or other responsible party may also be found on the label, tag, or marking. Hazards not otherwise classified do not have to be addressed on a container. All Labels for all hazardous materials shall be checked annually to ensure that their labels and other forms of hazardous warnings are up to date and not defaced or removed.

Because the product identifier is found on the label, the SDS, and our chemical inventory, the product identifier links these three sources of information, permitting cross-referencing. The product identifier used by the supplier may be a common or trade name, a chemical name, or a number. Employees should be aware that label information can be verified by referring to the corresponding SDS.

The Operations Manage or Area manager is responsible for ensuring that all hazardous chemicals in containers at the workplace have proper labels or other forms of warning that are legible, in English (although other languages may also be included), and displayed clearly on the container or readily available in the work area throughout each work shift, as required. This person will update labels, as necessary. The Operations Manager or Area Manager also ensures that newly purchased chemicals are checked for labels when containers are received.

If employees transfer chemicals from a labeled container to a portable, secondary container that is intended only for their IMMEDIATE use, no labels, tags, or markings are required on the portable

container. Otherwise portable containers must be labeled, tagged, or marked in accordance with our in-house labeling system for workplace containers.

The in-house labeling system we use for workplace container labeling is: Limited, we do not use very many chemicals to perform our work scope. The chemicals we use are packaged and labeled by the manufacture or supplier. We rely on the supplier of the few chemicals used by VRC Protx to properly label the chemical containers.

Finally, the following procedures are used to review and update label information when necessary, to ensure that labels that fall off or become unreadable are immediately replaced: If a Label is missing or not legible the container will be disposed of in an acceptable manor. It will not be used by VRC Protx for any purpose.

Training

Everyone who works with or is potentially "exposed" to hazardous chemicals on the job will receive initial training on the Hazard Communication Standard and the safe use of those hazardous chemicals before starting work. "Exposure" means that "an employee is subjected in the course of employment to a chemical that is a physical or health hazard, and includes potential (e.g., accidental or possible) exposure." Whenever a new chemical hazard is introduced or an old hazard changes, additional training is provided. All training is conducted by Darren Cameron Director of Safety and Technical Services or his designee.

Effective information and training is a critical part of the Hazard Communication Program. We train our employees to read and understand the information on labels and SDSs, determine how the information can be obtained and used in their own work areas, and understand the risks of exposure to the chemicals in their work areas, as well as ways to protect themselves. Our goal is to ensure employees know that they are exposed to hazardous chemicals, have the skills to read and use labels and SDSs, and understand how to appropriately follow the protective measures we have established. We urge our employees to ask Darren Cameron Director of Safety and Technical Services questions for greater comprehension.

As part of the assessment of the training program, Darren Cameron Director of Safety and Technical Services asks for input from employees regarding the training they have received and their suggestions for improving it. In this way, we hope to reduce any incidence of chemical-related illness or injury.

Training Content

Training will be organized and provided by Darren Cameron Director of Safety and Technical Services or his designee. The format of the training program used is provided in a classroom setting done in person or via a webinar. VRC Protx will utilize all elements provided with the J.J. Keller & associates "HazCom What You Need To Know" training videos, power point presentation and all other tools provided. The training program emphasizes these elements:

- Summary of the Hazard Communication Standard.
- What hazardous chemicals are present in operations in employee work areas.
- Chemical and physical properties of hazardous chemicals (e.g., flash point, reactivity, etc.) and how to detect the presence or release of these chemicals (including chemicals in unlabeled pipes).
- Physical hazards of chemicals (e.g., potential for fire, explosion, etc.)

HAZARDOUS COMMUNICATIONS

- Health hazards, including signs and symptoms of overexposure, associated with exposure to chemicals and any medical condition known to be aggravated by exposure to them.
- Any simple asphyxiation, combustible dust, and pyrophoric hazards, as well as hazards not otherwise classified, of chemicals in work areas.
- Any steps the company has taken to reduce or prevent exposure to hazardous chemicals, such as engineering controls.
- Procedures to protect against hazards and exposure (e.g., work practices or methods to assure proper use and handling of chemicals and any required personal protective equipment and its proper use and maintenance).
- Procedures for reporting and responding to chemical emergencies.
- How to read and use both the workplace labeling system and labels received on shipped containers.
- The order of information found on SDSs and how to read the information and what it means.
- How to access SDSs and the written Hazard Communication Program, including the chemical inventory.

The procedure to train new employees at the time of their initial assignment is the same method as described above. We train employees when a new hazard is introduced by is the same method as described above.

Training logs are signed by employees upon completion of their training and are kept by Darren Cameron Director of Safety and technical Services.

Hazards of Unlabeled Pipes

Work activities are sometimes performed by employees in areas where hazardous chemicals are transferred through unlabeled pipes. We inform employees of the hazards of chemicals contained in unlabeled pipes in their work areas by: Since this might only happen when we are working at a customer location, we rely on our customer's site specific training to make our employees aware of these potential hazards.

Moreover, it is the responsibility of Operations Manager, Area Manager or QC Foreman to obtain from each contractor or other employer the appropriate hazard information on chemicals they bring onsite, including SDSs, the labeling system used, and the precautionary measures to be taken in working with or near these chemicals.

Contractor Hazards

All contractors with employees performing tasks shall receive information as to the hazardous chemicals which their employees may be exposed to during the performance of their duties. This information shall be made available to the contractor during the orientation session required for each contractor, visitor and other outside personnel.

It is the responsibility of any contractor performing work to provide for the safety of their own employees and the safety of any contracting company employees that may be affected by the work being performed. This includes providing information (SDS) concerning any hazardous chemicals the contractor may bring with them on-site, proper identification and labeling of all hazardous chemicals and proper use and disposal of all hazardous chemicals.

HAZARDOUS COMMUNICATIONS

Methods of Informing Employees of Hazards Involved with Non-Routine Tasks

A non-routine task is defined as one which is performed less frequently than twice per year or one involving cleaning of or entry into vessels (see section on Confined Space Entry)

All training must be documented on the appropriate form. The training shall consist of a review of all SDSs and specific information on the physical and health hazards involved with the task. Employees shall be informed of the hazards dealing with the non-routine task in any of the following methods

- Supervisor/work crew orientation sessions
- Tailgate meetings with contractors, employees and supervisors
- One on one supervisor/employee training sessions
- Safe Work Permit

Additional Information

As stated earlier, all employees, or their designated representatives, may obtain further information on this written program, the Hazard Communication Standard, applicable SDSs, and the chemical inventory from Darren Cameron Director of Safety and Technical Services, Operations Manager or Area Manager.

Appendix

We have attached to this written program our chemical inventory and other information to ensure better understanding of our program.

INCIDENT REPORTING AND INVESTIGATION

Purpose

To establish standards for reporting and investigating incidents at facilities that VRC Protx may perform work, when these incidents result in personal injuries, property damage, or release of hazardous materials or when these incidents involve unsafe acts or near incidents.

Responsibility

VRC Protx is responsible for:

- Filling out incident report forms if VRC Protx is involved with the incident
- Ensuring that employees follow these procedures after an incident
- Implementing all actions identified by an incident investigation
- Seeing that all injuries receive proper treatment, with examination by a physician if there is any question as to the seriousness of the injury
- Maintaining a working injury/illness log
- Notifying the supervisor of the contracting employer whenever an incident or near-miss occurs

All employees are responsible for:

- Notifying their supervisor immediately following an incident
- Notifying their supervisor of all safety hazards so that corrective action can be taken before an incident occurs
- Assisting with incident investigations when requested by their supervisor

General

In the event of an incident, appropriate action shall be taken to protect people first and then property.

OSHA 300 Logs

The Occupational Safety and Health Administration requires that all companies maintain a Bureau of Labor Statistics Log and Summary of Occupational Injuries and Illnesses (OSHA 300). **There is an exemption from maintaining the OSHA 300 log if the company has less than 10 employees.** This form is to be maintained as a permanent record for VRC Protx.

- Since the OSHA 300 form is a legal record of recordable injuries at a site, care must be taken to comply with the requirements which are shown in the attached information from OSHA.

INCIDENT REPORTING AND INVESTIGATION

Definitions

Accident - an incident which results in personal injury, illness or death.
Catastrophic Release - a major uncontrolled emission, fire or explosion, involving one or more highly hazardous chemicals, that presents serious danger to employees in the workplace.
Illness - occupational induced acute or chronic diseases that may be caused by inhalation, absorption, ingestion or direct contact.
Incident - An unplanned event that interrupts the completion of a planned activity and may include injury and/or property damage.
Injury - any occupational injury such as a burn, cut, fracture, sprain, amputation, animal bite, or one time exposures to chemicals.
Loss - a disruption of normal efficiency, loss of production or physical damage to property.
Lost Workdays - either Days Away from Work or Days of Restricted Work Activity

- Days Away from Work is any time an individual is unable to report to work on a given day due to an occupational accident or illness.
- Days of Restricted Work is any time an individual is unable to perform all duties which are normally assigned due to an occupational injury or illness and is then assigned to temporary duty or part time duty at his regular job.

Medical Treatment - includes treatment (other than First Aid) administered by a physician or registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid (one time treatment and subsequent observation of minor scratches, cuts, burns, splinters and so forth which do not ordinarily require medical care) even if the treatment was provided by a physician or registered professional.
Near Incident - an event where no damage or injury occurred, but there was a high probability for severe injury or damage.
OSHA 300 Log (Working Log) - the log kept at each manned facility where all recordable and potentially recordable incidents are recorded.
OSHA 300 Log (Summary) - the log generated by safety that shall be posted at each manned facility no later than February 1 and kept posted until April 30 of each year.
OSHA Reportable - any occupational accident or illness which requires medical treatment. First Aid cases are not OSHA recordable.

INCIDENT REPORTING AND INVESTIGATION

INCIDENT INVESTIGATION

Introduction

In order to learn from past incidents and prevent future incidents, all incidents will be investigated. All incidents should be investigated by the personnel at the location where the incident occurred. If COPMANY had any involvement in the incident, VRC Protx employee(s) should assist with the investigation.

Incident Investigation Steps

Each of the items required to be covered is listed below:

INITIAL RESPONSE - After notice has been received about an incident, confirm whether a formal investigation is necessary. If a formal investigation is necessary, ***the timing will be an immediate response for a fatality or incident where 3 or more employees are hospitalized***.

DETERMINING THE FACTS - Using standard investigation techniques (such as interviews, review of site, review of operating logs, past incident review, etc.), a full investigation into the facts surrounding the incident will be performed.

DETERMINING THE CAUSE - Based on the facts discovered, the root cause(s) of the incident will be determined.

WRITTEN REPORT - The written report will be issued as soon as possible.

RECOMMENDATIONS AND FOLLOW-UP - After everything is complete, a final report shall be written.

JSA HAZARD RECOGNITION AND AWARENESS

Purpose

VRC Protx utilizes a JSA (Job Safety Analysis) format to recognize and manage hazardous conditions, behaviors and, as much as possible, reduce the likelihood of an incident to zero. Hazards are to be identified and mitigated in a timely manner to facilitate the efficient flow of work to provide full value while creating and maintaining a safe environment. NOBODY GETS HURT!

Responsibility

VRC Protx expects all employees and subcontractors must actively participate in the JSA hazard identification program.

Utilization

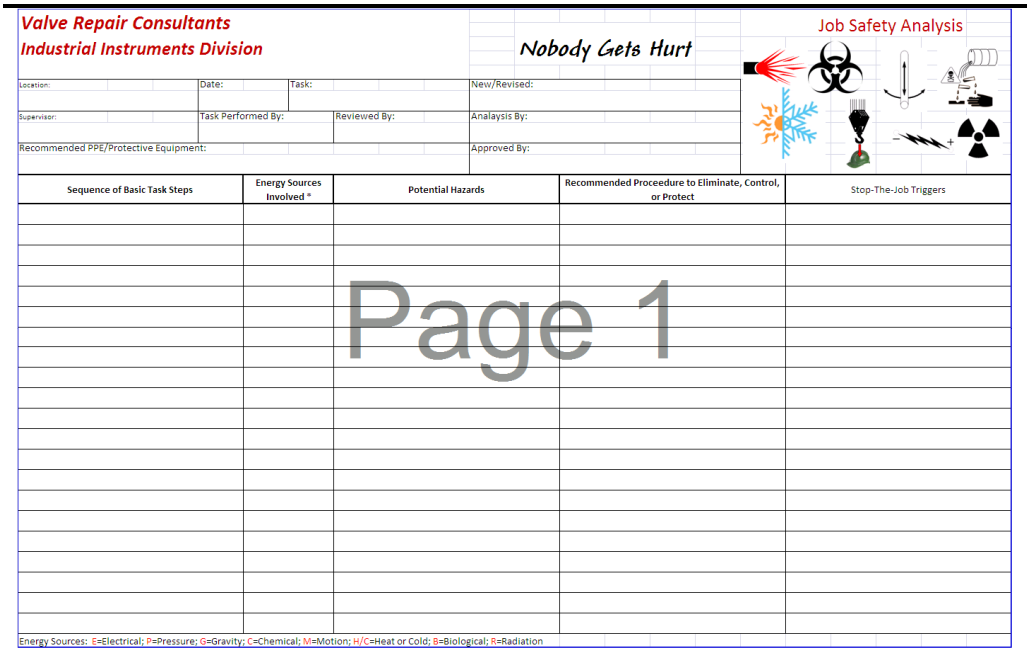
VRC Protx expects the JSA program to be used on a daily basis. When starting the day in the work shop in addition to the daily toolbox meetings, when on a customer site performing tasks that put people and/or equipment at risk, and take the safety awareness culture home to be an influence in day to day life.

- JSA is not a one-time event, but rather a proactive part of a continuous improvement process focused on improving safety and health in the workplace
- JSA is not something extra to do. It should be an inherent part of improving every task that is performed in an organization.
- JSA is not a punishment for wrongdoing. It is a tool for improvement.
- The desired outcome for a JSA is a safer and healthier workplace.

Hazard Identification and Classification

VRC Protx uses the following format to identify then rank and/or classify hazards.

JSA HAZARD RECOGNITION AND AWARENESS



Valve Repair Consultants
Industrial Instruments Division

Nobody Gets Hurt

Job Safety Analysis

Location:	Date:	Task:	New/Revised:
Supervisor:	Task Performed By:	Reviewed By:	Analysis By:
Recommended PPE/Protective Equipment:			Approved By:

Sequence of Basic Task Steps	Energy Sources Involved *	Potential Hazards	Recommended Proceedure to Eliminate, Control, or Protect	Stop-The-Job Triggers

Page 1

Energy Sources: E=Electrical; P=Pressure; G=Gravity; C=Chemical; M=Motion; H/C=Heat or Cold; B=Biological; R=Radiation

Definitions

Occupational Safety and Health

Occupational Safety and Health efforts involve the control and elimination of recognized workplace hazards to attain and acceptable level of risk and promote the wellness of workers. Optimal Occupational Safety and Health results from a continuous proactive process of anticipating, identifying, designing, implementing and evaluating risk-reduction practices.

Incident

An unplanned event that results in personal injury, damage to property, equipment, or the environment; or an event that has the potential to result in such consequences. Within this context, incident includes all occurrences, regardless of degree, with the purpose of focusing safety and health control strategies on the elements of causation.

Hazard

An existing or potential condition in the workplace that, by itself or by interacting with other variables, can result in deaths, injuries, property damage, and other losses. Hazards include unsafe conditions and/or unsafe practices. Hazards have the potential to damage people, property, or the environment. Hazards include the characteristics of things and the actions or inactions of people.

Risk

A measure of the probability and severity of adverse effects.

JSA HAZARD RECOGNITION AND AWARENESS

Risk Assessment

The ranking of risks according to three criteria: consequence, probability, and exposure.

Job Safety Analysis

A method for studying a task to:

- Identify hazards and potential injuries associated with each step.
- Develop solutions that will eliminate, minimize, and prevent hazards.
-

Energy Sources:

E=Electrical
P=Pressure
G=Gravity
C=Chemical
M=Motion
H/C=Heat or Cold
B=Biological
R=Radiation

Four Key Components of JSA

1. Determine which task to analyze.
2. Break the task into steps.
3. Identify the hazards.
4. Identify solutions and controls.

Benefits of JSA

Can be used to set performance standards

- The recommendations from JSA's can be built into the job description as performance standards. Improving the safety factor of each small item – guards on machines, safe and healthful work practices when operating equipment – can make the entire workplace safer and healthier.

Can be used to facilitate training

- JSA's can be used in a variety of training situations:
  - Providing training in safe and efficient procedures
  - Instructing new employees on the job
  - Giving pre-job instructions for non routine work.
  - Providing refresher training for current employees.

Can be used to conduct Job Safety Observation (JSO)

- JSA is a valuable tool for supervisors when they conduct their job safety observations. The JSA provides a checklist of measurable guidelines.

JSA HAZARD RECOGNITION AND AWARENESS

Minimizes incidents

- The very purpose of the JSA is to reduce incidents by analyzing the hazards associated with the tasks, then controlling or eliminating those hazards.

Makes employees safety conscious

- When employees analyze how they perform tasks with an eye for safety and health, they will adjust their behavior and become more safety conscious.

Can be used to conduct incident investigations

- Whenever an incident occurs on a task covered by a JSA, use the JSA to help assess why it occurred. Based on the results, determine whether the JSA needs to be revised.

Integrates safety into quality and production functions

- JSA provides an excellent starting point for questioning the established way of doing a task and for making improvements. The results help improve safety and health, reduce costs, reduce incidents, and often increase production and quality.

Improves profits

- Activities that help the bottom line are the most likely to be approved and endorsed by top management.

Key requirements for successful JSA

For any safety and health effort to work – including JSA – it has to be a part of an outstanding safety and health system. There are four key requirements for an excellent safety and health system.

Management commitment and involvement

- This is the single most important requirement.
- If leaders aren't personally and genuinely committed to JSA, then no one else will be either.

Employee involvement

- Employees must be involved in proactively identifying hazards in their work area.
- To be involved they need the appropriate tools:
  - Training
  - Time
  - Resources
  - Rewards for doing the job well
  - Consequences for not doing the job.

Measurement system

- You have to know whether or not the system is working and you find out by measuring your efforts.
- If you are not measuring improvement (or lack of improvement) in key operational areas, you can't know if JSA is working.

Continuous improvement

- All safety and health efforts, including JSA, are more than one-time events. They are ongoing efforts to address safety and health needs.

JSA HAZARD RECOGNITION AND AWARENESS

- It is not enough to simply respond to crises.
- Continuous improvement provides proactive methods for identifying, controlling, and eliminating hazards. JSA is one of those methods.

Implementing JSA in your organization

There are six steps to implementing JSA.

1. Get management committed and involved
2. Set goals and expectations.
3. Get employees involved in the effort.
4. Provide training and education relating to JSA.
5. Integrate JSA into all of the operational areas of the organization.
6. Measure your results.

JSA HAZARD RECOGNITION AND AWARENESS

Management policy statement	Management will author a document spelling out their intention to endorse safety and health practices. • This statement will be written in coercion with the employees and signed by management. • This policy shall be reviewed annually by management and revised as needed. This policy should be signed by the entire management staff. • This policy statement should include: o Management's philosophy towards safety and health o Management's intent to support safety and health initiatives o Management's commitments to make safety and health the highest priorities. • Once the policy has been written and signed it needs to be communicated. The written policy should be clearly visible in all of the following areas: o Lobby of the facility o On the cover of training materials o On all bulletin boards o In the lunch and break rooms o In the training rooms o On the front page of all health and safety material o In the employee handbook o In the human resources new employee orientation
Training	Who should be trained in what?
Senior Management	Training in strategic issues, overall corporate procedure and the written plan
Middle Management	Policy, procedure and how to perform performance reviews.
Supervisors	Policy, procedure and how to perform performance reviews. Be a conduit for communication from employees to upper levels of management.
Employee	Policy and more detailed training on the identification of the hazards, familiarization with the processes and with how our customers expect them to behave and perform their assigned tasks.
Everyone	Everyone needs to become familiar with the JSA form, its sections, and what they mean so that the system can work. Detailed training on the forms and

what it all means must be provided formally on an annual basis, and as often as a reminder will help people remember. If people do not understand the why, the how becomes academic.

Process of Review

Measure your results.
No JSA effort would be successful without measurement. When you measure, you learn if the JSA process is working. Ask the following questions to get a good start on the review process and create more questions as the situation, condition and location change:

1. Are people in your organization preparing their JSA's? (This includes all employees and contractors associated with VRC Protx.)
2. Are people doing their JSA's correctly?
3. Are people filling out their JSA's completely?
4. Is the content of their JSA's high quality? Does the content contain suggestions and recommendations that, when implemented, will make the job safer and healthier?
5. Do people believe in the JSA process or do they just see it as an exercise in paperwork?

SAFETY MEETINGS

Purpose

It is required of all employees that they attend scheduled safety meetings to promote safety awareness.

Responsibility

VRC Protx is responsible for holding the meetings as required by this manual and ensuring that all personnel attend these meetings on a quarterly basis. Note that job-specific safety meetings will be held prior to each job with the contracting employer.

Procedure

There should be at least one safety meeting per quarter. Tool box safety meetings should be held as required.

The safety meetings are documented. The format of the safety meeting is flexible according to the needs of the facility. However, the following topics should be covered in each safety meeting:

- Sign-in.
- Discussion of accidents, near incidents and incidents at the facility.
- Open discussion for any safety questions, problems or other issues.
- Scheduled topic.
- Discussion of following quarter topic.

Please note that safety issues or questions should be brought up as they occur - do not wait for a safety meeting to bring these issues up.

Required Safety Meeting Topics

Certain topics are mandatory for all employees on an annual basis.

- Respiratory Protection
- Hazard Communication Program
- Emergency Response Training
- Fire Equipment Training
- Safe Work Permits (hot work, confined space entry and excavation)

One Person Companies

If the contractor is a one person company, the safety meeting will consist of a review of a topic in the safety manual or other safety topic. Documentation of this safety review will be maintained.

DRIVING SAFETY

Purpose

Employees driving Company-owned or leased vehicles must be properly trained and aware of their safety responsibilities. Drivers must practice defensive driving techniques at all times. Properly maintained vehicles are another integral part of safe driving practices.

Responsibility

VRC Protx is responsible for ensuring that vehicles are properly maintained, that all drivers are properly licensed and that all drivers operate their vehicles in compliance with all laws and regulations.

Regulations

All drivers must have a valid drivers license in their State of residence, and valid for the class of commercial vehicle which they drive. Drivers shall follow all local, state and federal laws, including DOT Hazardous Materials regulations. VRC Protx employees must report all citations for traffic violations received while operating a company vehicle to their supervisor immediately.

All drivers must also follow posted speed limits within facilities or maintain a safe speed if a speed limit is not posted.

General Vehicle Safety Tips

- Secure all materials, tools and equipment against movement when they are stored in the same compartment as workers or erect barriers (such as headache racks) to isolate workers from stored items
- Only use a cellular telephone while driving in areas where the traffic conditions allow safe use of the phone. Note that there are some states where the use of a standard cellular phone is illegal. Use a hands free or speakerphone if possible.
- Vehicles should be equipped with a proper fire extinguisher
- Ensure seat belts are in use at all times

LOCKOUT / TAGOUT

Purpose

To prevent accidental injuries due to an uncontrolled release of hazardous energy or materials by establishing minimum requirements for the lockout or tagout of equipment.

Responsibility

VRC Protx is responsible for ensuring that:

- An effective lockout/tagout procedure is implemented
- Employees are provided with the necessary materials and training to comply with the requirements
- Retraining is required when there is a change in job assignments, in machines, a change in the energy control procedures, or a new hazard is introduced. All training and/or retraining must be documented, signed & certified.
- Lockout and Tagout devices include name of individual placing device.
- Periodic inspection is to be conducted & documented at least annually to ensure procedures & requirements are being followed.
- All new, repaired or modified equipment shall be designed to accept a lockout device.
- VRC Protx employees work with the contracting employer to ensure that lockout/tagout is effective.
- Safety testing machines can be used when the LOTO devices must be temporarily removed.
- An authorized employee must have primary responsibility for the employees on the job working under the protection of a group Lockout or Tagout device.

Each employee is responsible for:

- Understanding and applying lockout/tagout procedures in order to protect themselves and other employees.
- Understanding there is a possibility of stored energy and the possibility of re-accumulation of that energy.

LOCKOUT / TAGOUT

Definitions

Affected Employee - An employee or contractor that works in the area or on the equipment being locked or tagged out. Training involves why lockout/tagout is important and why they must not remove tags.

Authorized Employee - An employee trained in the recognition of energy sources and the proper methods of isolation, control and release of the energy and is therefore authorized to place a lockout or tagout device on equipment.

Energy Isolating Device - A mechanical device that physically prevents the transmission or release of energy. Examples include:

- Manually operated electrical circuit breaker
- Disconnect switch
- Line valve
- Blind

Individual Lock - A lock issued to an individual. These locks are to be used only for lockout purposes. If a key is lost, replace the lock, not the key.

Definitions (cont.)

Lockout - locking or blinding and tagging equipment in such a way that it cannot be energized without the lock being removed

Lockout Device - a device that uses a positive means (such as a lock) to hold an energy isolating device (such as a valve or switch) in the safe position and prevent the energizing of the equipment.

Tagout - the placement of a tagout device on an energy isolating device to indicate that the energy isolating device and the equipment being controlled may not be operated until the tag is removed.

Tagout Device - a unique and standardized warning device capable of being attached to energizing points on equipment. The tags must be durable, standardized, easily identifiable and attached to the equipment with non-reusable devices. Tags must contain who placed the lock/tag, when the lock/tag was put on and what system the lock/tag is protecting.

Zero Energy State - a state in which a logged and tagged machine or piece of equipment possesses no unrestrained stored energy of any type. Items such as capacitors and springs can retain energy even with no outside power sources.

LOCKOUT / TAGOUT

Lockout Examples

There are many different types of energy covered under this standard, including hydraulic, electrical, mechanical, pneumatic, gravity, chemical or thermal. Examples of lockout methods are shown below:

- Electrical and electromagnetic lockout - Disconnect the conductors of a circuit from the source of electrical current by:
  - Opening a disconnect switch, removing a fuse and/or effectively parting terminals and then attaching lock and tag.
  - Bleeding off all residual electrical and electromagnetic charges.
- Hydraulics, air, gas or steam lockout -
  - Close supply valve and blind the supply line when possible
  - Lock the valve closed and tag the valve
  - Bleed the line or lines and disconnect
- Mechanical energy - block or chain any objects that can be affected by the source of gravity or another source of mechanical energy
- Stored energy - relieve or restrain energy stored in spring, then lock and tag as appropriate
- Thermal, chemical, other - Always isolate, lock and tag, dissipate and restrain as appropriate.

Lockout/Tagout Sequence

Lockout/tagout procedures must be followed during the repair or servicing of equipment that may be energized. In general, lockout/tagout procedures include:

- Isolating and/or disconnecting energy sources with lockout/tagout devices
- Lockout/tagout devices shall be installed in a manner that will hold the energy isolating devices in a safe or off position and clearly indicate the operation or movement of the device.
- Where Tagout devices are used with energy isolating devices designed with the capability of being locked, the tag attachment shall be fastened at the same point at which the lock would have been attached.
- Where a tag cannot be affixed directly to the energy isolating device, the tag 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.
- Verifying isolation
- Repairing/servicing isolated equipment
- Removing locks and tags
- Returning to normal service

LOCKOUT / TAGOUT

Step	This table describes the lockout/tagout sequence
1	Locate and identify all switches, valves or other energy isolating devices that apply to the equipment to be locked and tagged out. More than one energy source may be involved. This identification should be done as part of the work order system.
2	Notify all affected employees (at least verbally) that a lockout/tagout system is going to be used. Explain the circumstances.
3	If the equipment is operating, shut it down with normal stopping procedures (i.e., press stop button, close valve, etc.)
4	If applicable, open the electrical disconnect switch(es), etc. so that all electrical energy sources are disconnected /isolated from equipment.
5	Blind valves or other isolating devices so energy sources (mechanical, hydraulic, etc.) are disconnected or isolated from equipment. Note - double block and bleed valves are suitable in place of blinds.
6	Authorized employees involved in the repair or maintenance operation must place a lock and tag on each energy isolating device.
7	Dissipate or restrain stored energy, such as in capacitors, flywheels, springs, hydraulics, air, gas, steam, water, gravity, etc.

Verification of Isolation

To ensure that equipment will not operate and to verify that energy sources are disconnected, operate the push button or other normal operating controls. Note: always return the operating controls to a "neutral" or "off" position after performing this test. Never leave a "command" which will lead to an unexpected or undesired operation of the equipment as soon as power is restored.

Removing Locks and Tags

The following table describes the procedures for removing locks/tags:

Step	Action
1	After servicing and/or maintenance is complete and the equipment is ready for normal operations, check area around equipment to ensure that no one is exposed.
2	Notify all affected employees of the intent to remove locks/tags.

3	After all tools have been removed from the equipment, guards have been reinstalled, employees are clear, and the controls are in neutral, each person removes their lock and tag. It is a serious violation of safety for any person to remove another person's lock and/or tag.

Equipment That Cannot be "Physically" Locked Out

Due to age and/or design, it is not possible to "physically" lock out some equipment. However, make every effort to secure a device to the system, machine or equipment so it can be physically locked out.

If it is not possible to physically lock out equipment:

- Perform alternate means, such as physically disconnecting and tagging drive chains, shafts, motors, electrical leads or switches, piping, etc.
- Clearly tag each piece of equipment to confirm that it has been disassembled to isolate the energy source.

Ensure that all repaired, modified or replaced pieces of equipment or machines are designed to accept a lock.

Lockouts must be used wherever possible, since tags do not provide the security of a lock. Tags alone are acceptable only if there is no way to lock out the equipment

CONFINED SPACE ENTRY

Purpose

To provide for the safety of employees and contractors who must enter a confined space in order to perform a job task.

Responsibility

VRC Protx is responsible for ensuring that:

- The confined space entry program is implemented.
- Contractors working for VRC Protx have and use a confined space entry program at least equal to this program and provide the proper training and equipment for their employees.
- Proper training is provided for all employees prior to assigning them confined space entry duties.
- All required equipment is provided, properly maintained and used.
- Entry operations are reviewed and deficiencies are corrected when there is reason to believe the program does not protect employees.
- The confined space entry program is at least as stringent as the contracting company

Each employee is responsible for:

- Not entering a permit required confined space except as specified in this procedure.
- Performing the assigned duties and using the provided equipment in accordance with the training and the manufacturer's specifications.

Scope

This standard applies to all company employees, contract personnel and subcontractor employees who must enter a confined space as part of their job. This procedure requires employees to:

- Prevent unauthorized entry into a permit space.
- Identify and evaluate permit space hazards.
- Place appropriate warning signs on permit spaces.
- Implement procedures for ensuring the safe entry into permit spaces.
- Be trained in the requirements of confined space entry.

Definitions

Acceptable Entry Conditions - the conditions that must exist in a permit space to allow entry.

Attendant - an individual stationed outside one permit space who monitors the authorized entrants and performs all duties assigned to an attendant in this standard. The monitoring of several confined spaces during an emergency is NOT allowed.

Definitions (cont.)

Authorized Entrant - an employee who is authorized to enter a permit space.

Blanking or Blinding - the absolute closure of a pipe, line or duct by the fastening of a solid plate that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line or duct with no leakage beyond the plate.

Confined Space - a space that:

- Is large enough and so configured that an employee can bodily enter and perform assigned work;
- Has limited or restricted means for entry or exit (i.e. tanks, vessels, pits, storage bins, vaults); and
- Is not designed for continuous occupancy.

Double Block and Bleed - the closure of a line, duct or pipe by closing and locking/tagging two in-line valves and by opening and locking/tagging a drain or vent valve in the line between the two valves.

Emergency - any occurrence (including any failure of hazard control or monitoring equipment) or event external or internal to the permit space that could endanger the entrants.

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

Entry Permit - the printed document that allows and controls entry into a permit space. Requirements of this permit are detailed in the Permits section later in this procedure.

Entry Supervisor - the person responsible for determining that the acceptable entry conditions are present within a permit space, overseeing entry operations, and for terminating the entry as required by this procedure. The Entry Supervisor shall know the hazards that may be faced during entry, verify that rescue services are available and remain within the facility where entry is to be conducted.

Definitions (cont.)

Hazardous Atmosphere - an atmosphere that contains one or more of the following:

- Flammable gas, vapor or mist in excess of 10% of its lower explosive limit (LEL) or lower flammability limit (LFL).
- Airborne combustible dust at concentrations exceeding LFL (obscures vision at 5 feet)
- Atmospheric oxygen concentrations below 19.5% or above 23.5%
- Atmospheric concentrations of any substance for which a dose or permissive exposure limit (PEL) is exceeded
- Atmosphere that is immediately dangerous to life or health (IDLH)
- Naturally occurring radioactive material (NORM) at or above 50 microrem/hr.

Hot Work Permit - a written authorization to perform work capable of providing a source of ignition (see section on Hot Work in this manual).

IDLH - Immediately Dangerous to Life or Health - any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space. This space may be entered for Emergency Rescue only using the buddy system and proper equipment. To enter an IDLH atmosphere requires 4 people - the entrant, the entrant's partner and at least 2 stand-by people.

Isolation - the process by which a permit space is removed from service and completely protected from unwanted energy or material being released into the space.

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

Permit Required Confined Space - a space that meets the definition of a confined space and has at least one of the following characteristics:

- Contains or has the potential to contain a hazardous atmosphere;
- Has the potential for engulfing an entrant;
- Has a configuration (such as sloping sides or trays) that could trap or asphyxiate an entrant; or
- Contains any other recognized serious safety or health hazard.

Permit spaces can include, but are not limited to, storage and sump tanks, vessels, separators, pits, pipelines and cooling fans.

CONFINED SPACE ENTRY

Definitions (cont.)

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

Rescue Service - the personnel designated to rescue employees from permit spaces.

Retrieval System - A line or rope secured at one end to the worker and the other end secured to a retrieval device or anchor point outside the entry space portal, used for non-entry rescue of persons from permit spaces.

1. Evaluation, Classification and Posting

Each facility shall evaluate confined spaces within the workplace to determine if they are permit required confined spaces. Such evaluations should be made using the flow chart in Attachment A. All spaces classified as permit required confined spaces shall be posted with a sign. As an example, the sign could state the following:

DANGER
CONFINED SPACE
DO NOT ENTER WITHOUT PERMIT
AND AUTHORIZED ATTENDANT

If a space is determined to be a permit required confined space, a procedure identifying the space and outlining the acceptable entry conditions, isolation requirements, tests, ventilation requirements and equipment required for entry will be developed if one is not already available. Such procedures will be made available to all entry supervisors, attendants and entrants.

2. Permit Required Spaces with Hazardous Atmosphere Only

If the evaluation shows that the only hazard posed by a permit space is an actual or potential hazardous atmosphere, the space can be entered without following all of the permit conditions provided:

- The hazard can be eliminated by using forced air ventilation, continuous monitoring of the hazardous atmosphere and periodic inspections.

The following requirements must be met before entry can occur:

- Any conditions making it unsafe to remove an entrance cover must be eliminated before the cover is removed.
- Protection must be provided to prevent foreign objects or other workers from falling through the opening when the covers are removed.
- Internal atmospheric testing must be completed prior to any employee entering the space. Such tests shall be made using a direct reading monitor that has been properly calibrated for the following conditions and in the order shown
  - Oxygen content (between 19.5% and 23.5%)
  - Flammable gases and vapors (less than 10% LEL)
  - Potential toxic air contaminants (less than the PEL of the contaminant)
  - Testing must be done on a continuous basis to verify that these levels are not exceeded whenever any employees are inside the space. If testing shows acceptable levels are exceeded, all persons shall leave the space immediately and the space shall be evaluated to assure that a safe atmosphere exists prior to any further entry.
  - Continuous forced ventilation shall be used, as follows:
    - ✓ No person shall enter the space until the ventilation has eliminated the hazardous atmosphere.
    - ✓ The ventilation must be directed to the area where the work is or will be done and shall continue for the length of time persons are in the space.
    - ✓ The air supply for the forced ventilation shall be from a clean source and must not increase the hazards in the space.
- The evaluation and demonstration that such ventilation and continuous monitoring eliminates the hazard must be documented on the work permit by the entry supervisor before entry and made available to each person entering the space. Posting the documentation at the entry to the space can provide this notification. Such posted documentation does not eliminate the need for the confined space permit.

3. Reclassification of Confined Spaces

A space classified as a permit required confined space may be reclassified as a non-permit required confined space if:

- The space poses no actual or potential atmospheric hazards and if all hazards within the space may be eliminated without entry into the space for as long as the non-atmospheric hazards remain eliminated.

  If it is necessary to enter the space to eliminate the hazards, such entry shall be done in accordance with the confined space entry procedures. Then, after proper testing to assure that such hazards have been eliminated, the space may be reclassified. It is important to note that control of atmospheric hazards through the use of forced air ventilation does not constitute elimination of the hazards.

- The entry supervisor shall document all testing and isolation used to determine that the hazards have been eliminated. This documentation must contain the date, location of the space, the methods used to make the determination and the signature of the person making the determination. Such certification shall be posted at the entrance to the space and available to any employee entering the space.

- If conditions change within the space which has been reclassified, then each employee must exit the space and the space shall be re-evaluated to see if it can meet the criteria of a non-permit required confined space.

4. Procedures - Acceptable Entry Conditions

Procedures and practices shall include testing for specific acceptable entry conditions, such as

- Oxygen levels between 19.5% and 23.5%.
- Flammable gas or vapor level below 10% LEL.
- Toxic gas levels below the PEL for the specific toxin.
- Minimum/maximum temperatures within the space.

5. Procedures - Isolation and Purging

Procedures and practices shall include isolation and purging requirements as shown below:

- Where necessary, specific piping or valves must be blinded or removed. A sketch shall be produced showing requirements that need to be met for proper isolation.
- Utility supplies must be removed or blocked in to prevent unwanted materials or energy from entering the space.
- Specific equipment must be locked out to prevent unwanted energy from being released into the space (such as an engine or other reciprocating machinery).
- Materials used for cleaning, flushing, inerting or purging equipment such as steam or nitrogen must be followed by forced air ventilation.
- Barriers must be in place to prevent external hazards from affecting an entrant to the space.
- Testing requirements must be in place to verify that the isolation and purging was and remains effective in eliminating the hazards.

6. Procedures - Specific Equipment Required

Procedures and practices shall include specific equipment required for entry, such as:

- Testing and continuous monitoring equipment needed to determine if acceptable entry conditions exist.
- Forced air ventilation equipment needed to obtain acceptable entry conditions.
- Communications equipment necessary to allow the attendant and entrants to maintain communications to warn of dangerous situations or trigger an evacuation alarm.
- Personal protective equipment required to protect entrants such as breathing equipment, Tyvek suits, heat resistant suits and gloves, in the event that engineering and work practice controls cannot adequately protect employees.
- Lighting equipment needed to allow entrants to see well enough to work safely and exit the area in the event of an emergency.
- Barricades or shields necessary to protect the entrants from hazards outside of the work space.
- Ladders or other devices to enable entrants to exit the work space.
- Rescue equipment such as ropes, retrieval systems, full body harnesses, etc.

7. Procedures - Prior to Entry

The following procedures and practices shall be implemented prior to entry:

- The supervisor shall review all entry operations that may not provide enough protection for employees & revise the program prior to subsequent entries being authorized.
- The entry supervisor shall ensure that the physical and atmospheric hazards of the space to be entered are evaluated. The MSDS manual shall be used to determine hazards, appropriate PPE and PELs.
- Testing of the space and isolation of the space as discussed in the sections above.
- There must be persons designated to fill the following roles - authorized entrants, attendants, and entry supervisors. The duties and training of these personnel is discussed in the training section later in these procedures.
- Identify and implement procedures for summoning rescue and emergency services. In order to be effective, these rescue services will most likely have to be provided from in plant resources. Emergency services numbers such as ambulance or fire departments must be included as part of the procedure.
- If more than one employee is to enter the space at a time, such activities shall be discussed and coordinated prior to entry. Each entrant should be well informed as to the nature and scope of the other entrant's work.

8. Procedures - During Entry

The following procedures and practices shall be followed during entry:

- When the Entry Supervisor determines that acceptable entry conditions exist, the authorized entrant may then enter the permit space. The attendant shall verify that the conditions are acceptable throughout the duration of the entry.
- Continuous monitoring of conditions is required if the space cannot be effectively isolated or purged due to size or contents of the space. Continuous monitoring is recommended on all confined space entries.
- The attendant shall be stationed outside the permit space and remain in contact with the entrant at all times. Communications shall be through visual, voice or signal wire. The attendant may be assigned to more than one space providing the attendant is able to perform the duties required for each space.
- The entry supervisor shall oversee and terminate the entry operations when safe conditions cannot be maintained.

9. Procedures - After Entry

The following procedures and practices should be implemented after entry:

- The entry procedures should include the proper method of placing the space back into service following the entry operations. These would include the removal of blinds, opening of valves and purging of the space if required.
- All sections of the entry procedures should be reviewed for accuracy before and after each entry and at any time it is felt that the procedures may not be adequate to protect a person who may enter the space.
- The entry supervisor shall oversee and terminate the entry operations when the job is over.
- Program shall include procedures for protection of employees from external hazards including but not limited to pedestrians & vehicles.

10. Work Generated Hazards

- All welding and cutting operations carried on in permit spaces shall be adequately ventilated to prevent accumulation of toxic materials or possible oxygen deficiency.
- All cylinders containing oxygen, acetylene, etc. shall be removed from the work area when not in use and shall be connected outside the permit space.
- A welding power source used in a permit space shall be placed and secured outside of the space where work is being performed.
- All equipment, chemicals and potential hazards shall be removed from the permit space when not in use for an extended period of time.
- Adequate protection for fire protection shall be kept near the permit space area.
- Class I, Division I, Group D electrical equipment, explosion proof lighting and non-sparking tools shall be used in the permit space when appropriate.

11. Entry Permit

The VRC Protx Permit Required Confined Space Entry permit (at end of manual) shall be used as an entry permit, unless the contracting employer provides one. Permits are required any time there is an entry planned into a "permit required" confined space.

- The permit must be filled out by the entry supervisor, who has the power to issue and cancel the permit.
- The duration of the permit should not exceed the anticipated time for completion of the job tasks.
- A permit will be revoked or canceled when the job is completed or if the conditions within the space exceed the conditions of entry.
- Each permit shall be kept in the possession of the entry attendant. If the attendant is monitoring more than one entry simultaneously, a permit shall be stationed at each entry location.
- Each issued permit must be retained for three (3) years to allow for proper review and evaluation of the system.

12. Contents of the Entry Permit

The permit must include the following:

- The permit space to be entered.
- The purpose of entry.
- The date and authorized duration of the entry permit.
- The names of the authorized people who will enter the permit space.
- The name of the attendant.
- The name and signature of the entry supervisor.
- The hazards of the space which will be entered.
- The measures used to isolate, eliminate or control hazards prior to entry.
- The acceptable conditions for entry.
- The results of the initial and follow-up tests for these conditions and the initials of the person performing these tests.
- The rescue services which may be summoned and how they are to be summoned.
- The communication procedures which will be used.
- Personal protection, testing, communications and rescue equipment necessary for entry.
- Additional permits being issued such as hot work.
- Any other information which may be necessary for the protection of the entrants.
- Any problems that were encountered during the entry must be noted on the permit after completion of the job, so that appropriate changes in the entry procedures may be made.

13. Training

Training will be provided as follows:

WHO - Each employee whose work is affected by this standard must be trained such that they are knowledgeable of the requirements of this standard and skilled in the tasks required for the safe performance of the duties that they may be assigned.

WHEN - This training will be provided to each affected employee prior to being assigned the duties or whenever there is doubt that the previous training was adequate for the hazards which may be present within the space.

WHAT - The training must establish the proficiency of the duties which will be expected of the person. Such training and proficiency testing must be documented. Documentation shall include the employee's name, signature of the trainer and the dates of the training. Such documentation shall be available to the employees upon request.

14. Duties of Authorized Entrants

Each person authorized to be an entrant shall:

- Know the hazards that may be faced during entry, including the methods, signs, symptoms and consequences of exposure to any toxic materials.
- Know how to properly use all personal protective, testing or monitoring, and communication equipment that may be used during the entry.
- Communicate with the attendant to alert them of changes in status or conditions that may affect the entry status.
- Alert the attendant if they suspect there is an increase in the hazards within the space.
- Exit the confined space if ordered to do so by the attendant or entry supervisor, or if hazardous conditions are encountered, or if an evacuation alarm is activated.

15. Duties of Attendants

Each person authorized to be an attendant shall:

- Know the hazards that may be faced during entry, including the methods, signs, symptoms and consequences of exposure to any toxic materials.
- Know the affects of exposure to the possible chemicals, including behavioral changes.
- Maintain an accurate count and identity of persons in the space.
- Be properly trained and equipped for rescue operations.
- Remain outside the space during entry operations until properly relieved. If rescue is necessary, the attendant should not attempt entry into the space until another attendant is on site.
- Communicate with the entrants as necessary to alert them of changes in conditions within the space.
- Monitor the activities both inside and outside of the space to assure it is safe for the entrants to remain in the space.
- Order the evacuation of the space if:
  - A prohibited condition is detected.
  - A change in the behavior of the entrants indicates possible exposure to a hazard.
  - A situation outside the space represents a hazard to the entrants.
  - Attendant can't perform assigned duties or must leave the area.
- Summon rescue or emergency services if required
- Not allow unauthorized persons to enter the space.
- Perform other tasks as outlined by the entry procedure, providing they don't interfere with the primary duty of protecting the entrants.

16. Duties of Entry Supervisors

Each person authorized to be an entry supervisor shall:

- Know the hazards that may be faced during entry, including methods, signs, symptoms and consequences of exposure to any toxic materials.
- Should be responsible to coordinate operations if multi employers are working in the same confined space.
- Verify before signing the permit or allowing entry that:
  - The proper information is on the entry permit.
  - All tests specified by the procedures have been conducted and the results are documented.
  - All necessary PPE is in place and in proper working condition.
- Terminate the entry and cancel the permit if the work is completed or hazards arise that endanger the entrants.
- Restrict entry to the space to those authorized.
- Authorize persons as entrants or attendants and arrange the relief of persons assigned to these tasks.
- Reviewing the permit confined space program using the canceled permits retained within 1 year after each entry and revise the program as necessary, to ensure that employees are protected. Note: Employers may perform a single annual review covering all entries performed during a 12-month period. If no entry is performed during a 12-month period, no review is necessary.

17. Rescue and Emergency Services

Employee Rescue Crews - Each person authorized to act as part of a rescue or emergency service crew shall:

- Be provided with and properly trained in the use of the necessary PPE and rescue equipment to effect a rescue from a confined space.
- Be trained to perform the duties necessary for rescue operations including all functions required under the "authorized entrant" section.
- Practice rescues from confined spaces. Such practices can take place using manikins or actual persons and involve real or simulated confined spaces. Simulated spaces should be representative of actual confined spaces in the workplace.
- Be trained in basic first-aid and CPR.
- Rescue services shall be provided by the host facility and for IDLH conditions. IDLH Conditions: require trained rescue on site while work is being performed.

Contract Rescue Services - If contract or volunteer rescue crews are to be used for emergency and rescue services, they shall:

- Be notified of the hazards that may exist within the confined space.
- Be furnished a list of all confined spaces and entry procedures for spaces from which rescue may be necessary to allow appropriate rescue planning and practice.

Non-Entry Rescue - Retrieval systems or methods shall be used whenever possible to avoid risks to rescue crews unless this type of retrieval would not contribute to the rescue of entrants. Each retrieval system shall:

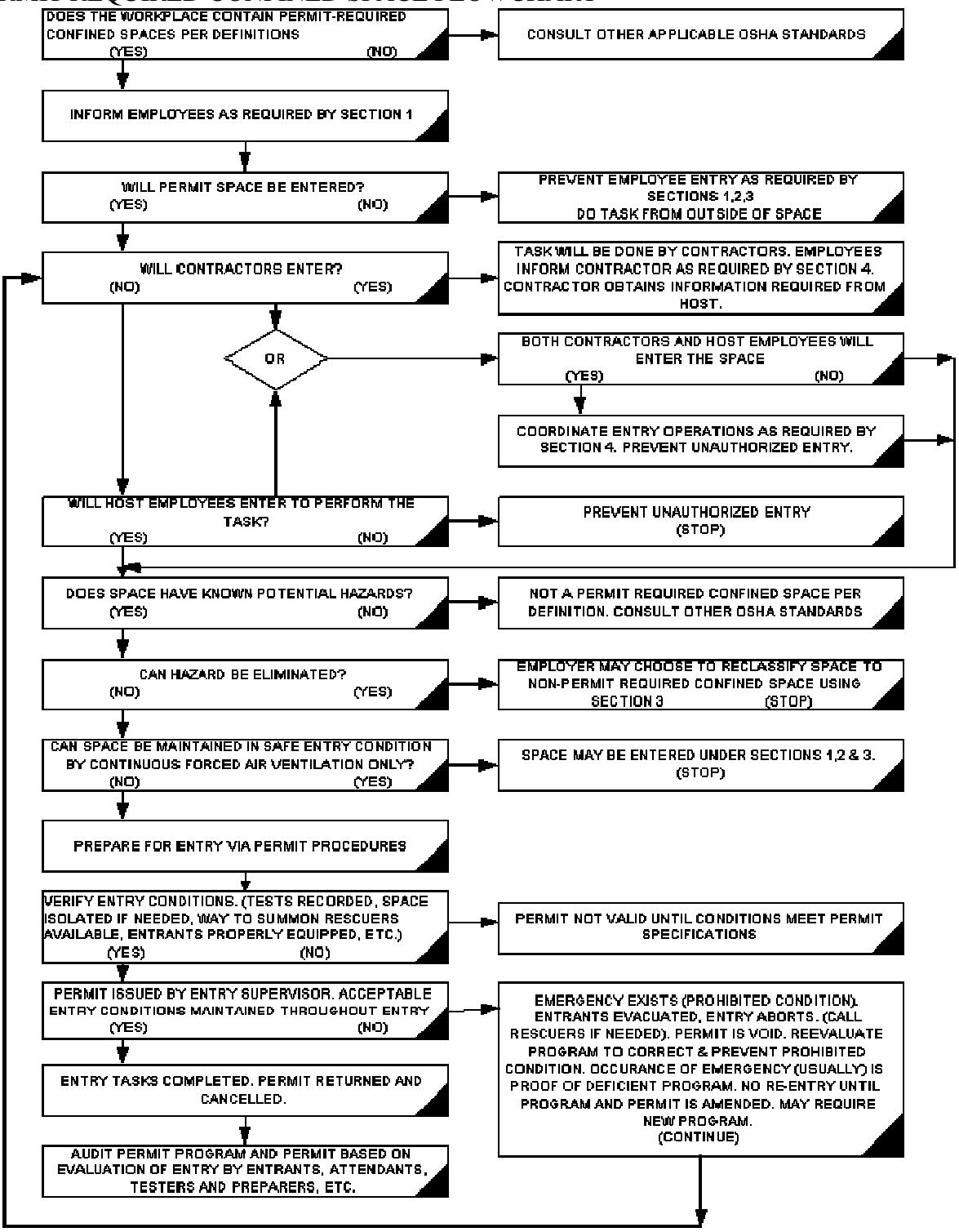
- Be of the chest or full body type with a retrieval line attached near the upper shoulder or above the head. Wristlets may be used if the other described equipment creates a greater hazard.
- Have the retrieval end of the line attached to a fixed point outside the entry space so that rescue can be started as soon as it is necessary. A mechanical method of retrieval shall be used if there is a drop of more than five (5) feet into the entry space.

Documentation

DOCUMENT	WHERE KEPT	HOW LONG
Confined Space Entry Permit	Office	3 years
Training of each employee	Office	Length of employment

CONFINED SPACE ENTRY

PERMIT REQUIRED CONFINED SPACE FLOWCHART



EXCAVATIONS

Purpose	This procedure establishes safety requirements for the protection of personnel who enter excavations or who excavate on the plant site, field stations or pipeline right-of-way. This procedure is to protect people from injury due to possible cave-ins or unexpected release of gases during excavation activities. This procedure is not a detailed procedure for how to design sloping/benching or how to classify soil. Those procedures require a competent, specially trained person, while this general procedure describes the safety requirements for all employees who may enter an excavation or participate in the excavation of soil.
Responsibility	It is the responsibility of VRC Protx and the person in charge of the job to follow the requirements of this section.

EXCAVATIONS

Definitions

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

Excavation - Any operation that involves boring, trenching, digging, auguring or removal of earth which results in a cavity, pit or depression.

Live Line - Any pipeline under pressure, pipeline carrying product or other hazardous material, buried cable or conduit containing electrical or instrumentation wiring that is in use.

Type A Soil - Cohesive soil with an unconfined compression strength of 1.5 tons/ft^2 (tsf) or greater. Examples of Type A soil are clay, silty clay, sandy clay, caliche and hardpan. However, no soil is Type A if:

- The soil is fissured.
- The soil is subject to vibration.
- There are other factors that would classify it as a less stable material.

Type B Soil - Cohesive soil with an unconfined compressive strength greater than 0.5 tsf but less than 1.5 tsf. Examples of Type B soils are angular gravel (crushed rock), silt, silt loam, sandy loam and:

- Previously disturbed soil unless it is Type C soil.
- Soils subjected to vibration and fissures.
- Dry rock which is not stable.

Type C Soil - Cohesive soil with an unconfined compressive strength of 0.5 tsf or less. Examples of Type C soils include:

- Submerged soil or soil from which water is freely seeping.
- Submerged rock that is not stable.

Procedures Prior to Excavation

The following safety procedures shall be observed prior to excavating:

1. The local "ONE CALL" or similar organization shall be notified prior to beginning an excavation or trenching operation. All piping or conduit shall be located and marked.
2. All "live lines" shall be located with probes.
3. Ensure that a competent person is supervising the project.

EXCAVATIONS

Permit Requirements for Excavations

1. Prior to starting work, a Safe Work Permit shall be issued by the person in charge of the job.
2. Precautions for confined space entry shall be observed when required, including testing and monitoring of atmosphere, emergency plans and rescue equipment. Refer to the confined space entry section of this manual for more details.
3. If the excavation is more than 4' deep, a confined space entry permit is required. If the excavation is more than 3' deep and there is congestion due to other piping or other obstructions, a confined space entry permit is required.

EXCAVATIONS

Other Procedures for Excavations

1. Prior to start of work within any excavation, the faces of the excavation shall be scaled to remove any loose material and other material shall be stored at least two feet (2') from the edge of the excavation.
2. The walls of all excavations deeper than four feet (4') shall be shored up or sloped according to OSHA requirements (see 1926.650 through 1926.653). The type of shoring and/or sloping will be determined based on the type of soil determined by a competent person.
3. A competent person shall inspect the excavation at least twice per day, with documentation. More frequent inspections may be necessary in case of rain, sloughing side walls or similar hazard increasing events.
4. If there is evidence of possible cave-ins or slides, all work in the excavation shall cease until necessary repairs or precautions have been taken to safeguard the employees.
5. For a trench or excavation more than four feet (4') deep and eight feet (8') long, a ladder or other acceptable method of exit is required. A ladder should be available at least every twenty-five feet (25'), but one ladder must always be in view. If a structural ramp is used rather than a ladder, a competent person must design the ramp.
6. Except in stable rock, excavations below the level of the base of a foundation or retaining wall shall not be permitted unless the wall is underpinned and other precautions are taken to ensure the stability of adjacent walls.
7. Barricades shall be erected by the work crew doing the excavating and shall remain in place until the excavation is filled in.
8. Heavy equipment.
   - At no time shall personnel be in an excavation that is within twenty five feet (25') of an operating backhoe or other similar operating equipment unless the excavation has been properly back sloped, personnel are protected by a trench box and backhoe is properly barricaded and spaced to insure against a cave in or fall in hazard.
   - Trenching machines, backhoes, boring machines, paving breakers, concrete saws and other mechanical equipment shall be operated only by authorized employees.
   - No employees shall be allowed under loads handled by digging or lifting equipment.

EXCAVATIONS

Soil Type Classification

A competent person shall make each soil and rock classification, based on the results of at least one visual and one manual test.

Visual Test - Visual tests are conducted to identify the factors and conditions affecting the classification of soil types.

1. Observe excavated soil and faces of the excavation for evidence of fine-grained (cohesive material) or coarse-grained sand or gravel (granular material).
2. Observe soil as it is excavated - soil remaining in clumps is cohesive and soil that breaks up easily is granular.
3. Observe the faces of excavations - if crack-line openings appear or chunks of soil fall off, the soil could be fissured.
4. Observe the excavation and adjacent areas for utilities which may identify previously disturbed soil.
5. Observe the opened side of the excavation for layered systems and estimate the slope of the system (horizontal to vertical).
6. Observe the excavation and adjacent area for evidence of water encroachment.
7. Observe the excavation and adjacent area for sources of vibration that may affect the stability of the excavation faces.

Manual Test

1. Compression strength - estimate the unconfined compressive strength of the soil by using a pocket penetrometer or by using a hand operated shear vane.
2. Plasticity - mold a moist or wet sample of soil into a ball and attempt to roll it into thin threads without crumbling.
3. Dry strength - Granular soil is dry and crumbles on its own or with moderate pressure into individual grains. If the soil is dry and falls into clumps, but the smaller clumps can only be broken up with difficulty, it may be a combination clay. If the dry soil breaks into large clumps which can only be broken with difficulty and there is no indication of fissured soil, the soil may be considered unfissured.
4. Thumb penetration - if a soil can readily be indented by the thumb, but only penetrate with great effort, this would be Type A soil. Type C soil can easily be penetrated several inches by the thumb and can be molded with light finger pressure. This test should be conducted on an undisturbed soil sample as soon as practicable after the excavation to keep to a minimum the effects of exposure to drying influences.

Upon completion of the visual and manual testing of the soil, the results shall be compared to the definitions for determination of the soil type.

EXCAVATIONS

Sloping and Benching

When excavating, one of the following three options for the design of sloping and benching systems shall be used.

Option 1 - The excavation may be made with a minimum allowable slope of 2 horizontal to 1 vertical.

Option 2 - The excavation may be sloped or benched to the configurations found in applicable tables. Use of these tables requires that the soil be classified for the location of the excavation. Copies of these tables are in the OSHA regulations.

Option 3 - A design using written tabulated data from tables and charts may be selected. Identification of the parameters, limitations of data, explanatory information, and a copy of the tabulated data, which identifies the registered professional engineer who tabulated the data, is required on site during construction.

Supports and Trench Shields

Options for design of support, shield and other protective systems are:

Option 1 - Determine the soil classification for the location of the excavation. Timber shoring configurations for different soil types are found in applicable tables.

Option 2 - Determine the soil classification for the location of the excavation. A support, shield and shoring system design using manufacturer's tabulated data may be used.

Option 3 - A design using written tabulated data from tables and charts may be selected. Identification of the parameters, limitations of data, explanatory information and a copy of the tabulated data, which identifies the registered professional engineer who tabulated the data, is required on site during construction.

Documentation

Documentation required during excavations include:

- Safe work permits
- Excavation inspections
- Design data on excavations and/or shoring.
- Soil classifications
- Training for the competent persons

FIRE PROTECTION

Purpose

To provide adequate fire protection equipment and training to allow employees to protect themselves and, in some cases, the equipment in the event of a fire. Human safety is more important than equipment. Fight a fire only if in your judgment, you can do so without unnecessary risk.

This procedure establishes safety practices for the prevention and minimization of fires due to accidental ignition of combustible gases, liquids, chemicals, and other materials.

Responsibility

VRC Protx shall be responsible for:

- Ensuring that each employee is properly trained
- Ensuring that all necessary equipment is at the location
- Providing fire protection as needed for specific work

Definitions

Combustible Liquid - any liquid having a flash point at or above 100 degrees

Flammable Liquid - any liquid having a flash point below 100 degrees.

Flash Point - the minimum temperature at which a liquid gives off ignitable vapors near the surface of a liquid.

Incipient Stage Fire - a fire which can be controlled or extinguished by portable fire extinguishers or small hose systems without the need for protective clothing or breathing apparatus

Smoking Policy

VRC Protx shall refrain from smoking in and around company facilities, except in designated smoking areas.

FIRE PROTECTION

Storage of Flammable Material

Install NO SMOKING or NO UNAUTHORIZED IGNITION SOURCES signs at all enclosures and areas where the possible leakage or presence of gas, flammable and/or combustible materials could constitute a fire or explosion hazard.

Flammable material shall be stored as follows:

- All oily rags and oil/paint soaked material should be stored in metal cans with airtight closures.
- Only NFPA approved containers and portable tanks shall be used for storage and handling of flammable and combustible liquids. These cans shall be maintained with flame arrestors intact and proper hose connections. Safety cans shall be used to handle flammable liquids, such as methanol and gasoline and shall be labeled accordingly. Safety cans shall mean an approved container of not more than 5 gallons capacity, having a spring-close lid and spout cover and so designed that it will safely relieve internal pressure when subjected to fire exposure.
- Quantities of flammable or combustible liquids in excess of 25 gallons shall be stored outdoors or in approved flammable storage cabinets. Standards for the cabinets are found in OSHA CFR 1926.152. The maximum allowable storage of liquids stored in such a cabinet is 60 gallons for flammable liquids and 120 gallons for combustible liquids. Whenever possible, large quantities of flammables should be stored out of doors, in a safe designated area.
- Flammable and combustible liquids shall not be stored in areas normally used as exits.

FIRE PROTECTION

Fire Extinguisher Mounting

When mounting fire extinguishers, the standard practice will be as follows:

- All mounted extinguishers shall be installed between 3 and 5 feet above the floor. Extinguishers having a gross weight more than 40 pounds shall be mounted no more than 3 1/2 feet above the floor.
- Fire extinguisher mounts must be secure and not subject to vibration.
- Fire extinguishers must be covered for protection, if located outside.
- All fire extinguishers must be labeled with a readily visible sign above the mounted fire extinguisher
- Access to fire extinguishers shall not be blocked by equipment, stored materials or machinery.

Fire Extinguisher Inspections

The standard practice for fire extinguisher inspections shall be as follows

Fire extinguishers should be inspected continuously for any sign of damage. However, each fire extinguisher should be inspected monthly to ensure that the extinguisher has not been used, is capable of being used and all equipment is in good condition. Records of these inspections should be maintained.

Annually, the fire extinguishers should be given a more thorough inspection, including weighing the extinguisher to ensure that it is full and ready to use.

Check to ensure that the extinguisher is up-to-date on the required hydrostatic test. Most extinguishers have to be hydrostatically tested every twelve years.

Training

Fire prevention and fire extinguisher training shall be conducted annually for all employees required to work with or around flammable or combustible materials.

ELECTRICAL SAFETY

Purpose

To prevent injuries and minimize damage to equipment, VRC Protx has these standards for the proper installation and handling of electrical devices and wiring.

Responsibility

It is the responsibility of VRC Protx to assure that the employees under their supervision are properly trained in the safe handling of electricity and the conditions of this standard. It is also the responsibility of VRC Protx to ensure that no person undertake electrical work for which they are not properly trained.

Electrical Safety Guidelines

Follow these guidelines for general electrical safety

- Unplug equipment prior to repairing or servicing it.
- Report all electrical problems to your supervisor. Do not attempt to repair electrical problems unless you are properly trained.
- Portable electrical heaters must be located so as to avoid a tripping hazard. Always unplug them when not in use.
- Keep electrical equipment away from water unless specifically designed for that service.
- Be aware of overhead power lines when working with tall equipment (cranes, ladders, tall vessels, etc.)
- Always follow lockout/tagout procedures, no matter the size or strength of the electricity in question.
- Do not use adaptors to defeat a standard grounding device.
- Use extension cords only on a temporary basis.
- Never unplug an appliance by pulling on the cord, pull on the plug.
- In case of an emergency, do not touch a victim that is still in contact with a power source, as you could electrocute yourself.
- In case of an electrical fire, do not use water on the fire

ELECTRICAL SAFETY

General Requirements

Qualified Personnel

- Only qualified personnel may alter electrical circuits, tools or other types of electrical equipment.
- Qualified personnel shall exercise caution when working on or near electrical equipment. Electrical equipment shall not be repaired unless the equipment can be locked out, tagged out and tested as to the effectiveness of the lockout/tagout. Persons working on such equipment must take extreme care.

Warnings and Labels

- Warning labels shall be permanently posted on electrical equipment for voltages over 480 volts AC/DC. An example of a sign is shown below:

DANGER
HIGH VOLTAGE
VOLTS
KEEP OUT

- The labels shall be plainly visible even when the doors are open or panels are removed from compartments. The labels shall indicate the voltages in the equipment and/or compartments.
- All electrical disconnects shall be legibly marked to indicate their purpose (what they control), unless located and arranged so the purpose is obvious. The service feeder and branch circuits shall also be legibly marked to indicate their purpose. The applicable equipment must be identified to cross reference with the disconnect, if it is not obvious. The markings shall be durable to withstand the service environment.

ELECTRICAL SAFETY

General Requirements (cont.)

Miscellaneous

- Circuits shall be locked out, tagged out and tested prior to performing work on any electrical circuit unless the work is such that the equipment must remain hot. Such hot work requires a skilled electrician and a hot work permit.
- Where doors are used for access to voltages from 500 to 1000 volts AC or DC, either door locks or interlocks shall be provided. Mechanical lockouts with a disconnecting means to prevent access until voltage is removed from the cubicle shall be in place on doors where over 1000 volts AC or DC are used.
- Purchases of switches, controllers, circuit breakers and the like shall be limited to only those types that can be mechanically locked out in the off positions to facilitate repairs and maintenance.
- All installations shall be as required by the National Electric Code for the area classification based on API Report 500B.

Electrical Power Tools and Extension Cords

General Requirements

- Power tools shall be properly grounded by means of a three wire ground plug used in a properly grounded receptacle. Double insulated tools may be used provided the case has not been opened or damaged. Non-explosion proof electrically operated tools shall be operated only when the area is clear of flammable vapors and following the issuing of a hot work permit.
- Extension cords shall be of sufficient conductor size to carry the maximum current load for the equipment. All extension cords shall include a grounding conductor within the cable jacket and shall have proper receptacle ends for its intended purpose and area classification, i.e. Class I, Div. II.
- If a cord is damaged, it shall be replaced or repaired immediately. Cords shall not be spliced or patched with electrical tape.
- Extension cords are for temporary use. Install permanent wiring when use is not temporary.
- Care shall be taken to protect extension cords from damage. Possible sources of damage may include sharp edges, pinch points, vehicle damage, hot surfaces, chemicals or oils. Keep slack in flexible cords to prevent tension on electrical terminals.

ELECTRICAL SAFETY

Electrical Power Tools and Extension Cords (cont.)

- Adapter cords (pigtails) shall be provided with an explosion proof plug on one end and a three wire grounding type receptacle on the other end. Care shall be taken to prevent accidental disconnection of either plug. Prior to using a pigtail, the area must be free of flammable gases and a hot work permit shall be issued. Adapter cords must be disconnected from the power supply when not in use. Use the following procedure when using extension cords or pigtails:
  - Area shall be checked for flammable gases and a hot work permit issued.
  - Connect tool to extension cord, ensuring accidental disconnect is not possible.
  - Connect extension cord to adapter cord (pigtail), ensuring accidental disconnect is not possible.
  - Connect adapter cord (pigtail) to power supply, ensuring accidental disconnect is not possible.
  - Insure tripping hazard is not created by any of the cords.
  - To disconnect, reverse above steps.

Electrical Fuses

- High voltage circuits shall be de-energized using lockout/tagout and test procedures before attempting to replace fuses.
- Bridging of fuses, circumventing the normal operations of circuit breakers or replacing fuses with higher current rated or lower voltage fuses is prohibited. Trained personnel using a fuse puller shall remove cartridge fuses.
- Determine the reason that a fuse operated or circuit breaker tripped before replacing or resetting.

Static Electricity

Many operations or conditions can generate static electricity. Care must be taken to minimize hazards associated with static electrical discharge.

- Sand or bead blasting operations in areas where flammable gases may occur shall require the issuance of a hot work permit.
- Transfer of flammable or combustible liquids requires that the vessels be bonded or grounded together. Plastic containers shall not be used to sample or collect hydrocarbon liquids.
- Nylon wearing apparel shall not be worn in areas where flammable gases are likely to occur.

ELECTRICAL SAFETY

Classified Areas

All electrical equipment for hazardous locations shall conform to current NEC specifications for the classified area. Equipment installed in classified areas shall be legibly marked by the manufacturer or testing agency indicating in what areas it is approved for use.

Equipment and associated wiring approved as intrinsically safe shall be permitted in any classification so long as it is not capable of releasing sufficient electrical or thermal energy to cause ignition of any mixture in its most easily ignitable concentration.

The hazardous locations most likely encountered during typical jobs will be Group D (flammable liquids, vapors and gases) and:
Class I, Division I location - a location in which:

- Ignitable concentrations of flammable gases or vapors can exist under normal operating conditions; or
- Ignitable concentrations of such gases or vapors may exist frequently because of repair or maintenance operations or because of leakage; or
- Breakdown or faulty operation of equipment or processes might release ignitable concentrations of flammable gases or vapors and might also cause simultaneous failure of electric equipment.

Class I, Division II location - a location:

- In which volatile flammable liquids or flammable gases are handled, processed or used, but in which the liquids, vapor or gases will normally be confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown of such containers or systems, or in case of abnormal operation of equipment; or
- In which ignitable concentrations of gases or vapors are normally prevented by positive mechanical ventilation, and which might become hazardous through failure or abnormal operation of the ventilating equipment; or
- That is adjacent to a Class I, Division I location, and to which ignitable concentrations of gases or vapors might occasionally be communicated unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air, and effective safeguards against ventilation failure are provided.

ELECTRICAL SAFETY

Procedures for Touching, Connecting or Disconnecting Power at Electrical Control Panels

- If you have to touch anything on an electrical control panel, first check it with a non-contact voltage tester.
- To disconnect the electrical power, always shut the control switch off first before shutting the main switch off.
- To connect the electrical power, always make sure that 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 will not be in a direct line with the explosion.

Rubber Insulating Electrical Gloves

Rubber insulating electrical linemen's gloves shall be visually inspected before each use. At intervals not exceeding six months, these gloves shall be tested by the manufacturer, or their qualified agent, to determine their integrity or they may be replaced in lieu of testing.

If the gloves fail the tests, then they shall be replaced. The test results must be documented and retained on file. Also spare gloves must be tested every six months or identified as spare gloves and are not to be used until tested.

These gloves shall only be used by qualified personnel. Remember that PPE is only a last line of defense in case something goes wrong.

Documentation

DOCUMENT	WHERE KEPT	HOW LONG
Electrical Glove Tests	Office	3 years
Electrical Certifications for Certified Employees	Office	As needed

ELECTRICAL EQUIPMENT GROUNDING ASSURANCE

Purpose:

The purpose of this Electrical Equipment Grounding Assurance program is to provide guidelines and policies in the safe operation and use of electrical equipment, both as it applies to our facilities and on the customer properties.

Responsibility:

It is the responsibility of the individual operators, supervisors and technicians to inspect maintain and facilitate repairs by qualified personnel all electrical equipment used by VRC Protx employees.

Definitions:

Electrical Equipment includes, but is not limited to, tools powered by or generating or used to conduct electrical current in the performance of the work tasks. This also includes lighting equipment.

Electrical Equipment Grounding Assurance:

VRC Protx subscribes to a program of electrical equipment grounding assurance. This includes daily inspection of portable generators, electrical tools, cords and equipment to be used in the days work that they will have in place and functional all grounding lugs, pins and connections. Extension cords and power cords will have the insulation, plugs and caps inspected and verified free of damage, defects, etc and will not be used until repaired or replaced. Unusable electrical equipment shall be tagged, disabled, destroyed and disposed of properly. Outlets on walls, generators or where they are subject to physical damage shall be inspected and verified free of damage or defect. If damaged these shall be repaired. On customer property the policy will be that VRC Protx employees do not use damaged outlets and the customer will be made aware of the deficiency to facilitate corrective action. VRC Protx also operates under a quarterly electrical equipment inspection program.

VRC Protx assumes that the facility/equipment grounding grid will be installed, bonded and maintained by the property owner (customer) when on the job site.

PERSONAL PROTECTIVE EQUIPMENT AND HAZARD ASSESSMENT

Purpose

This standard is designed to protect employees by reducing the probability of injuries from hazards that may exist due to normal operations or emergencies. Personal Protective Equipment (PPE) establishes a barrier between the worker and the hazard, but it does not eliminate the hazard. Thus, PPE should be used in conjunction with hazard assessments, engineering controls, training and safe practices to enhance safety in the workplace.

Responsibility

VRC Protx is responsible for:

- Ensuring that each employee has the necessary training.
- Documenting all training.
- Ensuring that all PPE is provided and used properly.
- Assigning duties only to properly trained employees.
- Ensuring that VRC Protx employees meet the PPE requirements of the contracting employer
- VRC Protx will oversee employee-owned equipment and VRC Protx is responsible for the assurances of its adequacy, maintenance and sanitation.
- All PPE shall be fitted to each affected employee.

All VRC Protx employees who may need to wear PPE have been properly trained in the use of the PPE. Retraining for PPE will be conducted for VRC Protx employees when the workplace changes, making the earlier training obsolete; the type of PPE changes; or when the employee demonstrates lack of use, improper use, or insufficient skill or understanding. All PPE training shall be documented. Each employee is responsible for using, maintaining, storing and cleaning PPE properly.

Definitions

Hazard Assessment – A review of the workplace to determine if hazards are present, or are likely to be present, which necessitates the use of PPE.

General PPE Requirements

PPE shall include, but is not limited to, protection for hearing, eyes, face, head, skin, extremities, respiratory devices, clothing, and toxic gas/combustible gas monitors. All PPE shall display the appropriate insignia (ANSI, NIOSH or other appropriate standard) stating that the equipment does meet the standards.

PERSONAL PROTECTIVE EQUIPMENT AND HAZARD ASSESSMENT

PPE Provided

VRC Protx will supply all PPE deemed necessary by the hazard assessment and/or the contracting employer. All PPE will be in good working order, and all defective PPE must immediately be repaired or replaced.

The following PPE shall be provided:

- Eye and Face Protection (see Appendix #1)
- Head Protection (see Appendix #2)
- Hearing Protection (see Appendix #4)
- Respiratory Protection (see Appendix #5)
- Special Clothing Protection (see Appendix #7)
- Other Personal Protective Measures (see Appendix #8)

Hazard Assessment

Facilities where VRC Protx will work are assumed to have some or all of the following potential safety hazards:

- Overhead structures, with potential falling material
- High, medium and low elevation piping
- Sound levels in excess of 85 dBA
- Flammable or combustible gases and/or liquids
- Heavy equipment
- Welding and grinding
- Tripping hazards

As such, the required PPE will include hard hat, steel toed footwear, safety glasses, hearing protection (where needed) and fall protection (where needed). A more detailed hazard assessment will be performed if the contracting employer requires it or if the contractor deems it necessary based on the conditions at each individual site. The contracting employer may stipulate the required PPE based on their own hazard assessment.

PERSONAL PROTECTIVE EQUIPMENT AND HAZARD ASSESSMENT

Hazard Assessment Guidelines

1. Survey – Conduct a walk-through survey of the areas in question. The purpose of the survey is to identify sources of hazards to workers and coworkers. Consideration should be given to the basic hazard categories:

Impact	Penetration	Compression (Rollover)	Chemical
Heat	Harmful dust	Light radiation	Noise

2. Sources – During the walk-through survey, observe the following sources:
   - Motion, such as machinery or processes where any movement of tools, machine elements or particles could exist or movement of personnel that could result in collision with stationary objects.
   - High temperature that could result in burns, eye injury or ignition of protective equipment
   - Chemical exposure
   - Harmful dust
   - Light radiation, such as welding, cutting or heat treating
   - Falling objects or potential for dropping objects
   - Sharp objects that might pierce the feet/hands or cut the arms/legs.
   - Rolling or pinching objects which could crush body parts
   - Any electrical hazards
   - Noise hazards
3. Gather incident, accident or near miss data
4. Organize and analyze data – Each of the basic hazards should be reviewed and a determination made as to the type, level of risk and seriousness of potentially injury from each of he hazards found in the area. The possibility of exposure to several hazards simultaneously should be considered.
5. After becoming familiar with the potential hazards, select the proper PPE that provides a level of protection equal to or greater than the hazard.
6. Train the user on the PPE within 30 days of the hazard assessment.
7. Document in writing all training given on appropriate form.
8. Reassessment of hazards in the workplace will be necessary by identifying and evaluating new equipment and processes, reviewing accident records and reevaluating the suitability of previously selected PPE.

PERSONAL PROTECTIVE EQUIPMENT AND HAZARD ASSESSMENT

APPENDIX 1
EYE AND FACE PROTECTION

Equipment Standards

Approved eye and face protection equipment must:

- Conform to ANSI standards
- Be properly fitted and worn
- Be marked to facilitate identification of the manufacturer

Note – Safety glasses that conform to ANSI standards must be stamped "Z87" on the temple of the glasses. Safety glasses must comply with ANSI Z87.1-1989 or later amendments

When to Wear

All personnel must wear approved eye protection while at all locations. Certain tasks with a potential for eye injury require additional eye protection, regardless of the location.

Corrective lenses (Glasses)

Personnel who require corrective lenses (glasses) must wear:

- Prescription safety glasses
- Safety glasses, specifically designed to be worn over corrective lenses

Note – For additional information on the use of prescription lenses and contacts, refer to the Respiratory Protection section.

Contact Lenses

Personnel who wear contact lenses and work where eye hazards exist must inform their supervisors that they wear contact lenses. Personnel may wear contact lenses at field locations, shops, plants and warehouses if:

- The lenses are used in conjunction with approved eye protection equipment; and
- Their use is not prohibited by documented work rules and regulations.

Special Eye Protection

Safety glasses with side shields are approved for general eye protection in the workplace. Other eye protection is required under certain conditions and in some locations, as shown below:

PERSONAL PROTECTIVE EQUIPMENT AND HAZARD ASSESSMENT

ACTIVITY	REQUIRED EYE AND FACE PROTECTION
Activities that create flying particles: • Grinding • Hammering • Wire brushing • Weed eating • Compressed air cleaning • Cutting cable or wire rope • Using power tools • Using pneumatic tools • Blasting • Sanding • Chipping • Machining • Chiseling • Scraping • Buffing • Sawing	Impact-type goggles or safety lasses with side shields Note: A face shield must also be worn if a face hazard exists.
• Handling hazardous liquids, powders, chemicals or vapors, or • Presence in the immediate vicinity where these materials are being handled, or • Where an eye/face hazard exists while venting natural gas.	Splash-proof goggles and face shield Reference : for more information, always refer to the MSDS for the material involved
Inspecting and lighting fire boxes manually	Safety goggles and face shield
Inspecting equipment, tubing or piping while they are under hydraulic pressure or air pressure	Safety goggles
Working near other persons who are doing work that requires safety goggles	Safety goggles

Welding Protection

Anyone observing welding operations must wear proper eye protection. The table below shows the eye protection that welders and their helpers must wear. Shaded welding and cutting lenses must be protected by a clear cover glass.

PERSONAL PROTECTIVE EQUIPMENT AND HAZARD ASSESSMENT

Activity	The Welder Must Wear	The Helper Must Wear
Acetylene gas cutting	• Goggles with No. 5 or 6 shade lenses, or • No. 5 or 6 shade full face shield or helmet in conjunction with safety glasses with side shields	• Goggles with No. 4 shade lenses, or • No. 4 shade full face shield or helmet in conjunction with safety glasses with side shields
Electric-arc welding (Arc current < 250 amps)	• A welding helmet with No. 9 or darker shade lenses, or • A hand shield with No. 9 or darker shade lenses plus safety glasses with side shields or goggles	• Goggles with No. 6 or darker shade lenses

Eyewash Facilities

Eyewash stations (portable or stationary) must be provided for immediate emergency use at locations where hazardous chemicals (caustic, corrosive, toxic, etc.) are used. Stations must be clearly marked and accessible.

Eyewash stations should be periodically checked for proper function, including temperature, pressure and water quality. Documentation of the latest 2 inspections must be kept at the location. Use ANSI Z358.1-1990 (Emergency Eyewash and Shower) as reference.

Eyewash material (eyewash solution, cups, etc.) must be provided to all employees who work in the field. These items are to be carried in their company vehicle or located at the work site as appropriate. For emergency situations in remote areas, potable water can be used to flush eyes.

PERSONAL PROTECTIVE EQUIPMENT AND HAZARD ASSESSMENT

APPENDIX 2
HEAD PROTECTION

Approved Hardhats

Hardhats are designed to provide protection for specific hazards. The ANSI Class B design is the only approved hardhat because it provides the highest level of protection against impact from falling objects and it reduces the danger of high voltage shock and burn. Metal hardhats are prohibited. All hardhats must comply with ANSI Z89.1-1986 or later editions.

When to Wear

All VRC Protx personnel must wear hardhats at all field locations and plants.

When Not Required

A hardhat is not required:

- Inside vehicles
- In shops or warehouses unless overhead work is being done
- In parking lots
- In office areas or control rooms
- When performing work that requires a special helmet
- When performing work in small spaces where the wearing of a hardhat causes more hazards than would be reduced by wearing the hardhat.

How to Wear

- The hard hat must not be tipped forward, backward, or to either side.
- The headband must be adjusted to the proper size to provide sufficient clearance between the shell and headband. The suspension system must never be modified or altered, and objects must never be carried or stored between the headband and head.
- When chinstraps are used, they must be adjusted so that the hardhat stays positioned properly. On the head and must be designed to break at a force that will prevent a strangulation hazard.
- Liners designed for use during cold weather should be installed in accordance with the manufacturer's instructions.
- The hardhat must not be worn on top of everyday hats or caps.

Maintenance

Never use gasoline, solvents or similar substances on a hardhat. Use mild soap and warm water to clean a hardhat. Never paint or modify the shell of a hardhat (e.g., punching holes in it for additional ventilation).

Periodic Inspection and Replacement

Hardhats should be periodically inspected. The hat or headband may need to be replaced if the following is observed:

- Cracks
- Breaks
- Brittleness
- Discoloration

Hardhats used on a daily basis should have their headband/suspension replaced annually and the entire hardhat replaced every five years. The entire hardhat should be replaced after a major impact.

PERSONAL PROTECTIVE EQUIPMENT AND HAZARD ASSESSMENT

APPENDIX 3
FOOT PROTECTION

Minimum Requirements	Sturdy footwear with nonslip soles and steel toes must be worn: • At all field locations, shops, warehouses and plants • Any other location where the potential for foot injury exists Protective footwear must comply with ANSI Z41-1991
Footwear Inspection and Replacement	Footwear should be inspected periodically and replaced when it does not provide adequate protection or traction.

PERSONAL PROTECTIVE EQUIPMENT AND HAZARD ASSESSMENT

APPENDIX 4
HEARING PROTECTION

Required Use

All personnel, including contractors and visitors, must wear hearing protection in areas where signs are posted that warn of excessive noise levels.

Hearing protection should be worn in areas that are not posted, if the work creates a potential for temporary elevated noise levels, such as when high-pressure gases are released.

PERSONAL PROTECTIVE EQUIPMENT AND HAZARD ASSESSMENT

APPENDIX 5
RESPIRATORY PROTECTION

Where to Use

Respiratory protection must be used where respiratory hazards may be encountered in the workplace. Generally, these hazards include but are not limited to:

- Oxygen deficiency
- Gas and vapor contaminants
- Particulate contaminants, such as harmful dust, fume, chemical mist or fog, smoke and spray
- A combination of gas, vapor and particulate contaminants
- Potential exposure during emergency response activities

RESPIRATOR COLOR CHART

CONTAMINANT	COLOR
Acid Gases (note – it is not suggested to use air purifying respirators for acid gas)	White
Organic vapor	Black
Ammonia Gas	Green
Carbon Monoxide	Blue
Acid gases and organic vapor	Yellow
Acid gas, organic vapor and ammonia gas	Brown
Radioactive materials	Purple
Hydrocyanic acid gas	White with ½" green stripe near bottom
Chlorine gas	White with ½" yellow stripe near bottom
Acid gas and ammonia gas	Green with ½" white stripe near bottom
Particulates with any of the above gases or vapors	Color of contaminant, as designated above, with ½" gray stripe near top
All the above contaminants	Red with ½" gray strip near top

PERSONAL PROTECTIVE EQUIPMENT AND HAZARD ASSESSMENT

APPENDIX 6
HAND PROTECTION

Types of Hand Protection

Workers must use hand protection to prevent injuries when hazards are present. The most common types of hand protection are gloves and barrier creams. Gloves are normally the most effective type of hand protection.

Glove Selection

When selecting gloves, consider:

- Size, style, material, thickness and design
- The potential hazards associated with the material or equipment being handled
- Chemical hazards

Personnel working around rotating or moving equipment must not wear gauntlet gloves or gloves that fasten around the wrist and should exercise caution using other types of gloves that might cause the hand to become caught or pulled into a dangerous area.

Cleaning Chemical Resistant Gloves

Chemical resistant gloves should be cleaned in accordance with manufacturer's recommendations. Soap and water should be used to clean the inside of the gloves.

Barrier Creams

Barrier creams do not replace required protective equipment. However, they may be used selectively to provide protection to hands or other areas of exposed skin.

PERSONAL PROTECTIVE EQUIPMENT AND HAZARD ASSESSMENT

Types of Gloves The table below describes types of gloves used during operations:

Glove Type	Purpose	Common Uses
Cotton/canvas cloth	• Protects from abrasions • Provides warmth and cleanliness	Light work (e.g., handling pipe, small hand tools, and materials with rough surfaces)
Leather/leather reinforced	Protects from • Abrasions • Puncture wounds • Lacerations	Handling rough, rigid or abrasive materials during work activities such as wire-rope handling, grinding and blasting
Leather, reinforced with metal or metal stitching	Protects from • Lacerations • Abrasions	Handling edged tools for cutting, such as knives, chainsaws and skill saws.
Leather, insulated or heat resistant	Protects from thermal burns (hot or cold)	Welding or operating/maintaining cryogenic equipment or equipment around engines, boilers and steam lines
Electrical insulated	Protection from electrical burns and shock	Work on electrical equipment
Latex	Protection from • Bloodborne pathogens • Mild detergents	First aid, emergency response, cleaning, glove liners.
Chemical resistant	Protection from • Skin contact • Skin irritation or absorption • Burns	Handling chemicals such as acids, caustics, soda ash, and most hydrocarbons. Refer to the MSDS for the chemical to be handled.

PERSONAL PROTECTIVE EQUIPMENT AND HAZARD ASSESSMENT

APPENDIX 7
PROTECTION BY SPECIAL CLOTHING

When to Wear

Special protective clothing should be used during operations where potential job hazards may include but are not limited to:

- Exposures to hazardous materials (see MSDS for proper clothing)
- Hot work and/or pipeline repairs
- Burns from fires due to flammable atmospheres (use fire retardant clothing)
- Other hazards that may be produced by special operations, such as short-term exposures to extreme heat or cold.

Examples

Examples of operations that may require flame resistant clothing include but are not limited to:

- Loading and unloading LPG
- All welding operations
- Hot work
- Work in excavations with gas exposure

The use of fire resistant clothing will depend on the results of the hazard assessment and the requirements of the contracting employer.

PERSONAL PROTECTIVE EQUIPMENT AND HAZARD ASSESSMENT

APPENDIX 8
OTHER PERSONAL PROTECTIVE MEASURES

Additional Protective Measures

Personnel must wear clothing suited to the work, weather and the environment in which they work.

Personnel who work around moving and rotating machinery must not wear:

- Neckties
- Long hair or beards that might constitute a hazard
- Neck chains
- Gauntlet gloves or gloves that fasten around the wrist
- Baggy, loose or ragged clothing
- A handkerchief or rag tied to them that prevents removal by one quick, easy pull.

If potential hazards exist, the wearing of jewelry, such as earrings, rings, watchbands or neck chains on the job is prohibited.

If clothing becomes saturated with oil, gasoline or chemicals, the following actions must be taken:

- Avoid all sources of fire until clothes have been changed and the skin is washed free of oil, etc.
- Respond as prescribed by the appropriate MSDS
- Immediately wash the exposed skin area with soap and water to prevent skin irritation and change clothes

PERSONAL PROTECTIVE EQUIPMENT AND HAZARD ASSESSMENT

JSA
HAZARD ASSESSMENT FORM

LOCATION - _____

DATE - _____

PERFORMED BY - _____

_____

_____

_____

HAZARDS IDENTIFIED	PPE SELECTED

Employees must be informed and become familiar with the identified hazards. Training on the PPE shall be given no later than 30 days after the Assessment is completed. Training shall consist of proper fit, use, care and limitations of all PPE

CERTIFIED BY _____

FALL PROTECTION AND LADDERS

Purpose

To provide guidelines for workers who have to work at least 6 feet above ground level, as well as safety requirements for the use of ladders and scaffolding.

Training

The following items should be covered in the required training:

- Fall protection principles (engineer away the hazard)
- Ladder and scaffolding safety
- Stairs and handrail requirements
- Fall protection hazard assessment
- Fall protection using body harnesses

Portable Ladder Safety

All portable ladders shall meet the following requirements:

- All ladders should be Type 1 - Industrial. Ladders should have a working rate of 275 pounds.
- Stepladders should not exceed 20 feet in length
- Extension ladders should not exceed 40 feet in length
- The base of the ladder must have secure footing, such as skid resistant feet.
- The care and maintenance of portable ladders shall include:
  - Periodically check all hardware, ropes, movable parts, skid resistant feet and rungs for damage or excessive wear. Repair or replace prior to usage.
  - Rungs should be kept free from accumulations of dust, paint, oil grease and ice.
  - Visible inspection of ladder prior to each use
  - Ensure that no alterations or modifications have been made to the ladder
  - Ensure ladder has not been painted as this may hide defects.

FALL PROTECTION AND LADDERS

Use of Portable Ladders

- Always face the ladder when climbing or descending
- The angle of the ladder should be 1 foot horizontal for each 4 feet vertical whenever possible.
- The ladder should be tied off at the top for security or held in place by another employee.
- The ladder should extend 3 feet above the top surface
- Ladders shall not be placed in front of doors unless the door is blocked or guarded.
- Ladders shall not be placed on boxes, drums or other unstable items to gain additional height.
- Ladders with missing or broken rungs, steps or other faulty conditions shall not be used until repaired or replaced.

Personal Fall Protection Equipment

When engineering efforts are not attainable, fall protection can be set up in a three component system.

1. Body Harness - designed to distribute the forces throughout the body to prevent further injuries should a fall occur. Note that safety belts are no longer acceptable.
2. Connecting device - normally a rope or webbing lanyard.
3. Tie-off point - the anchor point that will support the employee in case of a fall. This point must be capable of supporting 5,000 pounds per worker and could be part of existing equipment already on the location. This tie-off point must be high enough so that no lower level equipment is struck in case of a fall. Also, the tie-off point must be such that no rough or jagged edges could damage the connecting device.

Fall Rescue Plan & Execution

Date: _____
Job #:_____

Pre-plan:
Best means to perform Rescue if one occurs:
_____ Self-Rescue
_____ JLG
_____ Ladder
_____ Scissor Lift
_____Other_____
Is equipment ready & within reach for timely rescue Yes _____ No ____
Has equipment been inspected before job begins? Yes _____ No _____

FALL PROTECTION AND LADDERS

Job Task:

_____ Tie off point above head or as high as possible
_____ Tie off point has been rated to withhold 5,000 lbs.
_____ Fall distance has been calculated (height of employee + lanyard length + 3 ft. for absorber)
_____ Employee have been assigned a work Partner (Buddy System)
_____ Does employees have trauma suspension straps
Is there a fall rescue team on site? Yes _____ No _____
Number to contact in case of
Emergency:_____

Last Minute Risk Assessment:

_____ Inspect Harness
_____ Inspect Lanyard
_____ Permit has been approved
_____ Job task has been assessed on JSA
_____ Inspect Tools & Equipment
_____ Inspect extension cords
_____ Have all effected crews been notified
_____ Stay out of line of fire

FALL PROTECTION AND LADDERS

VRC Protx

Date: _____ Job Description: _____

Location: _____

Contacts	Rescue Equipment	Critical Rescue Factors
Rescuer (s) _____ _____ Competent Person: _____ Emergency Contact: _____ Method of Contact: ☐ PA ☐ Verbal/Face to Face ☐ Radio Channel: _____ ☐ Phone #: _____ ☐ Other: _____	☐ Ladder ☐ Block & Tackle ☐ Rescue Pole ☐ First Aid Kit ☐ Rescue Rope ☐ Life Ring ☐ Spider ☐ Work Vest ☐ Scaffold ☐ (Cutting Device) ☐ Stokes Litter **Location of equipment:** ☐ Job Site ☐ Gang Box ☐ Tool House ☐ _____	Anchor Point: _____ _____ _____ Landing Area: _____ _____ _____ Rescue Obstructions/Hazards: _____ _____ _____

Check for Yes	Comments
☐ Have alternatives to using fall arrest equipment been considered?	
☐ Has rescue equipment been inspected & found in good shape?	
☐ Is equipment adequate for the rescue plan (weight, ratings, Length, connection type, ect.)?	
☐ Have communication devices been identified, located & tested?	
☐ Are all rescuers familiar with the use of the rescue equipment?	
☐ If working over water, is there a boat available?	

Pre Work Tasks:	Response Procedure:
1) _____ _____ _____	1) Notify Emergency Contact: _____ _____ _____
2) _____ _____ _____	2) Make Medical Assessment of person: _____ _____ _____
3) _____ _____ _____	3) _____ _____ _____
4) _____ _____ _____	4) _____ _____ _____

SCAFFOLDING SAFETY PROGRAM

Purpose:

The purpose of this safety policy and procedure is to establish guidelines for the protection of VRC Protx employees who work on scaffold work surfaces.

Applicability:

Scaffolding has a variety of applications. It is used in new construction, alteration, routine maintenance, renovation, painting, repairing, and removal activities. Scaffolding offers a safer and more comfortable work arrangement compared to leaning over edges, stretching overhead, and working from ladders. Scaffolding provides employees safe access to work locations, level and stable working platforms, and temporary storage for tools and materials for performing immediate tasks. Scaffolding accidents mainly involve personnel falls and falling materials caused by equipment failure, incorrect operating procedures, and environmental conditions. Additionally, scaffolding overloading is a frequent single cause of major scaffold failure. This safety policy and procedure provides guidelines for the safe use of scaffolds. It includes training provisions and guidelines for scaffold erection and use.

Reference:

This safety policy and procedure is established in accordance with Occupational Safety and Health Standards for General Industry (29 CFR 1910.28) and Occupational Safety and Health Standards for Construction Industry (29 CFR 1926.451).

Policy:

Scaffolds shall be erected, moved, dismantled, or altered only under the supervision of a competent person* and will have guardrails and toeboards installed. When scaffolding hazards exist that cannot be eliminated, then engineering practices, administrative practices, safe work practices, Personal Protective Equipment (PPE), and proper training regarding Scaffolds will be implemented. These measures will be implemented to minimize those hazards to ensure the safety of employees and the public. ***Note: It is the general policy of VRC Protx to use certified scaffold installers and/or rely on the customer to provide the scaffold and installation. We will comply with the policies, procedures and standards that our customers require in the safe use of scaffold. We are not in the scaffold business.**

Responsibilities:

It is the responsibility of each manager, supervisor, and employee to ensure implementation of VRC Protx's safety policy and procedure on Scaffolds. It is also the responsibility of each VRC Protx employee to report immediately any unsafe act or condition to his or her supervisor.

Procedure:

This section provides applicable definitions, establishes general provisions, and identifies specific responsibilities required by VRC Protx's safety policy and procedure on Scaffolds.

SCAFFOLDING SAFETY PROGRAM

Definitions:

Brace:	A tie that holds one scaffold member in a fixed position with respect to another member. Brace also means a rigid type of connection holding a scaffold to a building or structure.
Coupler:	A device for locking together the component tubes of a tube and coupler scaffold.
Harness:	A design of straps which is secured about the employee in a manner to distribute the arresting forces over at least the thighs, shoulders, and pelvis, with provisions for attaching a lanyard, lifeline, or deceleration device.
Hoist:	A mechanical device to raise or lower a suspended scaffold. It can be mechanically powered or manually operated.
Maximum Intended Load:	The total load of all employee, equipment, tool, materials, transmitted, wind, and other loads reasonably anticipated to be applied to a scaffold or scaffold component at any one time.
Mechanically Powered Hoist:	A hoist which is powered by other than human energy.
Outriggers:	The structural member of a supported scaffold used to increase the base width of a scaffold in order to provide greater stability for the scaffold.
Platform:	The horizontal working surface of a scaffold.
Safety Belt (Full Body Harness):	A strap with means for securing about the waist or body and for attaching to a lanyard, lifeline, or deceleration device. **It is the policy of VRC Protx to no longer use the waist "safety belt". It has been proven that the use of a full body safety harness with double lanyard system is far superior to the use of a belt. Therefore, "safety belts" are no longer allowed on site as a safety device.**
Scaffold:	Any temporary elevated or suspended platform and its supporting structure used for supporting employees or materials or both, except this term does not include crane or derrick suspended personnel platforms.

SCAFFOLDING SAFETY PROGRAM

Training:

Affected employees will receive instruction on the particular types of scaffolds which they are to use. Training should focus on proper erection, handling, use, inspection, and care of the scaffolds. Training must also include the installation of fall protection, guardrails, and the proper use and care of fall arrest equipment.

This training should be done upon initial job assignment. Retraining shall be done when job conditions change. Periodic refresher training shall be done at the discretion of the supervisor.

Company designated "competent person(s)" will receive additional training regarding the selection of scaffolds, recognition of site conditions, recognition of scaffold hazards, protection of exposed personnel and public, repair and replacement options, and requirements of standards.* (see note in policy statement)

Safe Scaffold Erection and Use Safe scaffold erection and use are important in minimizing and controlling the hazards associated with their use. Scaffold work practices and rules should be based on:

- Sound design
- Selecting the right scaffold for the job
- Assigning personnel
- Fall protection
- Guidelines for proper erection
- Guidelines for use
- Guidelines for alteration and dismantling
- Inspections
- Maintenance and storage

Types of Scaffolds:

There are many different types of scaffolds used in VRC Protx. The three major categories are:

- Self-supporting scaffolds
- Suspension scaffolds
- Special use scaffolds

Self-supporting scaffolds are one or more working platforms supported from below by outriggers, brackets, poles, legs, uprights, posts, frames, or similar supports. The types of self-supporting scaffolds include:

- Fabricated Frame
- Tube and Coupler
- Mobile
- Pole

SCAFFOLDING SAFETY PROGRAM

Suspension scaffolds are one or more working platforms suspended by ropes or other means from an overhead structure(s). The types of suspension scaffolds include:

- Single-Point Adjustable (Boatswain's Chairs)
- Two-Point Adjustable (Swing Stage)
- Multiple-Point Adjustable
- Multi-Lend • Category
- Float (Ship)
- Interior Hung
- Needle Beam

Special use scaffolds and assemblies are capable of supporting their own weight and at least 4 times the maximum intended load. The types of special use scaffolds include:

- Form and Carpenter Bracket
- Roof Bracket
- Outrigger
- Pump Jack
- Ladder Jack
- Window Jack
- Horse
- Crawling Boards
- Step, Platforms, and Trestle Ladder

Responsibilities:

Managers: Managers will ensure adequate funds are available and budgeted for the purchase of scaffolds in their areas. They will also identify the employees affected by this safety policy and procedure. Managers will obtain and coordinate the required training for the affected employees. Managers will also ensure compliance with this safety policy and procedure through their auditing process.

Supervisors: Supervisors will not allow any employee who has not received the required training to perform any of the tasks or activities related to scaffold erection and/or dismantling. Supervisors will communicate appropriate needs to Managers and/or supervisors. Supervisors will ensure that employees are provided with PPE as necessary for their job. Supervisors will ensure that a competent person is in charge of scaffold erection according to the manufacturer's specifications.

SCAFFOLDING SAFETY PROGRAM

Competent Person:

The competent person will oversee the scaffold selection, erection, use, movement, alteration, dismantling, maintenance, and inspection. The competent person will be knowledgeable about proper selection, care, and use of the fall protection equipment. Additionally, the competent person shall assess hazards.

Employees:

Employees shall comply with all applicable guidelines contained in this safety policy and procedure. Employees will report damaged scaffolds, accessories, and missing or lost components. Employees will assist with inspections as requested.

Safety Department:

Safety Director /Safety Coordinator will provide prompt assistance to managers, supervisors, or others as necessary on any matter concerning this safety policy and procedure. Safety Director will assist in developing or securing required training. Safety Director will also work with Purchasing to ensure that all newly purchased scaffolds comply with current safety regulations and this safety policy and procedure.*(please see note in policy statement). Safety Engineers will provide consultative and audit assistance to ensure effective implementation of this safety policy and procedure. *(please see note in policy statement).

Purchasing Department:

Purchasing Department is responsible for ensuring that purchased scaffolds and related material and equipment meet or exceed current safety regulations. *(please see note in policy statement).

Safety Requirements for Scaffolds:

- 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 brick, or concrete blocks shall not be used to support scaffolds or planks.
- No scaffold shall be erected, moved, dismantled, or altered except under the supervision of competent persons or as requested for corrective reasons by Safety Director Personnel.
- Guardrails and toeboards shall be installed on all open sides and ends of platforms more than 10 feet above the ground or floor, except needle beam scaffolds and floats. Scaffolds 4 feet to 10 feet in height having a minimum horizontal dimension in either direction of less than 45 inches shall have standard guardrails installed on all open sides and ends of the platform.

SCAFFOLDING SAFETY PROGRAM

- Guardrails must be 2 X 4 inches, or the equivalent, not less than 36 inches or more than approximately 42 inches high, with a midrail, when required, of 1 X 4 inch lumber, or the equivalent. Supports must be at intervals not to exceed 8 feet. Toeboard and the guardrail shall extend along the entire opening.
- Scaffolds and their components must be capable of supporting without failure at least 4 times the maximum intended load.
- Any scaffold, including accessories such as braces, brackets, trusses, screw legs, ladders, couplers, etc., damaged or weakened from any cause must be repaired or replaced immediately, and shall not be used until repairs have been completed.
- All load-carrying timber members of scaffold framing shall be a minimum of 1,500 fiber (Stress Grade) construction grade lumber.
- All planking must be Scaffold Grades, or equivalent, as recognized by approved grading rules for the species of wood used. The maximum permissible span for 2 X 9 inch or wider planks is shown in the following:
- The maximum permissible span for 1-1/4 X 9 inch or wider plank of full thickness shall be 4 feet with medium duty loading of 50 p.s.i.
- All planking or platforms must be overlapped (minimum 12 inches) or secured from movement.
- An access ladder or equivalent safe access must be provided.
- Scaffold plank must extend over their end supports not less than 6 inches or more than 18 inches.
- The poles, legs, or uprights of scaffolds must be plumb and securely and rigidly braced to prevent swaying and displacement.
- Overhead protection must be provided for men on a scaffold exposed to overhead hazards.
- Slippery conditions on scaffolds shall be eliminated immediately after they occur.
- No welding, burning, riveting, or open flame work shall be performed on any staging suspended by means or fiber of synthetic rope. Only treated or protected fiber or synthetic ropes shall be used for or near any work involving the use of corrosive substances or chemicals.
- Wire, synthetic, or fiber rope used for scaffold suspension shall be capable of supporting at least 6 times the intended load. • Scaffolds shall be provided with a screen between

SCAFFOLDING SAFETY PROGRAM

the toeboard and guardrail, extending along the entire opening, consisting of No. 18 gauge U.S. Standard wire one-half inch mesh or the equivalent, when personnel are required to work or pass underneath the scaffolds.

- A safe distance from energized power lines shall be maintained.
- Tag lines shall be used to hoist materials to prevent contact.
- Suspension ropes shall be protected from contact with heat sources (welding, cutting, etc.) and from acids or other corrosive substances.
- Scaffolds shall not be used during high wind and storms.
- Ladders and other devices shall not be used to increase working heights on scaffold platforms.
- Scaffolds shall not be moved while employees are on them.
- Loose materials, debris, and/or tools shall not be accumulated to cause a hazard.
- Employees working on suspended scaffolds shall employ a fall-arrest system.
- Scaffold components of differing brands, manufacture, model, etc… shall not be mixed or forced to fit which may reduce design strength.
- Scaffolds and components shall be inspected at the erection location. Scaffolds shall be inspected before each work shift, after changing weather conditions, or after prolonged work interruptions.
- Casters and wheel stems shall be pinned or otherwise secured in scaffold legs. Casters and wheels must be positively locked if in a stationary position.
- Tube and coupler scaffolds shall be tied to and securely braced against the building at intervals not to exceed 30 feet horizontally and 26 feet vertically.

VRC PROTX SAFETY MANUAL

MOBILE ELEVATED WORK PLATFORM SAFETY POLICY

Purpose: This procedure is intended to provide for the safe training and instruction on the use of elevated work platforms on site and in our own facilities.

Note: As a general statement of policy VRC Protx avoids the operation of such equipment on customer property due to the fact that we do not have the documentation, certifications, or site specific training for *every* site we visit and perform work at. When the situation warrants we will submit to whatever training and certification required by our customers before we operate any kind of mobile equipment.

Overview: Mobile elevated work platforms (MEWP) such as articulating boom-lifts, man-lifts, scissor-lifts, etc. are assets when working at heights. However, used improperly, or poorly maintained, these devices can cause serious injury or death. This document has been created to minimize the risk of injury to operators, bystanders, and to avoid damaging VRC Protx and/or customer property. Employees assigned this equipment will utilize this program to increase operator awareness of recognized safety standards. Qualified trainers will be used to provide all training activities. Written records will be kept in the respective departments and by Safety to document all training. Specific responsibilities for monitoring the effectiveness of this program are assigned to departments, supervisors, and Safety. This document, will be reviewed annually by Safety, and those departments affected by its requirements. The annual review will assess the current level of program compliance, the programs' effectiveness in reducing injuries and property damage, and address program improvements.

Policy: Departments assigned MEWP(s) must ensure that supervisors and operators of MEWP(s) comply with all aspects of this safety program. All VRC Protx employees who would use this equipment must successfully complete this training program, and receive certification prior to the operation of any MEWP.

Requirements:

- OSHA Standard 29 CFR 1910.67
- OSHA Standard 29 CFR 1926.453
- ANSI / SIA 92.6 Self Propelled Elevating Work Platforms
- ANSI / SIA A92.2-1900 Vehicle Mounted Elevating and Rotating Devices
- ANSI / SIA A92.3 Manually Propelled Elevating Work Platforms
- ANSI / SIA A92.5 Boom-supported Elevating Work Platforms

MOBILE ELEVATED WORK PLATFORM SAFETY POLICY

Purpose II: This program has been developed to reduce the risk of physical injury or property damage in areas where MEWP(s) are in operation. It also brings VRC into compliance with federal, state, and local law.

Scope: This program applies to the operation of all MWEP(s) by VRC Protx employees and contractors, engaged in VRC Protx projects.

Procedures:

Pre-Use Inspection

- Prior to the operation of any mobile elevated work platform the Pre-Use Inspection Checklist found in Appendix B must be completed. This applies at the beginning of every work period, and whenever a new equipment operator takes control of the MEWP.
- Safety defects found during the inspection must be reported for immediate repair. They must also be locked and tagged, and placed out of service.
- Inspection forms specific to individual pieces of equipment may be created by the department which owns the equipment providing they are equal to, or more stringent, than the form in Appendix B.
- Inspection forms must be kept either on the equipment or in the department offices.
- A permanent inspection record file must be created and maintained for 3 years by the department responsible for the equipment.

Operation

- Workplace Assessment: Prior to, and throughout use, the user shall check the area in which the MEWP is to be used. This assessment shall include, but is not limited to:
  - Floor conditions
  - Housekeeping
  - Hazardous energy
  - Overhead Obstructions
- The elevating platform must be equipped with a standard guardrail system that has been installed according to manufacturer specifications, and that is in safe condition.
- The floor of the work platform must be kept in a clean and orderly fashion (i.e. free of trash, materials, tools, etc.) Use of

planks, ladders, or any other device on the MEWP for achieving additional height or reach is prohibited.

- Loads are not to exceed manufacturer load ratings, which have been established by the manufacturer. Additionally, all loads are to be distributed as recommended by the manufacturer. MEWP's shall not be used as a crane, (i.e. transport of materials, hoisting tools and equipment, etc.)
- Adequate clearance must be maintained between the MEWP and overhead obstructions to prevent personnel from becoming caught between the MEWP and any overhead obstructions. Personnel must remain within the confines of the guardrail system any time the platform is elevated (i.e. personnel shall not lean out over the handrail during vertical movement).
- To prevent inadvertent movement of the MEWP after it has been moved into the final work position, the control panel shall be de-energized (turned off).
- All MEWP control panels are required to be designed so that two-hand actuation or equivalent is required in order to operate the directional controls. The two hand activation must be designed so that an operator must maintain physical contact with the controls while operating the MEWP. Time-delay (Ramping Feature) activation controls are not permitted.
- Work platforms must be lowered to their base position before the platform is moved horizontally, unless the MEWP is designed for movement while elevated. However, horizontal movement of 10 feet, or less, of the work platform in the elevated position is only allowed for the final positioning of the lift.
- All movements performed in congested work locations must be performed with the aid of a spotter. Under all travel conditions, the operator shall limit travel speed according to conditions of ground surface, congestion, visibility, slope, location of personnel, and other factors that may create hazards related to travel. Personnel must maintain a firm footing on the platform floor while traveling.
- The operator and/or the spotter must ensure that the area surrounding the MEWP is clear of personnel and equipment before lowering the platform. Care shall be taken to prevent rope, electric cords and hoses from becoming entangled in the MEWP.
- No MEWP may be operated within 30 feet of overhead, energized lines without an approval from a supervisor or Risk Management and Safety representative.

- Altering or disabling interlocks or other safety devices is prohibited and is grounds for disciplinary action, up to and including termination.
- The engine shall be shut down while fuel tanks are being filled. Fueling shall be done in a well-ventilated area free of flame, sparks, or other hazards.
- Batteries shall be charged in a well-ventilated area free of flame, sparks, or other hazards that may cause fire or explosion.
- MEWP shall not be operated while positioned on trucks, trailers, railway cars, floating vessels, scaffolds, or similar equipment unless the application is approved in writing by the manufacturer or appropriate Environmental Health and Safety representative.
- The outriggers, stabilizers, extendible axles, or other stability enhancing means, shall be used as required by the manufacturer.
- Unsafe driving and horseplay is prohibited.
- The MEWP shall not be driven on grades, side slopes or ramps exceeding the rated capacity of the MEWP as stated by the manufacturer.
- If the MEWP basket or supporting assembly becomes caught, snagged, or otherwise prevented from normal motion by adjacent structures or other obstacles such that control reversal does not free the platform, all personnel shall be removed from the platform/basket before attempts are made to free the platform using ground station controls.
- Depending on the location and local work environment, safety spotters may be required during the use of MEWP.

    - Spotters shall be required when there is a potential for operator injury due to physical contact with facility systems or structures.

    - Spotters shall also be required when there is a potential for damage to sensitive facility systems or structures. Such as:
        1) Congested work locations with overhead piping/mechanical chases above ceiling grids.
        2) Operating manufacturing areas.
        3) Areas of poor visibility.
        4) Locations adjacent to hazardous production materials.
        5) Areas containing energized electrical equipment.

- A safety spotter may be another co-worker located on the work platform or on the ground depending on area to be observed during movement.
- The spotter shall work in conjunction with the operator to ensure the MEWP is utilized in a safe manner.
- Spotters shall be in a visual line of site with the MEWP and be able to lower the MEWP in an emergency.
- Spotters shall monitor all horizontal and vertical movements and provide guidance to the operator.
- A spotter may spot for multiple lifts.
- The spotter is not an additional person for the sole purpose of observing the lift.
- The spotter is meant to be a productive worker who can be called on to observe the MEWP during the vertical or horizontal movement.
- The spotter shall conduct a workplace hazard assessment survey for potential hazardous operating conditions prior to all horizontal or vertical movements of the MEWP.
- Hazard warnings and signage shall be used when other moving equipment and or personnel are present in the work area, special precautions shall be taken. Warnings such as, but not limited to, flags, roped-off areas, flashing lights, safety cones or barricades shall be used.
- Operating and maintenance manuals must be available for each MEWP located on customer's property. Operating manuals must be obtained or provided with each rental, lease or sale delivery and shall be stored in a weather resistant storage compartment located on the MEWP.
- Fall Protection – Aerial Boom Lift
    - A full-body harness with a fall arrest lanyard must be worn at all times by those workers located within the lift cage. The fall arrest lanyard must be secured to the aerial boom lift fall protection attachment point.
    - Tying off to an adjacent pole, facility structure, or equipment while working inside the cage of an aerial boom lift is prohibited.
    - Personnel required to climb out of an elevated boom lift onto an elevated facility structure shall utilize 100% tie off procedures during the

transition from the boom lift cage to the elevated work location. (i.e. personnel shall tie off to a fall rated facility anchorage point prior to disconnecting their lanyard attached to the aerial boom lift cage).

- Fall Protection – Scissor Lift
  - A full-body harness with a fall arrest lanyard will be worn if the manufacturer has supplied tie-off points on the lift and there are warning signs stating that fall protection must be worn. If attaching fall arrest systems to an overhead tie-off point that point must be able to support 5,000lbs or twice the arresting force.
- Operators shall immediately report any problems or malfunctions that become evident during operation to their supervisor. Any lifts with problems or malfunctions that affect the safety of operations shall be immediately removed from service, locked and tagged, and repaired prior to continued use.
- The operation/maintenance of MEWP shall comply with safety-related bulletins as received from the manufacturer, dealer, or owner.
- Only MEWP approved for use in hazardous locations or atmospheres as defined by ANSI / NFPA 505-1987 shall be used in ANSI / NFPA defined hazardous locations. Operators shall immediately cease work in and report to a supervisor any potentially hazardous location(s) or environment that become evident during operation.
- All operators shall carry a certification card or card sticker which indicates they are qualified operators of the MEWP. The certification card and or a card sticker shall be renewed or reissued annually. MEWP shall be sufficiently controlled to prevent the use of the MEWP by unauthorized persons.

Responsibilities

Departments Assigned MEWP(s)

- Must implement and administer the MEWP program.
- Review the MEWP program annually for compliance and effectiveness.
- Make recommendations for revisions if necessary.
- Maintain written records of operator training on each model of MEWP and the name of the trainer.

	• Maintain written records of the frequent and annual inspections performed by the MEWP owner, including the date any problems found, the date when fixed, and the name of the person performing the repairs. • Maintain a record of the Pre-Acceptance Inspection Checklist. • Maintain written records of the name and purchaser of each MEWP.
Supervisors:	• Complete the Quarterly Assessment Checklist. Supervisors will retain the original, and send a copy to Risk Management and Safety. The Quarterly Assessment Checklist must remain on file for 3 years. • Coordinate employee training, and certify that all operators receive annual training. • Verify employee compliance with the principles and practices outlined in the MEWP program. • Provide specific operational training for each powered industrial truck. • Observe the operation of MEWP(s) in the department, and correct unsafe practices. • Ensure that only trained and qualified individuals use a MEWP.
Operators:	• Be responsible for operating MEWP in accordance with this program and the machine specific safety training. • Complete the MEWP training. • Responsible for conducting and documenting pre-use use inspections. • At least annually, review the procedures outlined in Section 6.0 of this document. • Observe the operation of MEWP's in your department, and report unsafe practices to your supervisor.
Safety Director & Safety Training Coordinator:	• Annually review and update the program as necessary; • Monitor the effectiveness of program by receipt of copies of inspection checklists. • Provide orientation and initial training as requested by VRC Protx departments and/or contractors. • Provide the general safety training requirements for program. • Upon request, evaluate work areas and employee work practices. • Observe the operation of MEWP's and report unsafe practices to the appropriate supervisor.

MOBILE ELEVATED WORK PLATFORM SAFETY POLICY

Training Requirements:

All MEWP operators shall be trained in accordance with the manufacturer's operating and maintenance manual, the user's work instructions, and the requirements listed in this specification before operating the MEWP. Only properly trained and authorized personnel shall be permitted to operate the MEWP.

The operator shall be trained either on the same model of MEWP or one having operating characteristics and controls consistent with the one to be used during actual work site operation. Under the direction of a qualified person, the trainee shall operate the MEWP for a sufficient period of time to demonstrate proficiency and knowledge in the actual operation of the equipment. Care shall be taken to ensure the area of such operation has a minimum of obstacles and is conducive to training.

Operator:

- Prior to operating any MEWP the trainee will read and understand the manufacturer's operating instruction(s) and user's safety rules, or receive training by a qualified person on the contents of the manufacturer's operating instruction(s) and users safely rules.
- Receive instruction on the intended purpose and function of each control.
- Understand by reading or having a qualified person explain all decals, warnings, and instructions displayed on the MEWP.
- Be informed of the MEWP operating limitations and restrictions as defined by the manufacturer.

Spotter

- Each spotter shall be trained to perform their assigned roles/responsibilities as defined. Spotters shall be trained to understand basic operating procedures of each MEWP they monitor. Each spotter shall be trained in the operation of the MEWP ground station controls and possess complete understanding of the overriding capability of the work platform controls.

Maintenance Personnel:

- All personnel performing maintenance on MEWP shall be trained in accordance with manufacturer requirements.

MOBILE ELEVATED WORK PLATFORM SAFETY POLICY

Training Records:

- Each department must maintain a record of all individual training, including:
  - Subject of training.
  - Date of training.
  - Names of those trained.
  - Name of the trainer.
- Training records must maintained by the department for a minimum of three years.

Monitoring

Departments Assigned MEWP(s)

- Review documents prepared by individual supervisors. Documents may include, but not be limited to:
  - Employee evaluations
  - Annual visual operating observations
  - Daily Pre-Use Inspection forms including the resolution of any deficiencies noted by the operators.
  - Quarterly Assessment Checklists

Supervisors:

- Review documents prepared by operators to ensure accuracy and consistency.
- Review all requests for repairs, and document completed repairs.
- Ensure that an MEWP does not remain in use if safety concerns are noted on the Daily Pre-Use Inspection form.
- Visually observe each MEWP operator at least annually to assess their driving competence and compliance with this program. Supervisors will place the following information in each operators file to document their observations: operators name, date, time, location, and supervisors comments relative to the performance observed.

Safety:

- Review all records received, and evaluate them completeness and accuracy.
- Monitor the submission of required records and reports.
- Maintain a permanent record of all documents received.
- Provide additional training as may be necessary to ensure compliance with the MEWP program.
- Review and respond to all comments and suggestions received from departments, supervisors, or operators pertaining to the MEWP program.

MOBILE ELEVATED WORK PLATFORM SAFETY POLICY

DEFINITIONS:

Authorized Personnel (Authorized Person) - Personnel approved as assigned to perform a specific type of duty or duties at a specific location or locations at a work site.

Competent Person - One who 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.

Delivery - Transfer of care, control, and custody of the MEWP from one person or entity to another person or entity.

Directional controls - Controls that initiate functions that affect movement of the platform or the MEWP.

Guardrail system - A vertical barrier erected to prevent personnel from falling to lower levels.

Hazardous location - Any location that contains, or has the potential to contain, an explosive or flammable atmosphere as defined by ANSI/NFPA 505.

Instability - A condition of an MEWP in which the sum of the movements that tend to overturn the unit exceeds the sum of the movements tending to resist overturning.

Interlock - A control or mechanism that, under specified conditions, automatically allows or prevents the operation of another control or mechanism.

Manufacturer - A person or entity that makes, builds, or produces an MEWP.

MEWP (Mobile Elevated Work Platform) - A mobile device that has an adjustable work platform that can be elevated in order to perform work above the ground level. Examples of MEWP's include scissors lifts, aerial boom lifts, articulating boom lifts, etc.

Modification - To make a change(s) to an MEWP that affects the operation, stability, safety factors, rated load or safety of the MEWP.

Operator - A qualified person who controls the movement of the MEWP.

MOBILE ELEVATED WORK PLATFORM SAFETY POLICY

Outriggers -Devices that increase the stability of the MEWP and that are capable of lifting and leveling the MEWP.

Override - To take over MEWP movement control functions of the work platform control station by personal at the ground station controls.

Owner - A person or entity that has possession of an MEWP by virtue of proof of purchase.

Platform - The portion of an MEWP intended to he occupied by personnel and tools.

Qualified Person - a person, who by reason of knowledge, experience, or training, is familiar with the operation to be performed and the hazards involved,.

Shall: The word "shall" is to be understood as being mandatory.

Stabilizers - Devices that increase the stability of the MEWP but are not capable of lifting or leveling the MEWP.

Unrestricted rated work load - The maximum designed carrying capacity of the MEWP allowed by the manufacturer in all operating configurations.

User - A person(s) or entity having care, control and custody of the MEWP. This person or entity may also be a dealer, owner, leasor, leasee, or operator.

MOBILE ELEVATED WORK PLATFORM SAFETY POLICY

DAILY PRE- USE INSPECTION CHECKLIST

Name/Type of MEWP:		**Model or Equip No.:**						
Shift:								
Inspectors Initials:								
Date(s):								
Is the operator trained to operate this MEWP and does the operator have a valid operators license/card?		Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N
Inspection Item & Description **Pass Fail Status**		**P/F**	**P/F**	**P/F**	**P/F**	**P/F**	**P/F**	**P/F**
1	Operating and emergency controls are in proper working condition, EMO button or Emergency Stop Device							
2	Functional upper drive control interlock (i.e. foot pedal, spring lock, or two hand controls)							
3	Emergency Lowering function operates properly							
4	Lower operating controls successfully over ride the upper controls							
5	Both upper and lower controls are adequately protected from inadvertent operation.							
6	Control panel is clean & all buttons/switches are clearly visible (no paint over spray, etc.)							
7	All switch & mechanical guards are in good condition and properly installed							
8	All Safety Indicator lights work							
9	Drive controls function properly & accurately labeled (up, down, right, left, forward, back)							
10	Motion alarms are functional							
11	Safety decals are in place and readable							
12	All guard rails are sound and in place, including basket chains							
13	Work platform & extension slides are clean, dry, & clear of debris							
14	Work platform extension slides in and out freely with safety locking pins in place to lock setting on models with extension platforms.							
15	Inspect for defects such as cracked welds ,fuel leaks, hydraulic leaks, damaged control cables or wire harness, etc.							
16	Tires and wheels are in good condition, with adequate air pressure if pneumatic							
17	Braking devices are operating properly							
18	The manufacturer's operations manual is stored on MEWP (in all languages of the operators)							
19	Floor conditions: Drop offs, holes, uneven surfaces, and sloped floors.							
20	Housekeeping: Debris, floor obstructions, cords, construction material and supplies.							
21	Electrical power cables or panels, chemical lines, gas lines, drain lines, and utilities.							
22	Overhead obstructions							

Quarterly Assessment Checklist

(Use this checklist as a quarterly assessment of each MEWP in your area of responsibility)

If any answer is no, please describe the plan you have to remedy the situation.

1. Did you ensure that only properly trained and authorized personnel used the MEWP that you are responsible for?

Y N

2. Did you ensure that the proper manuals were located on each machine at all times?

Y N

3. Did you ensure that a daily or pre-use safety inspection was conducted and documented?

Y N

4. Did you ensure that the proper fall protection was used when required?

Y N

5. Did you ensure that trained spotters were used when required?

Y N

6. Did you ensure that all maintenance was done by authorized personnel?

Y N

Comments on “No” answers:

FORK LIFT SAFETY

Purpose	The purpose of this Powered Industrial Truck Program is to protect the health and safety of all employees assigned to operate powered industrial trucks and to comply with the requirements of 29 CFR 1910.178 (Powered Industrial Trucks)
Responsibility	It is the responsibility of VRC Protx to assure that any employee assigned to operate a specific brand of Powered Industrial Truck (PIT) is properly trained and certified in the operation of the brand of PIT that they are required to operate. It is also the company's responsibility to maintain the training and certification records of each employee.
Training	Only employee's who have successfully completed training in accordance with 1910.178(l) will be permitted to operate a PIT. VRC Protx will rely on a third party certified safety contractor to provide our employee evaluation, training and certifications.
PIT Inspection	VRC Protx PIT's are used on average of 3 hours per week. VRC Protx will perform a visual inspection daily before use and will do a documented inspection monthly. This inspection will be documented with a PIT Inspection Checklist.

HEARING CONSERVATION PROGRAM

Purpose

This purpose of this hearing conservation program is to prevent occupational hearing loss and comply with the COMM/OSHA Standard 29 CFR 1910.95 - Occupational Noise Exposure.

Authority and Reference

Occupational Safety and Health Administration (OSHA) 29 CFR 1910.95
Dept. of Commerce Chapter 32

Application

The Occupational Safety and Health Administration (OSHA) Occupational Noise Exposure standard 29 CFR 1910.95 establishes a permissible exposure limit (PEL) for occupational noise exposure, and requirements for audiometric testing, hearing protection, and employee training if those sound levels are exceeded. This regulation defines an "action level" (AL) as a "dose" of 50%, which is equivalent to an eight-hour time weighted average of 85 dBA. When noise levels exceed this amount, an effective hearing conservation program is required, which includes as a minimum:

Requirement	Section
1. Noise monitoring	29 CFR 1910.95(d)(e)(f)
2. Audiometric testing	29 CFR 1910.95(g)(h)
3. Hearing protectors	29 CFR 1910.95(i)(j)
4. Education and training	29 CFR 1910.95(k)(1)
5. Recordkeeping	29 CFR 1910.95(m)

Note: The OSHA regulation only indicates a minimum level of hearing protection and focuses on permanent hearing loss. Short durations of noise, especially sharp bursts of noise at these levels can not only induce hearing loss but can also affect an employee's health and safety in other ways (See Table # 1 on page 15).

Background

Occupational noise can cause hearing loss, and increase the worker's susceptibility to other workplace problems including physical and psychological disorders, interference with speech and communication, and disruption of job performance associated with excessive noise intensities. This exposure to noise produces hearing loss of a neural type involving injury to the inner ear hair cells. The loss of hearing may be temporary or permanent. Brief exposure causes a temporary loss. Repeated exposure to high noise levels will cause a permanent loss. Permanent hearing loss is preventable with the continued use of proper hearing protection and reduction of workplace noise levels to below 85 decibels. This will benefit not only employees who can listen and communicate well throughout their lifetimes, but also helps the employer in terms of reduced exposure to hearing loss compensation claims and a potential for increased general safety and job performance.

HEARING CONSERVATION PROGRAM

Responsibility for Compliance

The administration of this program will be the responsibility of Safety Director. Administrative responsibilities include:

1. Coordination and supervision of noise exposure monitoring.
2. Identification of employees to be included in the Hearing Conservation Program.
3. Coordination and supervision of audiometric testing program.
4. Supervision of hearing protector selection.
5. Development of policies relating to the use of hearing protectors.
6. Supervision of employee training programs.
7. Coordination and supervision of required recordkeeping.
8. Periodic evaluation of overall program.
9. Coordination of required changes/improvements in the program.

Noise Monitoring

1. When information indicates that any employee's exposure may equal or exceed an 8-hour time-weighted average of 85 decibels, the employer shall develop and implement a monitoring program.
2. Employers shall identify employees for inclusion in the hearing conservation program and to enable the proper selection of hearing protectors.
3. All continuous, intermittent and impulsive sound levels from 80 decibels to 130 decibels shall be integrated into the noise measurements.
4. Instruments used to measure employee noise exposure shall be calibrated to ensure measurement accuracy.
5. Monitoring shall be repeated whenever a change in production, process, equipment or controls increases noise exposures to the extent that:
   i. Additional employees may be exposed at or above the action level; or
   ii. The attenuation provided by hearing protectors being used by employees may be rendered inadequate to meet the requirements (explained in section IX).
6. The employer shall notify each employee exposed at or above an 8-hour time-weighted average of 85 decibels of the results of the monitoring.
7. The employer shall provide affected employees or their representatives with an opportunity to observe any noise measurements conducted.

HEARING CONSERVATION PROGRAM

8. Monitoring will be coordinated by Safety Director with assistance from the local safety coordinator.
9. The results of the noise exposure measurements will be recorded on Form # 1.

Audiometric Testing

The employer shall establish and maintain an audiometric testing by making audiometric testing available to all employees whose exposures equal or exceed an 8-hour time-weighted average of 85 decibels.
The program shall be provided at no cost to employees.
Audiometric tests shall be performed by a licensed or certified audiologist, otolaryngologist, or other physician, or by a technician who is certified by the Council of Accreditation in Occupational Hearing Conservation, or who has satisfactorily demonstrated competence in administering audiometric examinations, obtaining valid audiograms, and properly using, maintaining and checking calibration and proper functioning of the audiometers being used. A technician who operates microprocessor audiometers does not need to be certified. A technician who performs audiometric tests must be responsible to an audiologist, otolaryngologist or physician.

Baseline Audiogram:

Within 6 months of an employee's first exposure at or above the action level, the employer shall establish a valid baseline audiogram against which subsequent audiograms can be compared.

Mobile Test Van Exception

Where mobile test vans are used to meet the audiometric testing obligation, the employer shall obtain a valid baseline audiogram within 1 year of an employee's first exposure at or above the action level. Where baseline audiograms are obtained more than 6 months after the employee's first exposure at or above the action level, employees shall wearing hearing protectors for any period exceeding six months after first exposure until the baseline audiogram is obtained.
Testing to establish a baseline audiogram shall be preceded by at least 14 hours without exposure to workplace noise. Hearing protectors may be used as a substitute for the requirement that baseline audiograms be preceded by 14 hours without exposure to workplace noise.
The Safety Director shall notify employees of the need to avoid high levels of non-occupational noise exposure during the 14-hour period immediately preceding the audiometric examination.

Annual Audiogram

Audiograms will be conducted at least annually after obtaining the baseline audiogram for each employee exposed at or above an 8-hour time-weighted average of **85 decibels**.

HEARING CONSERVATION PROGRAM

The Safety Director will maintain a record of all employee audiometric test records. This record will include:

1. Name and job classification of the employee.
2. Date of the audiogram.
3. The examiner's name.
4. Date of the last acoustic or exhaustive calibration of the audiometer.
5. Employee's most recent noise exposure assessment.

Audiometric Evaluation

1. Each employee's annual audiogram will be compared to his/her baseline audiogram by qualified evaluator to determine if a Standard Threshold Shift (STS) has occurred. This comparison may be done by a technician.
2. A Standard Threshold Shift is defined by OSHA as a change in hearing threshold relative to the baseline of an average of 10dB or more at 2000, 3000, and 4000 Hz either ear.
3. In determining if a Standard Threshold Shift has occurred, an allowance can be made for the contribution of aging (presbycusis). The age correction values to be used are found in Appendix F of 1910.95.
4. The audiologist, otolaryngologist, or physician shall review problem audiograms and shall determine whether there is a need for further evaluation. The employer shall provide to the person performing this evaluation the following information:
   a. A copy of the requirements for hearing conservation as set forth in the standard.
   b. The baseline audiogram and most recent audiogram of the employee to be evaluated.
   c. Measurements of background sound pressure levels in the audiometric test room as required in Appendix D: Audiometric Test Rooms.
   d. Records of audiometer calibrations
5. If the annual audiogram shows that an employee has suffered a standard threshold shift, the employer may obtain a retest within 30 days and consider the results of the retest as the annual audiogram.
6. Unless a physician determines that the standard threshold shift is not work related or aggravated by occupational noise exposure, the employer shall ensure that the following steps are taken when a standard threshold shift occurs:

a. Employees not using hearing protectors will be trained, fitted, and required to use hearing protectors if they are exposed to an 8 hour TWA average sound level of 85 decibels or greater.
b. Employees already using hearing protectors shall be retrained, refitted, and required to use hearing protectors and provided with hearing protectors offering greater attenuation if necessary.
c. The Safety Director will inform the employee, in writing, within 21 days of this determination, of the existence of a permanent Standard Threshold Shift. (See Form # 2) A copy of the STS letter will also be sent to the employee's supervisor.
d. The Safety Director will counsel the employee on the importance of using hearing protectors and refer the employee for further clinical evaluation if necessary.

7. Persistent significant threshold shifts must be entered on the OSHA 300 Log if determined to be work related.
8. If subsequent audiometric testing of an employee whose exposure to noise is less than an 8-hour TWA of 90 decibels indicates that a Standard Threshold Shift is not persistent, the (Position designated):
   a. Shall inform the employee of the new audiometric interpretation.
   b. May discontinue the required use of hearing protectors for that employee.

Protection Equipment:

A. The Safety Director shall ensure that hearing protectors are worn:
   1. By any employee who is subjected to sound levels equal to or exceeding an 8-hour TWA of 90 decibels.
   2. By any employee who has experienced a persistent Standard Threshold Shift and who is exposed to 8-hour TWA of 85 decibels or greater.
   3. By any employee who has not had an initial baseline audiogram and who is exposed to 8-hour TWA of 85 decibels or greater.

B. Employees will be given the opportunity to select their hearing protectors of suitable hearing protectors at no cost to them.

C. The Safety Director will provide training in the use and care of all hearing protectors.

HEARING CONSERVATION PROGRAM

D. The Safety Director will ensure proper initial fitting and supervise the correct use of all hearing protectors.

E. Employees will be held accountable for not properly using and maintaining the equipment furnished.

F. The Safety Director will evaluate the attenuation characteristics of the hearing protectors to ensure that a given protector will reduce the individual's exposure to the required decibels. (See Form # 3)

1. If the 8-hour TWA is over 90 decibels, then the protector must attenuate the exposure to at least an 8-hour TWA of 90 decibels or below.
2. If the protector is being worn because the employee experienced a Standard Threshold Shift, then the protector must attenuate the exposure to an 8-hour TWA of 85 decibels or below.
3. If employee noise exposures increase to the extent that the hearing protectors provided may no longer provide adequate attenuation, the employee will be provided more effective hearing protectors.

G. It is the responsibility of the supervisor to ensure that hearing protectors are worn by all employees who are exposed to noise levels at or above an eight hour TWA of 90 decibels or if the employee experienced a permanent STS or has not yet had a baseline audiogram.

Employee Educational Training

An annual training program for each employee included in the hearing conservation program will be conducted by Safety Director and will include information on:

1. The effects of noise on hearing.
2. The purpose and use of hearing protectors.
3. The advantages, disadvantages, and attenuation of various types of protection.
4. Instruction in the selection, fitting, use and care of protectors.
5. The purpose of audiometric testing and an explanation of the test procedures.

Form #4 will be used to record the training dates and the employees in attendance.

Information provided in the training program shall be updated to be consistent with changes in protective equipment and work processes.

HEARING CONSERVATION PROGRAM

Recordkeeping

Noise exposure measurement records will be retained for two years.
Audiometric test records will be retained for the duration of the affected workers employment plus thirty years.
Access to records. All records required by this section shall be provided upon request to employees, former employees, representatives designated by the individual employee.

***Program Evaluation**

At least annually, the Hearing Protection Program will be evaluated by Safety Director using a Program Evaluation Checklist (See Form # 5).
After the evaluation, the changes/revisions to the program deemed necessary will be made as soon as possible.
This written program may be adapted to fit the particular needs of your facility.
NOTE: An asterisk (*) indicates that that particular section is not required by the Hearing Conservation Standard.

HEARING CONSERVATION PROGRAM

Form # 1

Noise Exposure Measurements

Organization:_____

Location	Process/Operation	Noise Exposure Levels in Decibels

HEARING CONSERVATION PROGRAM

Form # 2

Sample Standard Threshold Shift (STS) Letter

Dear _____,

Your most recent audiometric test result was compared to your baseline audiogram. This comparison indicates that your hearing has deteriorated to the point where your hearing impairment constitutes a "standard threshold shift." This is defined by the Occupational Safety and Health Administration (OSHA) as a relative hearing loss of an average of 10 decibels in either ear at the frequencies of 2000, 3000 and 4,000Hz.

An audiogram cannot define why you have a hearing loss, but there are many possible reasons such as infection, wax buildup in your ear and noise.

By taking the necessary action now, we can try to stop hearing loss from getting worse.

Consequently, we want to fit you with hearing protectors. Please call _____ to arrange an appointment with_____.

Whenever you are in a work environment that would result in noise exposure that equals or exceeds an 8 hour Time Weighted Average (TWA) of 85 decibels, hearing protection **must** be used.

Loss of hearing will affect you life. Preserve your hearing while you still have a chance.

Our Safety Department will attempt to answer any questions you may have.

Sincerely,

_____

HEARING CONSERVATION PROGRAM

Form # 3

Hearing Protection Equipment Summary

Organization: _____

Type (muff/cap/plug)	Name (Brand and Model)	Noise Reduction Rating

HEARING CONSERVATION PROGRAM

Hearing Conservation Training Record

Organization: _____

Name of Employee	Job Classification	Department

Trainer:_____ Date: _____

HEARING CONSERVATION PROGRAM

Form # 5

*Annual Hearing Conservation Program Evaluation

1. Noise exposure level monitoring has been completed in all areas and rechecked as necessary after any alterations which may have resulted in a change in noise levels. Yes ___ No ___ If no, what action will be taken to complete the monitoring?

2. Baseline audiograms (if required) have been completed on all employees hired this year. Yes ___ No ___ If no, what arrangements will be made to complete the audiograms?

3. Annual audiograms (if required) have been completed on all employees who are included in the hearing conservation program. Yes ___ No ___
If no, what arrangements will be made to complete the audiograms?

4. All employees included in the hearing conservation program have been provided with hearing protection. Yes ___ No ___
If no, what action will be taken to provide this protection?

5. All employees who are required to wear hearing protection are wearing them correctly. Yes____ No ____ If no, what action(s) will be taken to enforce this requirement?

6. Have all employees included in the Hearing Conservation Program received initial and annual training in the use of hearing protection, the effects of noise on hearing and the purpose of audiometric testing if applicable? Yes____ No ____
If no, what will be done to complete this training?

7. Standard Threshold Shifts (STS) have been identified. Yes____ No ____
If no, what action will be taken with these employees?

8. Employees with STS's have been notified in writing and fitted with the proper hearing protectors. Yes____ No ____ If no, what action will be taken to notify these employees**?**

Review Completed by: _____ Date: _____

HEARING CONSERVATION PROGRAM

Table # 1

Permissible Noise Exposures
29 CFR 1910.95 Table G-16(a)

Duration (Hours)		Sound Level Slow Response
32.0		80
27.9		81
24.3		82
21.1		83
18.4		84
16.0		85
13.9		86
12.1		87
10.6		88
9.2		89
8.0		90
7.0		91
6.2		92
5.3		93
4.6		94
4.0		95
3.5		96
3.0		97
2.6		98
2.3		99
2.0		100
1.7		101
1.5		102
1.4		103
1.3		104
1.0		105
0.87		106
0.76		107
0.66		108
0.57		109
0.5		110
0.44		111
0.38		112

HEARING CONSERVATION PROGRAM

0.33		113
0.29		114
0.25		115
0.22		116
0.19		117
0.16		118
0.14		119
0.125		120
0.11		121
0.095		122
0.082		123
0.072		124
0.063		125
0.054		126
0.047		127
0.041		128
0.036		129
0.031		130

HEARING CONSERVATION PROGRAM EVALUATION CHECKLIST

Training and Education

Failures or deficiencies in hearing conservation programs (hearing loss prevention programs) can often be traced to inadequacies in the training and education of noise-exposed employees and those who conduct elements of the program.

	Yes	*No*
Has training been conducted at least once a year?		
Was the training provided by a qualified instructor?		
Was the success of each training program evaluated?		
Is the content revised periodically?		
Are managers and supervisors directly involved?		
Are posters, regulations, handouts, and employee newsletters used as supplements?		
Are personal counseling sessions conducted for employees having problems with hearing protection devices or showing hearing threshold shifts?		

Supervisor Involvement

Data indicate that employees who refuse to wear hearing protectors or who fail to show up for hearing tests frequently work for supervisors who are not totally committed to the hearing loss prevention programs.

	Yes	*No*
Have supervisors been provided with the knowledge required to supervise the use and care of hearing protectors by subordinates?		
Do supervisors wear hearing protectors in appropriate areas?		
Have supervisors been counseled when employees resist wearing protectors or fail to show up for hearing tests?		
Are disciplinary actions enforced when employees repeatedly refuse to wear hearing protectors?		

Noise Measurement

For noise measurements to be useful, they need to be related to noise exposure risks or the prioritization of noise control efforts, rather than merely filed away. In addition, the results need to be communicated to the appropriate personnel, especially when follow-up actions are required.

HEARING CONSERVATION PROGRAM

	Yes	*No*
Were the essential/critical noise studies performed?		
Was the purpose of each noise study clearly stated? Have noise-exposed employees been notified of their exposures and apprised of auditory risks?		
Are the results routinely transmitted to supervisors and other key individuals?		
Are results entered into health/medical records of noise exposed employees?		
Are results entered into shop folders?		
If noise maps exist, are they used by the proper staff?		
Are noise measurement results considered when contemplating procurement of new equipment? Modifying the facility? Relocating employees?		
Have there been changes in areas, equipment, or processes that have altered noise exposure? Have follow-up noise measurements been conducted?		
Are appropriate steps taken to include (or exclude) employees in the hearing loss prevention programs whose exposures have changed significantly?		

Engineering and Administrative Controls

Controlling noise by engineering and administrative methods is often the most effective means of reducing or eliminating the hazard. In some cases engineering controls will remove requirements for other components of the program, such as audiometric testing and the use of hearing protectors.

	Yes	*No*
Have noise control needs been prioritized?		
Has the cost-effectiveness of various options been addressed?		
Are employees and supervisors apprised of plans for noise control measures? Are they consulted on various approaches?		
Will in-house resources or outside consultants perform the work?		
Have employees and supervisors been counseled on the operation and maintenance of noise control devices?		
Are noise control projects monitored to ensure timely completion?		
Has the full potential for administrative controls been evaluated?		
Are noisy processes conducted during shifts with fewer employees?		
Do employees have sound-treated lunch or break areas?		

Monitoring Audiometry and Record Keeping

The skills of audiometric technicians, the status of the audiometer, and the quality of audiometric test records are crucial to hearing loss prevention program success. Useful information may be ascertained from the audiometric records as well as from those who actually administer the tests.

HEARING CONSERVATION PROGRAM

	Yes	*No*
Has the audiometric technician been adequately trained, certified, and recertified as necessary?		
Do on-the-job observations of the technicians indicate that they perform a thorough and valid audiometric test, instruct and consult the employee effectively, and keep appropriate records?		
Are records complete?		
Are follow-up actions documented?		
Are hearing threshold levels reasonably consistent from test to test? If not, are the reasons for inconsistencies investigated promptly?		
Are the annual test results compared to baseline to identify the presence of an OSHA standard threshold shift?		
Is the annual incidence of standard threshold shift greater than a few percent? If so, are problem areas pinpointed and remedial steps taken?		
Are audiometric trends (deteriorations) being identified, both in individuals and in groups of employees? (NIOSH recommends no more than 5% of workers showing 15 dB Significant Threshold Shift, same ear, same frequency.)		
Do records show that appropriate audiometer calibration procedures have been followed?		
Is there documentation showing that the background sound levels in the audiometer room were low enough to permit valid testing?		
Are the results of audiometric tests being communicated to supervisors and managers as well as to employees?		
Has corrective action been taken if the rate of no-shows for audiometric test appointments is more than about 5%?		
Are employees incurring STS notified in writing within at least 21 days? (NIOSH recommends immediate notification if retest shows 15 dB Significant Threshold Shift, same ear, same frequency.)		

Referrals

Referrals to outside sources for consultation or treatment are sometimes in order, but they can be an expensive element of the hearing loss prevention program, and should not be undertaken unnecessarily.

	Yes	*No*
Are referral procedures clearly specified?		
Have letters of agreement between the company and consulting physicians or audiologists been executed?		
Have mechanisms been established to ensure that employees needing		

evaluation or treatment actually receive the service (i.e., transportation, scheduling, and reminders)?		
Are records properly transmitted to the physician or audiologist, and back to the company?		
If medical treatment is recommended, does the employee understand the condition requiring treatment, the recommendation, and methods of obtaining such treatment?		
Are employees being referred unnecessarily?		

Hearing Protection Devices

When noise control measures are infeasible, or until such time as they are installed, hearing protection devices are the only way to prevent hazardous levels of noise from damaging the inner ear. Making sure that these devices are worn effectively requires continuous attention on the part of supervisors and program implementers as well as noise-exposed employees.

	Yes	*No*
Have hearing protectors been made available to all employees whose daily average noise exposures are 85 dBA or above? (NIOSH recommends requiring HPD use if noises equal or exceed 85 dBA regardless of exposure time.)		
Are employees given the opportunity to select from a variety of appropriate protectors?		
Are employees fitted carefully with special attention to comfort?		
Are employees thoroughly trained, not only initially but at least once a year?		
Are the protectors checked regularly for wear or defects, and replaced immediately if necessary?		
If employees use disposable hearing protectors, are replacements readily available?		
Do employees understand the appropriate hygiene requirements?		
Have any employees developed ear infections or irritations associated with the use of hearing protectors?		
Are there any employees who are unable to wear these devices because of medical conditions?		
Have these conditions been treated promptly and successfully?		
Have alternative types of hearing protectors been considered when problems with current devices are experienced?		
Do employees who incur noise-induced hearing loss receive intensive counseling?		
Are those who fit and supervise the wearing of hearing protectors competent to deal with the many problems that can occur?		
Do workers complain that protectors interfere with their ability to do their		

jobs?		
Do they interfere with spoken instructions or warning signals?		
Are these complaints followed promptly with counseling, noise control, or other measures?		
Are employees encouraged to take their hearing protectors home if they engage in noisy non-occupational activities?		
Are new types of or potentially more effective protectors considered as they become available?		
Is the effectiveness of the hearing protector program evaluated regularly?		
Have at-the-ear protection levels been evaluated to ensure that either over or under protection has been adequately balanced according to the anticipated ambient noise levels?		
Is each hearing protector user required to demonstrate that he or she understands how to use and care for the protector?		
The results documented?		

Administrative

Keeping organized and current on administrative matters will help the program run smoothly.

	Yes	*No*
Have there been any changes in federal or state regulations?		
Have hearing loss prevention program's policies been modified to reflect these changes		
Are copies of company policies and guidelines regarding the hearing loss prevention program available in the offices that support the various program elements?		
Are those who implement the program elements aware of these policies?		
Do they comply?		
Are necessary materials and supplies being ordered with a minimum of delay?		
Are procurement officers overriding the hearing loss prevention program implementers' requests for specific hearing protectors or other hearing loss prevention equipment?		
If so, have corrective steps been taken?		
Is the performance of key personnel evaluated periodically?		
If such performance is found to be less than acceptable, are steps taken to correct the situation?		
Safety: Has the failure to hear warning shouts or alarms been tied to any accidents or injuries?		
If so, have remedial steps been taken?		

HEARING CONSERVATION PROGRAM

Guide for Record Keeping

You can't control workplace noise without reliable information. Accurate records document what you have done to control noise and inform you when you may need to change your strategy to keep noise under control. Record keeping ties together critical information about all the other tools you use to eliminate or control workplace noise. The table below summarizes the critical record-keeping information for each noise-control tool.

Noise-control tool	What it covers	Critical record-keeping information	Retention period
Exposure monitoring	Sound survey	The date of survey, instruments used, areas surveyed, noise hazards identified, employees affected, employees with exposure levels exceeding 85 decibels over an eight-hour period	2 years
Audiometric testing	Baseline and annual audiograms	Name and job classification of each affected employee, employee test results, tester's name, test date, audiometer calibration date, test room background sound pressure level	Until the employee's termination date
Education and training	Hearing conservation concepts	Names of employees who received training, training dates, who presented the training	No minimum period
Engineering controls	Feasibility survey	Results of feasibility surveys, controls used, start date, noise reduction achieved	No minimum period
Administrative controls	Feasibility survey	Results of feasibility surveys, controls used, start date, noise reduction achieved, employees affected	No minimum period
Hearing protectors	Selection and fitting	Date of initial hearing protector fitting for each employee, size and brand of hearing protector selected, name of person who assisted with fitting	No minimum period

RESPIRATORY PROTECTION

Purpose

The Respiratory Protection Policy is to ensure that all VRC Protx employees are protected at all times against harmful levels of air contaminants and conditions of oxygen deficiency. This policy also provides a continuous training program to all affected employees. VRC Protx will provide respirators where engineering controls do not reduce atmospheric contamination to acceptable levels; or where unavoidable spills, leaks or other emergencies may occur when such equipment is necessary to protect the health and ensure the safety of employees. The use of respiratory equipment is meant to be for short duration and not as a substitute for elimination of the hazards through engineering or administrative controls.

Scope

This standard shall apply to all respiratory protection equipment belonging to or being used by VRC Protx personnel, contractors or subcontractors.

Responsibility

VRC Protx is responsible for ensuring that:

- All affected employees have received training and are qualified to use respirators prior to assigning them duties that require respiratory protection;
- Proper respiratory equipment is provided, used and maintained;
- Training is provided and documented on at least an annual basis.
- An annual effectiveness evaluation of the respirator program is performed.

Each employee is responsible for ensuring that:

- Respiratory protection is used in accordance with the training provided;
- Any malfunction of respiratory equipment is reported immediately to their supervisor.

RESPIRATORY PROTECTION

Definitions

APR - Air Purifying Respirator - A respirator that purifies the ambient air, such as a cartridge respirator.

Hazardous Atmosphere - Any atmosphere which is oxygen deficient, oxygen rich or which contains a toxic or disease-producing contaminant that exceeds the permissible limit.

IDLH - Immediately Dangerous to Life or Health - Any atmosphere that poses an immediate hazard to life or produces immediate irreversible debilitating effects on health. IDLH per NIOSH: the maximum concentration from which, in the event of respirator failure, one could escape without experiencing any escape-impairing or irreversible health effects within 30 minutes. Includes oxygen deficient atmospheres.

MSHA - Mine Safety and Health Administration

NIOSH - National Institute for Occupational Safety and Health

Oxygen Deficient Atmosphere - Any atmosphere with less than 19.5% oxygen

PEL - Permissible Exposure Limit - exposure limit that cannot be exceeded without adverse effect.

PFT - Pulmonary Function Test

SAR - Supplied Air Respirator - A respirator that provides its own air, such as Scott Air Pak and Air Line respirators.

SCBA - Self Contained Breathing Apparatus - A respirator that provides its own air and that air is carried with the user, such as a Scott Air Pak.

TLV - Threshold Limit Value - A level of airborne concentrations of substances, below which it is believed that nearly all workers may be repeatedly exposed without adverse effect (see MSDSs for TLVs).

RESPIRATORY PROTECTION

Respirator Requirements

Respirators are required while performing any work that could cause, through breathing, impairment or irreversible health effects.

In areas where the wearer, with failure of the respirator, could be overcome by a toxic or oxygen-deficient atmosphere, at least one additional person shall be present. Communications (visual, voice or signal line) shall be maintained between both or all individuals present. Planning shall be such that one individual will be unaffected by any likely incident and have the proper rescue equipment and/or personnel to be able to assist the other(s) in case of an emergency.

Review the MSDS for the chemical/product being used. If a potentially hazardous operation is not on this chart, please contact VRC Protx prior to starting work.

RESPIRATORY PROTECTION

RESPIRATORS FOR SELECTED OPERATIONS			
LOCATION/ OPERATION	CONTAMINANT	CONCENTRATION RANGE	MINIMUM RESPIRATORY PROTECTION
Confined Space Entry	O2 deficient O2 Enriched	<19.5% >23.5%	SCBA or Air Line Respirator
Responding to a Leak	Hydrogen Sulfide Sulfur Dioxide	>10 ppm >2 ppm	SCBA
Activity with exposure to	Benzene	>1 ppm	SCBA
Use of solvents and brush painting	Hydrocarbon base solvents	<1000 ppm >1000 ppm	Half-mask air purifying respirator with proper cartridge SCBA
Chemical spill, leak or emergency response	Various	Unknown	Depends on site assessment at location
Tank gauging	Hydrogen sulfide	>10 ppm	SCBA
Scale cleanup or similar activities with NORM present	Naturally Occurring Radioactive Material (NORM)	>30 picocuries	SCBA, Air Line Respirator or APR with a high efficiency particulate (HEPA) filter within limits
Spray Painting (Non-confined spaces)	Organic solvents	<1000 ppm >1000 ppm	Air purifying respirator w/ proper cartridge and paint spray pre-filter SCBA
Sandblasting	Silica Sand Lead	Any amount	Continuous flow air line w/ positive pressure Type CE Abrasive Blast respirator
Hydrocarbon or condensate (non-confined space exposure)	Organic Vapors	30 ppm - 1000 ppm >1000 ppm	Full mask APR SCBA or Air Line Respirator

RESPIRATORY PROTECTION

Respirator Selection

Air Purifying Respirators (APR) consist of a half or full face piece and a detachable air purifying device. These devices selectively remove specific airborne contaminants (vapors, fumes and particulates). Do not use APRs in the following instances:

- For protection against gaseous materials that are extremely toxic or IDLH in small quantities (such as H_2S).
- For protection against harmful materials that cannot clearly be detected by odor or nose irritation. If an odor is detected with an APR, change the cartridge.
- For protection against materials that are not effectively stopped by the cartridge, regardless of the concentration.
- For protection against any gaseous material in concentrations that are highly irritating to the eyes.

Air Line Respirators consist of a half or full face mask, a breathing air regulator operating under positive pressure demand mode, an air line and air supply (manifold or pressurized tanks). Air line respirators must be equipped with a portable auxiliary air supply (five minute escape air bottle). Hose length may be up to 250'. Hose fittings must be incompatible with other gas systems in a facility to prevent inadvertent servicing of air line respirators with non-respirable gases or oxygen. Cascades must have a minimum operating pressure of 500 psig and be equipped with an operable low pressure alarm. Half facemasks are not appropriate for substances that are eye irritants.

Self Contained Breathing Apparatus (SCBA) consists of a full face piece and detachable regulator and hose connected to an air source either carried by the user or an air source from a distance connected by a flexible hose. SCBAs offer protection against most types and levels of airborne contaminants. SCBAs must be the "Pressure Demand" type.

Equipment selection should be based on the following:

- Nature of the hazard
- Extent of the hazard
- Work requirements and conditions
- Characteristics and limitations of respirators
- NIOSH or MSA approval

RESPIRATORY PROTECTION

Fit-Testing and Eyewear

Employees will not use a respirator in a hazardous or potentially hazardous atmosphere unless they have successfully passed a qualitative fit test. The irritant smoke test is the preferred qualitative method. Following the initial fit-test, workers who use negative pressure respirators will then be re-tested periodically or whenever physical aspects of the wearer change (i.e. significant weight gain or loss, injuries to the face in the seal area of the mask, etc.).

Immediately before use of any respirator, the employee shall ensure proper fit and functioning of the respirator. The manufacturer's instructions must be followed with each use of any respirator.

Under no conditions will any employee be fit-tested or allowed to use a respirator who has:

- Facial hair (including stubble) in the sealing area of the face piece;
- Facial configurations (injuries, scars, missing teeth, etc.) which prevent an adequate seal of the respirator to the wearer's face.

Affected employees who are required to wear glasses to perform normal duties will be provided a special full face piece that is manufactured to accommodate glasses inside the face piece. Full face respirators must not be worn over eyeglass templates. Contact lenses shall not be worn with full-face supplied air breathing apparatus when performing work for a certain duration. However, wearing contact lenses with full-face supplied air breathing apparatus during emergency situations is acceptable.

Medical Determination

Employees who wear respirators or may wear respirators in an emergency may have a pulmonary test. A physician, for medical determination that the employee can wear a respirator, will review this pulmonary test (if taken), along with a questionnaire filled out by the employee.

Breathing Air Quality and Cylinders

All breathing air shall meet at least the specifications for Type I, Grade D breathing air as defined by the Compressed Gas Association Commodity Specification G-7.1 1966 -- ANSI Z86.1 1973. The oxygen content of the air shall be between 19.5 and 23.5%. Additionally, the air should have a dew point of -20ºF or less to avoid freezing off in the regulators during use. Breathing air containers must be marked with a label stating, "Breathing Air". Any cylinder that does not meet this specification shall be refused and returned to the vendor.

110 cubic foot capacity breathing air cylinders shall be replaced when the pressure drops to 500 psig and 220 cubic foot capacity cylinders shall be replaced when the pressure drops to 300 psig.

Wherever corrosion is a problem, all breathing air quick coupling fittings are to be 316 stainless steel. All breathing air regulators are to be equipped with CGA 346 thread connectors to prevent accidental use of the wrong gas. Breathing air quick coupling fittings are to be unique to prevent usage of the air hoses or regulators on other systems.

Where air compressors are used to provide breathing air, their air intake ports must be located in areas free of contamination. If an oil-lubricated compressor is used to provide breathing air, it shall have a high temperature and carbon monoxide alarm.

All compressed gas cylinders must be hydrostatically tested on a periodic basis. Breathing air cylinders constructed of steel shall be hydrostatically tested every 5 years, aluminum tanks every 3 years. Cylinders should be tested on or before the date stamped on the cylinder. If a cylinder has not been pressure tested prior to the hydrostatic test date on the bottle, the cylinder should be taken out of service and depressurized (maintain slight positive pressure) until the test can be performed. Testing must be performed by a qualified company in accordance with DOT regulations (49 CFR Part 173.34 and CGA C-1: Methods for Hydrostatic Testing of Compressed Gas Cylinders.)

Defective equipment shall be removed from service until properly repaired, with a replacement unit provided.

A "Respirator Inspection Checklist" or similar documentation will be used to document inspections of both APRs and SARs.

RESPIRATORY PROTECTION

Equipment Storage

Respirators must be stored in a clean, dry location where temperatures do not exceed 120ºF and in such a manner as to protect against sunlight, heat, extreme cold, excessive moisture, damaging chemicals and deformation. They should be kept free of distortion when stored. Respirators stored in vehicles will be kept in the manufacturer's case.

Equipment Inspection

Air Purifying Respirators - APRs - All APRs must be inspected routinely before and after each use, as well as periodically based on the manufacturer's instruction. Worn or broken parts should be replaced. The maker of the respirator must manufacture all replacement parts.

Supplied Air Respirators - SARs (SCBAs and Air Line) - All SARs, whether in regular use or being maintained for emergency use, must be inspected at least on a monthly basis and after each use by the wearer or an assigned, qualified person. A record of these inspections must be kept at the location where the respirator is normally stored. A tag may be affixed to each SAR or a form attached inside the storage cabinet so that the date of the monthly inspection and initials of the inspector can be entered.

The SAR inspection shall include a check of air pressure to assure that the cylinder is fully charged and a check to assure that the regulator and warning devices are functioning properly. The condition of the face piece, valves, headbands, shoulder straps and all connecting devices shall be checked. Connecting hoses should be stretched to check for breaks and leaks. Problems shall be immediately reported to supervisors.

Training

Each employee required to use a respirator will be trained on the following:

- Why a respirator is necessary
- Limitations of a respirator
- How to use a respirator (inspections, put on and remove)
- Maintenance of respirators
- General requirements of the regulation (covered in this procedure)

This training will be required at least annually, and whenever deemed necessary by VRC Protx based on actions of the employees.

RESPIRATORY PROTECTION

Program Evaluation

Periodic evaluation of the effectiveness of the program is essential to ensure that persons are being provided with adequate respiratory protection. The effectiveness of the respirator program shall be evaluated at least annually by VRC Protx and action shall be taken to correct defects in the program.

Wearer Acceptance - Respirator wearers will be consulted periodically and encouraged to report their acceptance of wearing respirators. Factors that might affect the acceptance of respirators include: comfort, resistance to breathing, fatigue, interference with vision, interference with communications, restrictions of movement, interference with job performance, and confidence in the effectiveness of the respirator to provide adequate protection.

Inspection and Evaluation of Respirator Program Operation - Random periodic inspections shall be conducted to ensure that

- proper types of respirators are selected,
- respirator wearers are trained properly,
- correct respirators are issued and used,
- respirators are worn, maintained and stored properly,
- respirators are inspected properly and
- Respiratory hazards are monitored.

Action shall be taken to correct any defects found in the Respiratory Protection Program. The findings of the respiratory protection program evaluation shall be documented, and this documentation shall list plans to correct faults in the program and target dates for the implementation of the plans.

Documentation

DOCUMENT	WHERE KEPT	HOW LONG
Fit Test Records	Facility	Length of Employment
Respirator Training	Facility	5 Years
Respirator Inspections	Facility	Last 2 inspections

PERSONAL COMBUSTIBLE GAS MONITORING

Purpose	To promote awareness of the potential hazards and dangers of a work environment in the presence of combustible gasses and to provide a program of safety and compliance. To familiarize employees with the equipment in its use, maintenance and care.
Responsibilities	All Valve Repair Consultant employees affected by work being performed in a combustible gas environment. Note: It is VRC's policy to include Combustible Gas detection with the monitoring of Oxygen levels, toxic gasses and other air-born gaseous hazards. This can vary from site to site and is addressed by compliance with the customers' situation, policies and procedures. VRC Protx will comply with the customers' requirements and employees will participate in customer on-site drills.
Definitions	
Carbon Monoxide	A colorless, odorless, highly poisonous gas, CO, formed by the incomplete combustion of carbon or a carbonaceous material, such as gasoline.
Combustible gas	A gas that burns, including the fuel gases, hydrogen, hydrocarbon, carbon monoxide, or a mixture of these.
Confined space	Usually defined as any space which is large enough for someone to enter and perform assigned work, which has limited means of entry or exit, and which is not designed for continuous employee occupancy.
LEL	Lower Explosive Limit (LEL): The explosive limit of a gas or a vapor is the limiting concentration (in air) that is needed for the gas to ignite and explode. The lowest concentration (percentage) of a gas or a vapor in air capable of producing a flash of fire in presence of an ignition source (arch, flame, heat). At concentration in air below the LEL there is not fuel to continue an explosion. Concentrations lower than LEL are "too lean" to burn. e.g.: Methane gas has a LEL of 4.4% (at 138 degrees C) by volume, meaning 4.4% of the total volume of the air consists of methane. At 20 degrees C the LEL is 5.1 % by volume. If the atmosphere has less that 5.1% methane, an explosion cannot occur even if a source of ignition is present. When methane (CH4) concentration reaches 5% an explosion can occur if there is an ignition source. Each combustible gas has its own

PERSONAL COMBUSTIBLE GAS MONITORING

	LEL concentration. These percentages should not be confused with LEL instrumentation readings. Instruments designed and calibrated to read LEL also read as percent values. A 5% displayed LEL reading for methane for example would be equivalent to 5% divided by 5.1% methane by volume at 20 degrees C
Stoichiometry	The proportion of a mixture of air and fuel such that the fuel is fully oxidized with no remaining oxygen. For example, stoichiometric combustion in gasoline engines typically occurs at an air-fuel mass ratio of about 14.7.
Toxic gas	A chemical or biological gaseous substance when introduced to human beings or other living organisms causes a detrimental effect on the systems of normal life function. It negatively affects the central nervous systems, auto immune systems, renal systems, etc…
Upper explosive limit (UEL)	The highest concentration (expressed in percent vapor or gas in the air by volume) of a substance that will burn or explode when an ignition source is present.

The risks of working in a combustible gas area can be divided into three categories: combustible gas, toxic gas, and high or low oxygen levels. It is of course the duty of employers to find alternatives to manned work in these areas wherever possible. However, in many cases such work cannot practicably be avoided, and so the priority must be to make it as safe as possible.

Combustible gas risks

For combustion to occur, the air must contain a minimum concentration of combustible gas or vapor. This quantity is called the lower explosive limit (LEL). At concentrations equal to or greater than this, combustion will occur in the presence of a suitable ignition source such as a spark or hot surface. For most combustible gases and vapors, the LEL is less than 5% by volume, and a combustible atmosphere is usually described as "hazardous" at 10% LEL. Combustion is almost certain when conditions reach stoichiometric.

Typically, storage vessels which have contained hydrocarbon fuels and oils present a danger. Other dangers come from fuel leaks: pipelines, gas cylinders and engine-driven plant. For workers in pits, sewers and other sub-surface locations, methane is an almost universal danger. Formed by decaying organic matter, this odorless gas collects in pockets

underground.

Toxic gases and vapors:

Confined space workers may be exposed to any of a large number of toxic compounds depending on the nature of the work and its environment. A risk assessment should be made of which toxic substances a worker may be exposed to in any given work situation.
When generators, for example, are used in a confined space, carbon monoxide in the exhaust fumes creates a serious poisoning risk. Workers near to traffic on roads may be exposed to carbon monoxide and nitrogen dioxide from vehicle exhaust fumes. The decomposing action of bacteria on organic matter releases toxic hydrogen sulphide and carbon dioxide, both of which are common subsurface hazards.

Oxygen – Too High or Too Low

The normal concentration of oxygen in fresh air is 20.9%. An atmosphere is hazardous if the concentration of oxygen drops below 19.5% or goes above 23.5%. If the concentration falls to 17%, mental and physical agility are noticeably impaired; death comes very quickly if it drops only a few percent more. At these levels unconsciousness takes hold so rapidly that the victim will be unaware of what is happening.
Without adequate ventilation, the simple act of breathing will cause the oxygen level to fall surprisingly quickly. Combustion also uses up oxygen, which means that engine-driven plant and naked flames such as welding torches are potential hazards. A less obvious risk is the fermentation of rotting vegetable matter, which absorbs oxygen and may create a hazard in agricultural storage units. Steel vessels and chambers which have been closed for some time are similarly dangerous because corrosion may have occurred, using up vital oxygen in the process.
Oxygen can also be displaced. Nitrogen, for example, when used to purge hydrocarbon storage vessels prior to re-use, drives oxygen out of the container and leaves it highly dangerous until thoroughly ventilated.
High oxygen levels are also dangerous. As with too little, too much will impair the victim's ability to think clearly and act sensibly. Moreover, oxygen-enriched atmospheres represent a severe fire hazard.
From clothing to grease, materials which would not normally burn become subject to spontaneous combustion under these conditions.
Common causes of oxygen enrichment include leaks from welding cylinders and even from breathing apparatus.

PERSONAL COMBUSTIBLE GAS MONITORING

Equipment Types:

Portable instruments and larger fixed systems can be used for confined space monitoring. Fixed systems typically comprise one or more detector "heads" connected to a separate control panel; if a detector "sees" a dangerous gas level, the panel raises the alarm by triggering external sirens and beacons. This sort of installation is suited to locations like plant rooms which have sufficient room for the hardware.

However, much confined space work takes place in more restricted areas, making compact portable units more suitable. Ease of use, with one button operation means minimal training is required while increased safety is ensured. Combining one or more sensors with powerful audible and visual signals to warn when pre-set gas levels are reached, portable detectors can be carried or worn wherever they are needed. In addition, a small instrument is easily carried in a confined space, ensuring that pockets of high gas concentration are not missed.

Simple portable detectors contain a single sensor are ideal for protecting workers where a risk assessment has identified only one foreseeable hazard. More sophisticated but only slightly larger are one-channel detectors with an illuminated display showing measured gas levels. These units are designed for servicing. They have rechargeable or replaceable batteries, and generally allow the user to set alarm levels.

Multiple Hazards

Often, more than one hazard may be foreseeable in a single area. In such cases, multi-channel instruments are used. These generally monitor up to four gases together, with a typical sensor array for underground work covering combustible hydrocarbons, oxygen, hydrogen sulphide and carbon monoxide. A wide range of other sensors can be specified, making this type of unit suitable for most confined space applications. The slightly larger physical dimensions of a multi-gas detector allow for bigger displays. The requirements for such units will be determined by the customer and their site-specific requirements.

Some multi-channel units incorporate a built-in sampling pump, allowing a flexible sample line to be fed into the space while the monitor remains outside with the user. This easily enables the user to test the atmosphere before entry into the confined space.

It is important that the sample line is free of kinks and blockages, be kept free of drawing any liquid into the tube and that sufficient time is allowed for the gas drawn from the chamber to arrive at the sensor.

Timed interval monitoring is typical and usually required when on customer sites. These intervals are determines by local requirements as well as OSHA and MSHA standards. In the oil and petrochemical industries. When a vessel which has held combustible liquids is purged

with inert gas, a monitor is set up outside to record falling hydrocarbon levels and indicate when it is safe to open the container to air. The latest portable detectors incorporate an infrared sensor for just this purpose because, unlike conventional sensors for combustible gas monitoring, infrared devices can operate in the absence of oxygen and in the presence of very high hydrocarbon levels.

Universal Features

Certain features should be expected in every portable gas detector. Clearly, life-saving tools for demanding environments must be as tough as possible, with reliable electronics housed in impact-resistant casings. Additional protection may be provided in some cases by a removable rubber "boot". While the need to leave gas sensors exposed to the atmosphere means that no instrument can be fully sealed, a high degree of protection against dust and water ingress is essential. Toughness notwithstanding, a well-designed detector will also be light and compact enough to wear for an entire shift.

Finally, because of the difficulties of working in a cramped space, perhaps under poor lighting, instruments should be easy to use. No matter how advanced a detector's internal architecture or data management options, personnel in the field should be faced with nothing more daunting than a clear display and simple, one-button operation.

Calibration

Typically these instruments are calibrated on site at the customer facility. In the event these monitoring instruments are provided by VRC Protx we will possess and maintain the required equipment or facilitate a relationship with a facility that can perform calibrations as needed by the time interval recommended by the manufacturer, OSHA and MSHA. These means will vary from manufacturer to manufacturer.

Issuance of Equipment

It is understood that VRC Protx will only issue known good and up-to-date monitoring equipment. It is also the responsibility of the employee to check the functionality, calibration date and monitor the condition of this equipment as it is ultimately they who are at risk and need this equipment to work. It is the employee who must ultimately understand the meaning of all of the alarms, indications and functions of the monitoring equipment. In the event there are alarms, reminders or any kind of communication that the units may not be operating correctly these units need to be returned to the supervisors immediately for a replacement unit before returning to work. Don't wait. Don't risk disaster.

COMPRESSED AIR SAFETY AWARENESS

General Safety Requirements for Compressed Air

The following precautions pertain to the use of compressed air in machine shops:

1. All pipes, hoses, and fittings must have a rating of the maximum pressure of the compressor. Compressed air pipelines should be identified (psi) as to maximum working pressure.
2. Air supply shutoff valves should be located (as near as possible) at the point-of-operation.
3. Air hoses should be kept free of grease and oil to reduce the possibility of deterioration.
4. Hoses should not be strung across floors or aisles where they are liable to cause personnel to trip and fall. When possible, air supply hoses should be suspended overhead, or otherwise located to afford efficient access and protection against damage.
5. Hose ends must be secured to prevent whipping if an accidental cut or break occurs.
6. Pneumatic impact tools, such as riveting guns, should never be pointed at a person.
7. Before a pneumatic tool is disconnected (unless it has quick disconnect plugs), the air supply must be turned off at the control valve and the tool bled.
8. Compressed air must not be used under any circumstances to clean dirt and dust from clothing or off a person's skin. Shop air used for cleaning should be regulated to 15 psi unless equipped with diffuser nozzles to provide lesser pressure.
9. Goggles, face shields, or other eye protection must be worn by personnel using compressed air for cleaning equipment.
10. . Static electricity can be generated through the use of pneumatic tools. This type of equipment must be grounded or bonded if it is used where fuel, flammable vapors or explosive atmospheres are present.

Safety Requirements for Operating & Maintaining Compressed Air Machinery:

All components of compressed air systems should be inspected regularly by qualified and trained employees. Maintenance superintendents should check with state and/or insurance companies to determine if they require their own inspection of this equipment. Operators need to be aware of the following:

COMPRESSED AIR SAFETY AWARENESS

Air Receivers

The maximum allowable working pressures of air receivers should never be exceeded except when being tested. Only hydrostatically tested and approved tanks shall be used as air receivers.

1. Air tanks and receivers should be equipped with inspection openings, and tanks over 36 inches in diameter should have a manhole. Pipe lug openings should be provided on tanks with volumes of less than five cubic feet.
2. The intake and exhaust pipes of small tanks, similar to those used in garages, should be made removable for interior inspections.
3. No tank or receiver should be altered or modified by unauthorized persons.
4. Air receivers should be fitted with a drain cock that is located at the bottom of the receiver.
5. Receivers should be drained frequently to prevent accumulation of liquid inside the unit. Receivers having automatic drain systems are exempt from this Requirement.
6. Air tanks should be located so that the entire outside surfaces can be easily inspected. Air tanks should not be buried or placed where they cannot be seen for frequent inspection.
7. Each air receiver shall be equipped with at least one pressure gauge and an ASME safety valve of the proper design.
8. A safety (spring loaded) release valve shall be installed to prevent the receiver from exceeding the maximum allowable working pressure.
9. Only qualified personnel should be permitted to repair air tanks, and all work must be done according to established safety standards.

Air Distribution Lines

1. Air lines should be made of high quality materials, fitted with secure connections.
2. Only standard fittings should be used on air lines.
3. Operators should avoid bending or kinking air hoses.
4. Air hoses should not be placed where they will create tripping hazards.
5. Hoses should be checked to make sure they are properly connected to pipe outlets before use.
6. Air lines should be inspected frequently for defects, and any defective equipment repaired or replaced immediately.
7. Compressed air lines should be identified as to maximum working pressures (psi), by tagging or marking pipeline outlets.

COMPRESSED AIR SAFETY AWARENESS

Pressure Regulation Devices

1. Only qualified personnel should be allowed to repair or adjust pressure regulating equipment.
2. Valves, gauges and other regulating devices should be installed on compressor equipment in such a way that cannot be made inoperative.
3. Air tank safety valves should be set no less than 15 psi or 10 percent (whichever is greater) above the operating pressure of the compressor but never higher than the maximum allowable working pressure of the air receiver.
4. Air lines between the compressor and receiver should usually not be equipped with stop valves. Where stop valves are necessary and authorized, ASME safety valves should be installed between the stop valves and the compressor.
5. The Safety valves should be set to blow at pressures slightly above those necessary to pop the receiver safety valves.
6. Blow-off valves should be located on the equipment and shielded so sudden blow-offs will not cause personnel injuries or equipment damage.
7. Case iron seat or disk safety valves should be ASME approved and stamped for intended service application.
8. If the design of a safety or a relief valve is such that liquid can collect on the discharge side of the disk, the valve should be equipped with a drain at the lowest point where liquid can collect.
9. Safety valves exposed to freezing temperatures should be located so water cannot collect in the valves. Frozen valves must be thawed and drained before operating the compressor.

Air Compressor Operation

1. Air compressor equipment should be operated only by authorized and trained personnel.
2. The air intake should be from a clean, outside, fresh air source. Screens or filters can be used to clean the air.
3. Air compressors should never be operated at speeds faster than the manufacturer’s recommendation.
4. Equipment should not become overheated.
5. Moving parts, such as compressor flywheels, pulleys, and belts that could be hazardous should be effectively guarded.

COMPRESSED AIR SAFETY AWARENESS

Compressed Air Equipment Maintenance

1. Only authorized and trained personnel should service and maintain air compressor equipment.
2. Exposed, non-current-carrying, metal parts of compressor should be effectively grounded.
3. High flash point lubricants should not be used on compressors because of its high operating temperatures that could cause a fine or explosion.
4. Equipment should not be over lubricated.
5. Gasoline or diesel fuel powered compressors shall not be used indoors.
6. Equipment placed outside but near buildings should have the exhausts directed away from doors, windows and fresh air intakes.
7. Soapy water of lye solutions can be used to clean compressor parts of carbon deposits, but kerosene or other flammable substances should not be used. Frequent cleaning is necessary to keep compressors in good working condition.
8. The air systems should be completely purged after each cleaning.
9. During maintenance work, the switches of electrically operated compressors should be locked open and tagged to prevent accidental starting.
10. Portable electric compressors should be disconnected from the power supply before performing maintenance.

Welding, Cutting, Hot Work Program

PROCEDURE

Introduction

This chapter contains guidelines and requirements for the safe use of flammable and/or compressed gases. It covers the use of flammable-gas piping systems, high-pressure gas cylinders, manifolded cylinders, and compressed air. Cutters, welders and their supervisors must be suitably trained in the safe operations of their equipment and the safe use of the process.

Hazards

All gases must be used in a manner that will not endanger personnel or property in routine shop use or experimental operations. Hazards associated with handling and use of flammable and/or high-pressure gases include the following:

Injuries caused by flying objects accelerated by an explosion or pressure release:

Asphyxiation;

Secondary accidents such as falls or electrical shocks:

Fire caused by ignition of flammable gases:

Confined spaces: Ventilation is required, prohibiting cylinders in the space, lifelines for permit-required spaces, electrode removal when not in use, and gas cylinder shutoff when not in use and warning signs are required. The Director of Safety shall be consulted prior to welding or cutting in any confined space.

Hazardous Fumes, Gases, Dusts: Any welding, cutting or burning of lead base metals, zinc, cadmium, mercury, beryllium or exotic metals or paints not listed here shall have proper ventilation or respiratory protection.

Relief Valves Required

All systems, system components, and piping subject to over-pressures must be equipped with relief devices.

Operational Safety Procedures

Equipment containing highly toxic gases requires an Operational Safety Procedure (OSP) and must comply with the requirements described in the chapters on chemical safety. If you are in

doubt as to the hazards, toxicity, or safe operating practices for any gases, consult the Director of Safety.

Fire Risk

Fire requires three elements: fuel, oxygen, and ignition. Any experiment or routine operation that places a flammable gas in the presence of an oxidant (air, oxygen) and an ignition source (spark, flame, high temperature) is extremely dangerous. To reduce the risk of fire, eliminate two of these three elements.

Thus, when using flammable gases, (1) eliminate ignition sources and (2) prevent mixing of fuel with air or oxygen. Contain or vent fuel.

Pyrophoric substances, which are materials that ignite spontaneously when exposed to air, require even more care. Minimize the use of oxygen in high concentration. Materials not normally considered combustible burn violently in high-oxygen atmospheres. Therefore, special precautions must be taken when working with high-oxygen concentrations.

Firewatch/ Fire Safety

Before cutting or welding is permitted the area shall be inspected by the Director of Safety, or designated representative, 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 to authorize welding or cutting operations. Before cutting or welding is permitted the area shall be inspected and a written permit shall be used to authorize welding and cutting operations. In many cases a firewatch may be required.

Assigned fire watchers must be trained in the use of fire extinguishing equipment and familiar with the facilities for sounding an alarm in the event of a fire. If the object to be welded or cut cannot readily be moved, all moveable fire hazards should be removed. If all the fire hazards cannot be removed, then guards shall be used to confine the heat, sparks and slag and to protect the immovable fire hazards.

If the object to be welded or cut cannot be moved and if all the fire hazards cannot be removed, then guards shall be used to confine the heat sparks and slag and to protect the immovable fire hazards. If welding cannot be conducted safely the welding and cutting shall not be performed.

There are several conditions that require a fire watch.

1) Locations where other than a minor fire might develop.
2) Combustible materials closer than 35 ft. (10.7M) to point of operation.
3) Combustibles that are 35 ft. (10.7M) or more away but are easily ignited.
4) Wall or floor openings within 35 feet (10.7M) radius expose combustible materials.
5) Combustible materials are adjacent to the opposite side of metal partitions, ceilings or roofs.

Welding / Cutting / Hotwork

Fire watchers shall have fire extinguishers readily available. A fire watch shall be maintained at least a half an hour after the welding or cutting operation was completed.

First aid equipment shall be available at all times.

Guidelines

All personnel authorized to work with flammable gases must be familiar with the hazards and emergency measures that might be required in the event of an accident. For safe operation the following safety guidelines must be observed: A piping (schematic) diagram of the apparatus and an operating procedure that includes safety considerations and emergency instructions must be developed, and the installed piping must be inspected to ensure that it is installed as shown on the piping diagram. Only personnel authorized to work on the experiment are allowed in the operations area. Appropriate warning devices and signs, such as "Danger-Acetylene" and "No Smoking and Open Flames," must be posted on or near the work area and at the doors to the operating area. Flammable gas shutoff valves must be located outside flammable gas operating areas. Good housekeeping practices must be observed; unnecessary combustible material must be kept out of flammable gas operating areas. Only the flammable gas cylinders actually required for the experiment are allowed in the operating area. Extra cylinders must be stored in an approved area outside the building or work area. When two or more cylinders containing flammable gas are used inside a room or other confined area, and are connected to a common manifold, the regulators must be modified. The existing relief valves on the regulator must be replaced with two special relief valves connected to a metal vent line that terminates outside and above the building. Likewise, when the building occupancy is rated H7, as defined in the Uniform Building Code, all flammable gas regulators must have their relief valves vented to a vent line that terminates outside and above the building.

All ignition sources, e.g., welding torches, lit cigarettes, electric arcs, electrostatic charges, and pilot lights, must be kept away from flammable gases at all times.

Ventilation must be provided to prevent entrapment of flammable gases in closed areas. If the gas is lighter than air, overhead ventilation is required. Gases denser than air must be prevented from entering trenches and manholes where they can collect and form explosive mixtures with air.

Cracking an Acetylene gas cylinder valve before attaching the regulator is not recommended since the gas may be ignited by static charge or friction heating. Closing the valve stops the flame immediately.

Never use a flame to detect flammable gas leaks. Use soapy water or use other approved methods.

If a flammable gas cylinder is discovered with a small leak and the gas has not ignited, the cylinder must be moved carefully to a safe outside area. If the leak is serious or the gas has ignited, evacuate the area and contact the VRC Protx Director of Safety and the local Fire Department immediately.

Welding / Cutting / Hotwork

Oxygen

Oxygen supports combustion but is itself nonflammable. Oxygen lowers the ignition point (in air) of flammable substances and causes them to burn more vigorously. Materials (such as oil and grease) burn with nearly explosive violence in oxygen, even when they are in minute quantities. Therefore, oxygen cylinders must not be handled with greasy or oily hands or gloves and must not be stored near highly combustible materials such as oil, grease, or reserve acetylene.

Oxygen must never be used to purge lines, to operate pneumatic tools, or to dust clothing - cloth, plastics, etc., saturated with oxygen burn explosively. Accordingly, oxygen cylinders must never be used as hat racks, clothes hangers, etc., since leaky fittings can result in accumulations of gas in the covering material.

Insects in oxygen "pigtails" can ignite spontaneously and may cause sufficient heat and over-pressure to burst the pigtail, valve, or manifold: don't leave pigtails disconnected for more than a few minutes.

Do not use white lead, oil, grease, or any other non-approved joint compound for sealing oxygen-system fittings. Threaded connections in oxygen piping must be sealed with joint compounds or Teflon tape approved for oxygen service. Litharge and water is recommended for service pressures above 300 psig (2.0 MPa). Gaskets must be made of non-combustible materials.

When high pressure oxygen cylinders are stored inside a building, they must be separated from flammable gas cylinders by at least 20 feet or by a fire-resistive partition.

Acetylene

Acetylene is used principally with welding and cutting torches. Commercial acetylene gas is colorless and highly flammable with a distinctive garlic-like odor. Acetylene, in its free state under pressure, may decompose violently - the higher the pressure, the smaller the initial force required to cause an explosion. Therefore, acetylene is stored in acetone, which dissolves 300 times its volume of acetylene. Acetylene cylinders are filled with a porous filler material that holds the acetone. The combination of filler and acetone allows acetylene to be contained in cylinders at moderate pressures without danger of explosive decomposition. Full cylinder pressure is 250 psig at 70 degrees F.

CAUTION: when acetylene is withdrawn from its cylinder too rapidly, the gas cannot come out of solution fast enough, the downstream pressure drops, and liquid acetone is thrown out of the cylinder and may limit the flow of the pressure-reducing regulator.

The following precautions are recommended when working with acetylene:

To prevent flashbacks check valves are required in welding gas lines and at the welding/cutting torch. If the acetylene pressure drops, the oxygen pressure at the torch can push oxygen back up the acetylene line, where it can mix with acetylene and cause a flashback.

Welding / Cutting / Hotwork

Copper must not be used in acetylene piping - copper forms an impact-sensitive copper acetylide.

NEVER use free acetylene gas outside the cylinder at pressures over 15 psig (30 psia) -- it can decompose violently.

Acetylene cylinders should be used or stored only in an upright position to avoid the possibility of acetone leaking from the cylinder. If an acetylene cylinder has been stored horizontally, the cylinder should be put upright and left in that position for about 30 minutes before being used.

When cylinders are empty of acetylene, valves must be closed to prevent evaporation of the acetone.

Acetylene cylinders may be filled only by the supplier.

Magic Gas

Magic Gas (magic gas II). This particular mixture is denser than air and consists of the following:

Isobutane _____ 23.52%

Methylal (dimethoxy-methane) _____ 4.00% (nominal)

Freon 13-B1 _____ 0.48%

Argon _____ 72.00%

This gas is purchased premixed in Matheson 1F (Fat Boy) cylinders pressurized to 35 psig. The flammable limits of this gas are about 1.8% to 7% in air.

VRC Protx safety rules for high pressure cylinders and flammable gases apply to all uses of Magic Gas.

Cylinders

Only cylinders meeting Department of Transportation (DOT) regulations may be used for transporting compressed gases. Each cylinder must bear the required DOT label for the compressed gas contained, except under certain specified conditions set forth in DOT regulations.

It is illegal to remove or to change the prescribed numbers or other markings on cylinders - do not deface, cover, or remove any markings, labels, decals, or tags applied or attached to the cylinder by the supplier. Each cylinder that is in use at VRC Protx must carry a legible label or stencil identifying the contents. Do not repaint cylinders unless authorized by the owner.

Compressed-gas containers must not contain gases capable of combining chemically, nor should the gas service be changed without approval by Director of Safety.

Welding / Cutting / Hotwork

The cylinder-valve outlet connections on cylinders containing gas mixtures are provided by the gas supplier, based on the physical and chemical characteristics of the gases.

Gas mixtures having a flammable component must have a cylinder-valve outlet connection with left-handed threads, even though the gas mixture is nonflammable, unless Director or Safety has authorized otherwise.

Regulators, gauges, hoses, and other appliances provided for use with a particular gas or group of gases must not be used on cylinders containing gases having different chemical properties unless information obtained from the supplier indicates that this is safe.

Gases must not be mixed at VRC Protx sites in commercial DOT cylinders and must not be transferred from one DOT cylinder to another. Gases that are mixed at VRC Protx must never be put into a VRC Protx - or vendor-owned compressed gas cylinder.

Vendor-owned cylinders must not be used for any purpose other than as a source of vendor-supplied gas. Only the vendor may pressurize these cylinders.

It is illegal to transport a leaking cylinder (charged or partially charged) by common or contract carrier.

Cylinder Handling

Compressed gases should be handled only by experienced and properly instructed personnel. When in doubt about the proper handling of a compressed gas cylinder or its contents, consult the Director of Safety.

Compressed gas cylinders are dangerous when handled incorrectly. Always assume that a cylinder is pressurized. Handle it carefully. Never throw, bang, tilt, drag, slide, roll, or drop a cylinder from a truck bed or other raised surface. If a cylinder must be lifted manually, at least two people must do the lifting. Because of their shape, smooth surface, and weight, gas cylinders are difficult to move by hand. A truck or an approved cylinder handcart must always be used to move a cylinder. Cylinders must be fastened in metal cradles or skid boxes before they are raised with cranes, forklifts, or hoists. Rope or chain lifting slings alone must not be used. Cylinders, even empty ones, must never be used as rollers for moving materials, as work supports, etc.

If damaged, a cylinder can cause severe injuries, including lung damage from inhalation of toxic contents and physical trauma from explosion. A pressurized gas cylinder can become a dangerous projectile if its valve is broken off.

Workers in charge of oxygen or fuel-gas supply equipment (including distribution piping systems and generators) must be instructed and judged competent for such work.

When a cylinder is not connected to a pressure regulator or a manifold, or is otherwise not in use, it is extremely important that the cylinder valve be kept closed and the safety cap be kept in place --

the cap protects the cylinder valve (do not lift cylinders by their caps). Notify the Director of Safety, giving details and cylinder serial number, if you believe that a foreign substance may have entered the cylinder or valve.

Cylinders containing compressed gases should not be subjected to a temperature above 125 degrees F. Flames, sparks, molten metal, or slag must never come in contact with any part of a compressed gas cylinder, pressure apparatus, hoses, etc. Do not place cylinders where they might become part of an electric circuit. When cylinders are used in conjunction with electric welding, ensure that the cylinders cannot be accidentally grounded and burned by the electric welding arc.

Cylinders must not be subjected to artificially low temperatures. Many ferrous metals become extremely brittle at low temperatures. The loss of ductility and thermal stress at low temperature may cause a steel cylinder to rupture.

Never attempt to repair, alter, or tamper with cylinders, valves, or safety relief devices.

Working with Gases

Always identify the contents of a gas cylinder before using it. If a cylinder is not clearly labeled, return it to the Director of Safety.

Before using a cylinder, be sure it is properly supported with two metal chains or the equivalent to prevent it from falling. Contamination of compressed gas cylinders by feedback of process materials must always be prevented by installation of suitable traps or check valves.

Suitable pressure-regulating devices and relief devices must always be used when gas is admitted to systems having pressure limitations lower than the cylinder pressure.

Gas cylinder valves can be "cracked" (opened slightly) momentarily before regulators are attached to blow dirt off the valve seats, but the valve outlet should always be pointed away from people or equipment. (Cracking the valve is not recommended with Acetylene because it can be ignited by static charge or friction.) After the regulator is securely attached to the cylinder valve, fully release (turn counter-clockwise) the pressure-adjusting screw of the regulator before opening the cylinder valve. Open gas cylinder high pressure valves slowly; this gives compression heat time to dissipate and prevents "bumping" the gauges. Never use a wrench on any cylinder-valve hand wheel.

Keep removable keys or handles on valve spindles or stems while cylinders are in service.

Never leave pressure in a system that is not being used. To shut down a system, close the cylinder valve and vent the pressure from the entire system. Equipment must not be disassembled while it is under pressure. Be aware that any valved-off portion of the system may still be under pressure; bleed the hose, line, or vessel before disassembly to ensure that there is not enough pressure energy stored in the trapped gas or in piping distortion to propel loose objects.

Connections to piping, regulators, and other appliances should always be kept tight to prevent

leakage. Where hose is used, it should be kept in good condition.

Manifold pigtails should not be left disconnected for more than a few minutes. Certain insects are attracted to pure gases and will quickly clog these lines.

Never use compressed gas to dust off clothing; this may cause serious injury or create a fire hazard.

About 30 psi gauge pressure (0.2 MPa) must be left in "empty" cylinders to prevent air from entering the cylinder and contaminating it; air contamination in an Acetylene cylinder is extremely dangerous.

Before a regulator is removed from a cylinder, close the cylinder valve and release all pressure from the regulator.

Before returning an empty cylinder, close the valve and replace the cylinder-valve protective cap and outlet cap or plug, if used.

Cylinder Storage

When transporting, moving and storing compressed gas cylinders and oxygen cylinders shall be stored in an upright secured position 20 feet from any flammable gases or petroleum products. Oxygen cylinders shall be stored in an upright secured position 20 feet from any flammable gases or petroleum products.

Cylinders not actively in use inside of buildings must be stored outside in areas approved by Director of Safety and must be fastened - with two metal chains or bars or in a fixture - to prevent them from falling if they are bumped or shaken, as during an earthquake.

When gases of different types are stored at the same location, cylinders must be grouped by types of gas, and the groups must be arranged in accordance with the gases contained, e.g., flammable gases must not be stored near oxygen.

Charged cylinders and empty cylinders should be stored separately in an arrangement that permits removal of "old stock" (cylinders in storage the longest) with minimum handling of other cylinders.

Storage rooms or areas should be dry, cool, well ventilated, and, where practical, fire resistant; must have solid, level floors or storage surfaces; and must be away from traffic. Storage in sub-surface locations should be avoided. Cylinders must not be stored at temperatures above 125 degrees F or near radiators or other sources of heat, near sparking devices, or near salt or other corrosive chemicals. If stored outside, cylinders must be protected from continuous direct sunlight, extreme weather, or moisture.

Compressed Air

Welding / Cutting / Hotwork

Compressed air for general shop or laboratory use must be restricted to 30-psig (207-kPa) maximum pressure by restricting nozzles. Compressed air at pressures up to 100-psig (700-kPa) may be used to operate pneumatic tools, certain control instruments, and research equipment with properly designed over-pressure relief devices. Use of air-pressurized research equipment must be approved by the Director of Safety.

Building compressed air (house air) may be used to dry parts and to help accomplish many other jobs in the shop or laboratory, but always ensure that no one is in line with the air stream and always wear goggles or a face shield.

Compressed air must not be used for breathing unless it has been especially installed for this purpose and such use has been approved by Director of Safety.

Never apply air pressure to the body or use compressed air to clean clothing. Compressed air injected into the body openings can be fatal. Compressed air used to clean clothing drives particles into the fabric, where they can cause skin irritation and infections. Use a clothes brush.

Compressed air must not be used to transfer liquids from containers of unknown safe working pressure. A pressurized commercial drum of unknown pressure rating is a hazardous device; for example, a 55-gal (200liter) drum pressurized to 14.5 psig (100 kPa) has a force on the drum head of about 3 tons. To transfer liquids use a pump or a siphon with a bulk aspirator. The transfer pressure for commercial-type liquid nitrogen dewars must be less that 14.5 psig. For most laboratory-type liquid nitrogen systems, transfer pressures of less than 5 psig are adequate. Compressed air must never be used for transferring liquid hydrogen or liquid helium.

When an automatic shut-off coupling is not used on air-operated tools, a short metal chain (or its equivalent) should be attached to the hose to prevent it from whipping in case it separates from the tool. When using an air-operated tool, shut off the compressed air and vent the hose before changing nozzles or fittings.

Welding & Cutting

Protecting yourself when performing welding operations depends on your understanding of the hazards involved and the proper way to control them. Control of welding hazards include avoiding eye injury, respiratory protection, ventilation of the work area, protective clothing and having safe equipment to use. Workman assigned to operate arc welding equipment must be properly instructed and qualified to operate such equipment. Workmen assigned to operate or maintain equipment be familiar with section (1910.254) and with 1910.252(a)(b) & (c). Operators of equipment shall report any equipment defect or safety hazards and discontinue use of equipment until its safety has been assured and repairs shall be made only by qualified personnel.

Eye hazards include exposure to ultraviolet and infrared light. Welders and their helpers should wear filter glasses with shades ranging from 2 to 14, depending on the type of welding being done, to protect their eyes. Unless a welding arc is behind a screen, not only the welder, but also people nearby may need eye protection. Other workers should be excluded within a 30 foot radius from gas or low powered arc welding, or also be protected with appropriate filter lenses. Heavy

welding requires a 100 foot radius. Inert gas welding produces 5 to 30 times as much ultraviolet light as arc welding and requires shielding for even greater distances. Keep in mind that ordinary untreated plastic lenses absorb ultraviolet light very poorly and should not be relied on for protection.

Virtually all welding processes generate gases, fume and dusts. Gases generated include carbon monoxide, carbon dioxide, ozone, and nitrous gases. Other gases may also be formed in the presence of chemicals which may be on the material being welded. For example 1,1,1 Trichloroethane generates phosgene gas when exposed to the heat of welding. Welding and cutting can also generate fumes from cadmium, lead, cyanide, beryllium, arsenic, fluorides, nickel, cyanide, and other materials when can be hazardous if inhaled. Proper respiratory protection should always be worn when cutting or welding. The best type of protection to use can be determined by reading the Material Safety Data Sheet for the material being welded, or the manufacturer of the rod or flux being used.

Mechanical ventilation at the rate of 2,000 cubic feet per minute per welder is required if the area is more crowded than 10,000 cubic feet per welder; has a ceiling height of less than 16 feet; or in confined spaces where structural barriers significantly obstruct cross ventilation. Additional specific ventilation requirements are necessary for fluorine compounds, zinc, lead, beryllium, cadmium, mercury, and for stainless steel that is oxygen cut using either a chemical flux or iron powder or gas shielded arc cutting. Where it is not possible to provide this ventilation, airline respirators, hose masks, or self-contained units must be used. Oxygen should never be used for ventilation.

All parts of the body should be protected from radiant energy, sparks, and molten metal splashes. Clothing made from wool, or wool blends, is generally better than cotton. Some cutting operations such as inert-gas metal arc welding will cause exposed cotton clothing to rapidly deteriorate. Leather capes, jackets, leggings, and aprons provide additional protection especially in vertical, or overhead operations. Use of dark clothing will help reduce reflected light.

All welding equipment should be inspected each day prior to use. Report any defects found in regulators, torches or electrical components to a person that is qualified to make the necessary repairs.

VENTILATION

The fumes produced in a welding operation can be hazardous to the welder or workers in the near vicinity. Reducing the exposure to fumes through an effective local exhaust or area ventilation system is the first line of defense in preventing discomfort or illnesses from toxic welding fumes.

Respirators are another means of reducing exposure. This personal protective equipment should be considered a temporary process until more appropriate measures to control the exposure are in place. However, when the level of the exposure cannot be entirely eliminated by an exhaust ventilation system, some form of respiratory protection will be required when welding is performed. Highly toxic or concentrated welding fumes may require the welder to use a supplied air hood-type respirator, no matter what type of ventilation is in place.

Welding / Cutting / Hotwork

Testing equipment is needed to effectively evaluate the levels of toxicity welding fumes emit. Many toxic fumes are colorless and odorless, and chronic effects of overexposures may not be immediately detectable. Harmful levels of welding fumes cannot be determined by relying on your body's senses. You may see smoke in the air, smell an irritant and not be adversely affected. In order to accurately determine the level of the contaminants present, air quality testing equipment in the way of air sampling pumps are placed in the area and on the welder. This equipment pulls air through a filter for a specified amount of time. The sample is then evaluated at a laboratory to determine the levels of the exposure.

The degree of exposure present determines which type of ventilation system is most appropriate. In field locations, such as construction projects and shipyards, 'sucker' hoses can be set up to pull fumes from the welding zone. Welding booths with local exhaust hoses at each station gives the welder some flexibility and mobility in performing the operation. In situations where the welder must go to the work area (due to size, weight or the unwieldy configuration of the work piece), portable exhaust systems could be an option to consider. In some situations, laboratory-type hoods may be used for ventilation. This type of system creates a high velocity exhaust vacuum within an enclosure. Using Laboratory-type hoods allow only the welder's hands/arms in the enclosure while welding is being performed.

Determining the needed ventilation and/or respiratory protection must be taken very seriously. Systematically evaluate the process, exposures and possible controls to determine which will help ensure providing an employee a safe place to work.

Once protective measures have been determined, it is the responsibility of each welder and their supervisor to make sure they are being used properly. Taking a proactive step in reducing your exposure to welding fumes is the professional approach to working as a welder.

HYDROGEN SULFIDE – H2S

This safety guideline is intended to provide suitable information to all VRC Protx employees regarding the potential toxic effects of H_2S so that adequate measures can be taken to limit exposures through controls in the workplace.	
Authorized Personnel:	
Name of Employee:	**Date Last Trained:**

General

Hydrogen sulfide is ever present in all refineries. In addition it is generated in many industrial processes as a by-product and also during the decomposition of organic matter containing sulfur.
Hydrogen sulfide (H_2S) is a colorless gas that at low concentrations has the odor of rotten eggs. At high concentrations, it kills your sense of smell.

- Formula H_2S
- CAS No.: 7783-06-04

H_2S is a highly flammable and extremely toxic gas that can form an explosive mixture with air over a wide area.

HYDROGEN SULFIDE – H2S

Characteristics of Hydrogen Sulfide

When ignition occurs, the combustion produces irritants and toxic gases, including sulfur dioxide (SO_2). SO_2 has an irritating effect on

When ignition occurs, the combustion produces irritants and toxic gases, including sulfur dioxide (SO_2). SO_2 has an irritating effect on the eyes and lungs and can be fatal at concentrations about 100PPM.

H_2S is heavier than air, has a tendency to settle in low-laying areas, and is readily dispersed by wind movements or currents.

H_2S attacks most metals, especially in the presence of water, forming sulfides that are usually insoluble precipitates. It is also very corrosive to plastics and tissue.

H_2S dissolves in water forming a weak acid (hydro sulfurous acid).

H_2S will be released when in water when agitated making it a dangerous hidden hazard.

Health Effects

The following information outlines the symptoms of hydrogen sulfide at specific concentrations.

10 PPM (0.001% H_2S)

- Obvious and unpleasant odor.
- Burning eye irritation.
- Permissible exposure limit is eight hours.

200 PPM (0.02% H_2S)

- Kills smell quickly.
- Stings eyes and throat.
- Respiratory irritation.
- Death after one to two hours of exposure.

500 PPM (0.05% H_2S)

- Dizziness. Breathing ceases within a few minutes.
- Requires prompt artificial respiration.
- Loss of muscle control, making self-rescue impossible.

1000 PPM (0.10% H_2S)

- Unconsciousness at once, followed by death within minutes.
-

Exposure Warning

H_2S CAN PARALYZE THE SENSE OF SMELL. DO NOT USE THE SENSE OF SMELL TO DETECT H_2S.

HYDROGEN SULFIDE – H2S

H_2S Detection and Alarm Systems

In most refineries emergency employee alarms are installed to meet the regulatory standards. The alarms provide warning for the necessary emergency action according to the site emergency action plan and provide time for employees to safely escape from the workplace or the immediate area.
Systems are also used on drilling locations, offshore platforms and produce H_2S, and some plants. It is not readily used on land production leases. Signs are and should be posted stating the presence of poison gas and urging caution. These are considered the domain of the customer unless the VRC Protx employee is performing maintenance on the system. In that event the employee will comply with, and follow customers' established safety procedures. It is also the employees' responsibility to know and understand these procedures.

Site Specific Safety Orientation Training

The majority of VRC's customers require site specific safety orientation training before any contract employee, vendor, or other individual is allowed on the property and before any work can commence. It is the specific responsibility of the VRC Protx employee to receive this training, be alert and attentive, and use this to keep themselves all those around them safe. You must know and understand what is being covered in this training or ask questions until you do understand.

Warning Conditions

There are three conditions that you must be aware of when working around H_2S. The following information identifies the level of danger and alarms associated with each condition. (Typical to most customer locations. Again, it is the responsibility of all employees to know the alert warning systems of the customers' facility and site specific procedures).

Condition Green:
- Possible Danger
- No Alarms

Condition Yellow:
- Moderate Danger
- H_2S to 50 PPM
- Intermittent Audible Alarm and Yellow Flashing Light

Condition Red:
- Extreme Danger
- H_2S at 50 PPM or Above
- Continuous Audible Alarm and a Red Flashing Light

HYDROGEN SULFIDE – H2S

Hydrogen Sulfide Detection Devices

Fixed H_2S detection devices (monitor and indicator) are designed to detect H_2S concentrations in air and established TWA (time weighted average) (10 PPM) and STEL (15 PPM).
The alarm should be capable of being perceived above the ambient noise or light levels in the affected area. The alarm should be distinctive and recognizable as a sign to evacuate the area and to start emergency status emergency procedures. This system is the responsibility of the customer unless VRC Protx is doing the installation or maintenance. In this event these should be configured to the customers' specifications in compliance with their procedures.

Personal Monitors

Personal monitors are also available in many types. These should be available from the customer and/or VRC. They are also designed with the employee's safety in mind. Familiarize yourself with the equipment available at your current work assignment. Bump test these devices weekly or daily if needs be to verify their correct operation.

Plant Monitors

Plant monitors are available in many types and are designed with the employee's safety in mind. Familiarize yourself with the equipment available at your current work assignment. These are the domain of the customer.
In order to respond effectively in an emergency situation, every individual at the site should know their specific responsibilities. Whether or not an individual has an assigned duty, each individual should know what to do in the event of an emergency.

Evacuation

Follow these procedures in the event of a hydrogen sulfide release that requires evacuation:

- Hold your breath and quickly leave the area containing H_2S. Do not inhale.
- Look for indication of wind direction.
- Move quickly <u>across the wind</u> to reach the "Safe Breathing Area" to receive instructions. *(Moving upwind could prove fatal because you do not know the distance the source of the hazard is away from you.)*
- Always be mindfully aware of the wind and constantly monitor wind direction. Wind socks and streamers show which direction the wind is blowing so that you can determine the proper safe breathing area.

HYDROGEN SULFIDE – H2S

SCBA Escape

- When in an area, on some client's premises, which has required you to be trained to use or wear an escape respirator such as an SCBA, put on your SCBA **FIRST,** ***then*** you can help anyone who appears to be affected by the gas.
- It is highly recommended that you have on your person, approximately waist high, an operating gas detector with display readout.
- Before taking off your SCBA equipment make sure that the air you will breathe is safe. **Always monitor the level of air in you equipment. If the air is running out get yourself out of the area to safety before you become the next victim or fatality. Keep an eye on your gas monitor as well.**
- Always be conscious of the wind and constantly monitor wind direction. Wind socks and streamers show which direction the wind is blowing so that you can determine the proper safe breathing area.

Emergency Rescue and First Aid

WARNING: ON CUSTOMER LOCATIONS THE CUSTOMER TYPICALLY HAS TRAINED PERSONNEL WHO ARE FAMILIAR WITH THE SURROUNDING EQUIPMENT, HAZARDS AND ESCAPE ROUTES.
VRC PROTX EMPLOYEES SHOULD EVACUATE THE AREA IMMEDIATELY IN EVENT OF AN EMERGENCY AND LET THE TRAINED PROFESSIONALS EFFECT RESCUE.

To prevent risk and injury to other personnel, re-entry into an area of unknown concentration of H_2S will require the use of self-contained breathing equipment and backup personnel TRAINED IN SITE SPECIFIC RESCUE PROCEDURES.

- Wear a full rescue unit (minimum 30-minute breathing apparatus) before attempting a rescue.
- Remove the victim immediately to fresh air.
- If breathing, maintain the victim at rest and administer respiration immediately.
- If the victim is not breathing, start artificial respiration immediately.

HYDROGEN SULFIDE – H2S

- Call an ambulance and get the victim medical treatment*. **NOTE: VRC Protx employees need to be well acquainted with customers' specific emergency communication procedures and comply with their established protocols.**
- Keep the victim lying down with a blanket or coat under the shoulders to keep airway passage open. Conserve the victim's body heat and do not leave the victim unattended.
- If the eyes are affected by H_2S, wash them thoroughly with clear water. For slight eye irritation, cold compresses are helpful.
- A victim should not return to work until authorized to do so by a physician, even if the victim has had minor exposure and has not completely lost consciousness.

PPE (Personal Protective Equipment)

Depending on the exposure i.e., the amount of gas in the air and the type of work, employees will be required to wear different levels of PPE. Examples of protection include:

- When the exposure level is near or above 10 PPM, you will be required to wear self contained fresh air gear.
- Wear chemical goggles or a face shield when eye contact with this material is possible.
- Avoid skin contact. Wear proper clothing such as impervious gloves, long sleeves, apron, and boots.

Any special conditions or requirements that are site specific should be addressed by the customer safety department. If you do not know, find out before you proceed.

Ventilation (Indoor)

Use adequate general and local exhaust ventilation to keep atmospheric vapor concentrations below the occupational exposure limits.

Eyewash and Showers

Safety showers and eyewash stations must be available in the vicinity of a potential exposure to the material. Familiarize yourself with the location of these facilities before starting the job.

HYDROGEN SULFIDE – H2S

Training

All employees will be provided awareness training in this program in order to be familiar with the potential hazards and proper safe work procedures to follow if exposed to this health hazard. The training will be provided prior to working in any job with potential exposure to H_2S operations.

The purpose of hydrogen sulfide training is to familiarize employees with the governmental regulations affecting H_2S operations. Employees will learn the necessary skills to recognize, detect, and use the proper safety equipment in the event of an H_2S incident.

BENZENE

This safety guideline is intended to provide suitable information to all VRC Protx employees regarding the potential toxic effects of Benzene so that adequate measures can be taken to limit exposures through controls in the workplace.

Authorized Personnel:

Name of Employee	Date Last Trained

General

Of all the hydrocarbons, Benzene poses the most serious long-term threat. Exposure over time, to even low levels of Benzene can cause leukemia, blood changes and aplastic anemia.

Characteristics

Benzene is a colorless to light-yellow liquid with a pleasant sweet odor.

- Formula (C6H6)
- CAS No.: 71-43-2

Benzene is a flammable liquid that can accumulate static electricity. Benzene vapors are heavier that air and may travel to a source of ignition and flash back. The vapors are readily dispersed by wind movement and/or air currents. Liquid benzene tends to float on water and may travel to a source of ignition and spread fire. Benzene is highly reactive with no oxidizing materials.

BENZENE

Uses

Benzene is a component of gasoline, both in the manufacturing process and found naturally in crude oil; Benzene is also used as a feed stock for chemical manufacturing.

Health Effects

WARNING
Benzene is a cancer-causing agent in humans. All contact should be reduced to the lowest possible level. The above exposure limits are for air levels only. Skin contact may also cause overexposure.

Benzene is one of the most hazardous of all petroleum products because of its adverse health hazards and high flammability.

The following adverse health affects are important to remember where there may be a potential exposure to Benzene:

a) **Acute:** At high concentrations (1000 PPM) Benzene has an acute effect on the central nervous systems causing headaches, dizziness, drowsiness, unconsciousness, and possible death.

   Acute exposure can also cause breathlessness, irritability, and giddiness.

b) **Chronic:** Benzene has the chronic exposure effect on bone marrow (aplastic anemia leukemia).

   Chronic exposure can also cause convulsions, liver damage, heart damage, blood diseases (aplastic anemia), and cancer (leukemia). These symptoms can take months or years to surface and can develop without physical or visible indications.

c) Repeated skin contact leads to irritant contact dermatitis (rash); as with any petroleum solvent (which Benzene is also classified as), it will leach the natural oils out of the skin. Direct contact with the skin can cause erythema and/or blistering.

d) Benzene is irritating to eyes and mucous membranes.

e) Flammable/dangerous fire risk: benzene has a very low flash point making it dangerous to have any open flame, spark or source of ignition when vapors are present.

f) Explosive limits in air 1.5 to 8% by volume: benzene is highly flammable at low levels of vapor quantity in air.

BENZENE

Personal Protective Measures	VRC Protx employees are not permitted to work in areas where there may be a potential for unacceptable OSHA limits of Benzene exposure. It is the responsibility of the Contracting Company's Project Manager and on-site supervisor/foreman to see that any job site that may expose employees to Benzene is not manned with personnel until it is proven that it is safe to work within acceptable OSHA limits. In these instances employees will wear all required personal protective equipment including: eye and face protection, boots, gloves, sleeves, aprons, ect. When working in these areas VRC Protx employees will ensure that there is a fire extinguisher readily available. VRC Protx employees are only allowed to smoke in customer approved designated areas and never in areas where Benzene may be located. VRC Protx employees are trained on customer site specific rules and regulations. If there is an emergency, all employees will follow the customer site specific contingency/emergency plans.
Special Requirements	If it is necessary to perform any work where the exposure to Benzene is about the OSHA acceptable limits, then VRC Protx must implement a comprehensive OSHA mandated special safety policy and procedure that includes special elements of exposure monitoring, formal medical program, special personal protective equipment, and much more.
Training	All employees will be provided awareness training in this program in order to be familiar with the potential hazards and proper safe work procedures to follow if exposed to this health hazard.

FIRST AID AND BLOODBORNE PATHOGENS

Purpose

To provide the necessary training and equipment to adequately protect the health and welfare of the employees.

Responsibility

It is the responsibility of the contractor to:

- Ensure that first aid supplies are available and properly maintained in the event of an emergency.
- Ensure that all contract employees receive the proper training.

Definitions

CPR – Cardiopulmonary Resuscitation – a method of reviving a person by a combination of rescue breathing (mouth-to-mouth) and external chest compressions.

Exposure Incident – A specific eye, mouth, mucous membrane or internal contact with blood or other infectious materials that results from the performance of an employee's duties.

First Aid – the immediate and temporary care given to the victim of an accident or sudden illness until the services of a physician can be obtained.

Emergency Response Phone Numbers

Emergency response phone numbers shall be posted in offices and other appropriate locations. These numbers shall include:

- Ambulance
- Fire Department
- Doctor/physician or clinic
- Sheriff
- Others as applicable to the specific site, such as air ambulance and emergency response teams

FIRST AID AND BLOODBORNE PATHOGENS

First Aid/CPR Training

All VRC Protx employees involved in field operations shall be trained and certified in First Ai, at the time of initial assignment and annual training for all employees will be provided with in one year of their previous training. The training shall consist of certification by the Bureau of Mines, American Red Cross, Medic-First or other recognized first aid providers. CPR training is not required by OSHA, but is recommended for certain jobs. Each employer shall ensure that a copy of the Exposure Control Plan is accessible to employees in accordance with 29 CFR 1910.1020(e).

Training must include the following:

- Hands on skills using mannequins or partners. Videos and workbooks should be used to supplement possible injuries or emergency situations
- Principles of responding to emergencies, illnesses or injuries likely in the facility, such as shock, poison inhalation, cuts, breaks, sprains, burns, insect or animal bites.
- Interaction with local emergency medical services
- Legal aspects of providing First Aid
- Scene safety and size-up
- Bandaging, splinting and moving victims
- Universal precautions for prevention of infection from bloodborne pathogens, hazards of body fluids, values of universal precautions, management of potentially infectious fluid spills and personal protective equipment
- First aid equipment provided

FIRST AID AND BLOODBORNE PATHOGENS

First Aid Supplies	First Aid Kits and supplies for immediate use shall be located in convenient accessible location. The contents of the large and small kit should contain items similar to those shown in Attachment 1. Any time any material is used from the First Aid kit, it shall be replaced immediately.
Other First Aid and Emergency Medical Equipment	Certain situations may require medical equipment that is not listed in the VRC Protx First Aid kit. This equipment includes, but is not limited to, emergency showers and eyewash, respirators, and bio-hazard bags for bloodborne pathogens. This other equipment is discussed in other sections of this manual, but in all cases, the equipment must be properly signed (marked) and all employees must have proper training in the use of this equipment.
Bloodborne Pathogens	Normal routine duties in VRC Protx facilities do not require any employees to be exposed to bloodborne pathogens. It is possible that exposure could occur while rendering first aid to a fellow employee or other person. Although the likelihood of exposure is small, all employees shall be trained in the proper precautions necessary to protect themselves and others from possible infection from bloodborne pathogens. This exposure determination shall be made without regard to the use of personal protective equipment.
Bloodborne Pathogens – Universal Precautions	Universal precautions shall be observed to prevent contact with blood or other potentially infectious materials. Under circumstances in which differentiation between body fluid types is difficult or impossible, all body fluids shall be considered potentially infectious materials. Engineering and work practice controls shall be used to eliminate or minimize employee exposure. Where occupational exposure remains after institution of these controls, personal protective equipment shall also be used.

FIRST AID AND BLOODBORNE PATHOGENS

Bloodborne Pathogens – Personal Protective Equipment

VRC Protx will use appropriate personal protective equipment to protect employees from exposure to blood or other infectious materials. The required PPE includes a micro-shield (a mouthpiece to protect the mouth area in case CPR is necessary) and rubber gloves, which must be kept in each first aid kit. This level of personnel protection is appropriate for the type of exposure our workers will face. Training will guide employees when extra protection is necessary. Employers shall provide hand washing facilities which are readily accessible to employees. When provision of hand washing facilities is not feasible, the employer shall provide either an appropriate antiseptic hand cleanser in conjunction with clean cloth/paper towels or antiseptic towelettes.

When antiseptic hand cleansers or towelettes are used, hands shall be washed with soap and running water as soon as feasible.

Immediately or as soon as possible after use, contaminated reusable sharps shall be placed in appropriate containers until properly reprocessed. These containers shall be: Puncture resistant; Labeled or color-coded in accordance with this standard; Leakproof on the sides and bottom; In accordance with the requirements set forth in paragraph (d)(4)(ii)(E) for reusable sharps.

Bloodborne Pathogens – Reporting

All first aid incidents must be reported as required as soon as possible. The contractor and contracting employer will determine what follow-up testing is required. The final report shall contain the following information:

- Name of First Aid providers
- Description of circumstances of the accident
- Determination of whether an “exposure incident” as defined in the standard has occurred.

Bloodborne Pathogens – Hepatitis B Vaccination

All First Aid providers assisting in any situation involving the presence of blood or other potentially infectious materials – regardless of whether or not an exposure incident occurs – must be offered the full immunization series no later than 24 hours after an incident. Even if the employee declines the immunization, the employee must document that on the appropriate form.

FIRST AID AND BLOODBORNE PATHOGENS

Bloodborne Pathogens - Documentation

All exposures are to be documented as required, but test results are to remain confidential. Follow-up exams will be made if the physician deems it necessary or requested by the employee.

Housekeeping

Employers shall ensure that the worksite is maintained in a clean and sanitary condition. The employer shall determine and implement an appropriate written schedule for cleaning and method of decontamination based upon the location within the facility, type of surface to be cleaned, type of soil present, and tasks or procedures being performed in the area.

Documentation

DOCUMENT	WHERE KEPT	HOW LONG
Bloodborne Pathogen Training	Facility	Length of Employment
First Aid Kit Contents	All First Aid Kits	Always
First Aid/CPR Training	Facility	Length of Employment

PNEUMATIC TOOLS SAFETY

Purpose

This program is intended to provide guidelines and procedures for the safe and proper use of pneumatic tools and equipment.

Responsibility

It is the responsibility of all employees who will use, maintain, repair or be in the vicinity of pneumatic tools and equipment to understand and implement the safety instructions, PPE, procedures and policies of this equipment.

Definitions

Pneumatic tools are powered by compressed air and include chippers, drills, hammers, sanders, spray guns, air ratchets, grinders, nibblers, needle scalers and many more.

Policy

There are several dangers associated with the use of pneumatic tools. First and foremost is the danger of getting hit by one of the tool's attachments or by some kind of fastener that you are using with the tool. There is also a danger of being struck by projectiles dislodged by the action of the tool. This can be reduced / prevented by the proper use of PPE as well as understanding how and why the tool does what it does.

Pneumatic tools must be checked to see that the connection between the tools and supply line / hose is fastened securely as to prevent them from becoming disconnected. A whip check or positive locking device attaching the air hose to the tool may also be used and will serve as an added safeguard. In the use of Chicago fittings safety clips installed on the two halves of the connection are required. In the situation where the supply line is "hard threaded" to the tool the air supply line must be drained of all pressure and blocked open before the connection can be broken or made.

If an air hose is more than 1/2-inch (12.7 millimeters) in inside diameter, a safety excess flow valve must be installed at the source of the air supply to reduce pressure in case of hose failure.

In general, the same precautions should be taken with an air hose that are recommended for electric cords, because the hose is subject to the same kind of damage or accidental striking, and because it also presents tripping hazards. Specifically hoses, where possible, need to be routed overhead where they are less likely to be damaged by traffic. Also be

PNEUMATIC TOOLS SAFETY

mindful of the proximity of the hoses when welding, cutting, grinding, maneuvering equipment to prevent the hoses becoming pinched, entangled and compromised and posing a safety hazard.

When using pneumatic tools, a safety clip or retainer must be installed to prevent attachments such as chisels on a chipping hammer from being ejected during tool operation. NEVER aim these tools, their bits or anything toward people or equipment other than the work piece intended. Take the time to warn and where needed barricade the work area to prevent injury or damage.

Pneumatic tools that shoot nails, rivets, staples, or similar fasteners and operate at pressures more than 100 pounds per square inch (6,890 kPa), must be equipped with a special device to keep fasteners from being ejected, unless the muzzle is pressed against the work surface. These safety mechanisms should be inspected and tested before use of the tool to insure they are installed and properly working. These safety devices shall not be altered or bypassed. Doing so will result in disciplinary action up to and including termination.

Airless spray guns that atomize paints and fluids at pressures of 1,000 pounds or more per square inch (6,890 kPa) must be equipped with automatic or visible manual safety devices that will prevent pulling the trigger until the safety device is manually released. These safety devices shall not be altered or bypassed. Doing so will result in disciplinary action up to and including termination.

Eye protection is mandatory. Head and face protection is highly recommended for individuals working with pneumatic tools. Where practical, screens should also be set up to protect nearby workers from being struck by flying fragments around pneumatic chippers, riveting guns, staplers, or air powered drills.

Hearing protection is required when using pneumatic tools. As a general rule, if you cannot be heard or hear a human voice at a normal speaking voice level it’s too loud. Use of disposable “in the ear” plugs, hearing protecting muffs or a combination is the best recommendation.

Compressed air guns should never be pointed toward anyone. Workers should never "dead-end" them against themselves or anyone else. Doing so will result in compressed air impregnation causing severe injury and possibly death. Horseplay will not be terminated. A chip guard must be used when compressed air is used for cleaning.

PNEUMATIC TOOLS SAFETY

Use of heavy pneumatic jackhammers can cause fatigue and strains. **If you get tired, stop.** Take a break. Heavy rubber grips reduce these effects by providing a secure handhold. Workers operating a pneumatic jackhammer must wear safety glasses, hearing protection and safety shoes that protect them against injury if the jackhammer slips or falls. In the event the jackhammer gets away from the operator do not try to catch it. This could result in crushing injury, back injury, etc. A face shield also should be used.

HAND AND POWER TOOLS SAFETY

Purpose	To reduce the likelihood of injuries involving the use of hand or power tools.
Scope	These requirements apply to all VRC Protx employees where the uses of hand or power tools are employed. This will most notably apply to employees involved in maintenance, construction or trade areas.
General	Failure to observe one or more of the following safe practices accounts for most hand and powered hand tool accidents:
Select the Right Tool for the Job	Examples of unsafe practices are: striking hardened faces of hand tools together (such as using a carpenter's hammer to strike another hammer, hatchet, or metal chisel), using a file for a pry, a wrench for a hammer, and pliers instead of the proper wrench.
Keep Tools in Good Condition	Wrenches with cracked work jaws, screw drivers with broken points or broken handles, hammers with loose heads, dull saws, and extension cords or electric tools with broken plugs, improper or removed grounding lugs, or split insulation are examples of tools in poor conditions. Tools that have deteriorated in this manner must be taken out of service.
Use Tools in the Right Way	Screw drivers applied to objects held in the hand, knives pulled toward the body, and failure to ground electrical equipment are common causes of accidents.
Keep Tools in a Safe Place	Many accidents have been caused by tools falling from overhead and by knives, chisels, and other sharp tools carried in pockets or left in tool boxes with cutting edges exposed.

STEPS TO BE USED TO CONTROL TOOL ACCIDENTS:

1. Supervisors are to ensure that employees are trained to select the right tools for each job.
2. Establish regular tool inspection procedures and provide means to facilitate repair to ensure that tools will be maintained in safe condition.
3. Provide proper storage facilities in the tool room and on the job.
4. The employer is responsible for the safe condition of tools and equipment used by employees but the employees have the responsibility for properly using and maintaining tools.

   Each supervisor is to make a complete check of their operations to determine the need for special tools that will do the work more

safely than ordinary tools. Special tools should be kept readily available in a centralized tool room if possible.

Supervisors and foremen should be qualified by training and experience to pass judgment on the condition of tools for further use. Dull or damaged tools shall not be returned to stock. These tools need to be repairs or replaced.

Carrying Tools

The employee is to never carry tools, which in any way may interfere with his/her using both hands freely on a ladder or while climbing on a structure. A strong bag, bucket, or similar container is to be used to hoist tools from the ground to the job. Tools are to be returned in the same manner, not brought down by hand, carried in pockets or dropped to the ground.

Housekeeping

Mislaid and loose tools cause a substantial portion of hand tool injuries. Tools should not be left where employees are moving or walking.

Chisels, screwdrivers, and pointed tools shall never be carried in a worker's pocket. They are to be carried in a tool box or cart, in a carrying belt (sharp or pointed end down) like those used by electricians and steel workers, in a pocket tool pouch, or in the hand with points and cutting edges pointing away from the body.

Employees carrying tools on their shoulders should pay close attention to clearances when turning around and should handle the tools so that they will not strike other employees.

Personal Protective Equipment

Appropriate personal protective equipment, e.g. safety goggles, gloves, etc. should be worn due to hazards that may be encountered while using portable power tools and hand tools.

Employees using hand and power tools and exposed to the hazard of falling, flying, abrasive and splashing objects, or exposed to harmful dusts, fumes, vapors, or gases are to be provided with the particular personal protective equipment necessary to protect them from the hazard.

Use of Hand Tools

Hand tools are non-powered. They include anything from axes to wrenches. The greatest hazards posed by hand tools results from misuse and improper maintenance.

A part of every maintenance and construction worker’s instruction program shall include detailed training in the proper use of hand tools. So important is this training that considerable attention is given, in the following pages, to those safe practices.

HAND AND POWER TOOLS SAFETY

1. Metal-Cutting Hand Tools

a. Chisels

Factors determining the selection of cold chisels are the materials to be cut, the size and shape of the tool, and the depth of the cut to be made.

The chisel should be made heavy enough so that they will not buckle or spring when struck.

A chisel no larger than the job should be selected so that the blade is used rather than the point or corner. Also, a hammer heavy enough to do the job should be used.

Employees shall wear safety goggles when using a chisel and should set up a shield or screen to prevent injury to other workers from flying chips. If a shield does not afford positive protection to all exposed employees, then glasses with side protection should be worn.

b. Tap and Die Work

Tap and die work requires certain precautions. The work should be firmly mounted in the vise. Only a "T" handle wrench or adjustable tap wrench should be used. When threads are being cut with a hand die, hands and arms should be kept clear of the sharp threads coming through the die, and metal cuttings should be cleared away with a brush.

c. Hack Saws

Hacksaws should be adjusted in the frame to prevent buckling and breaking, but should not be tight enough to break off the pins that support the blade. Install blade with teeth pointing forward.

Pressure should be applied on the forward stroke not on the back stroke. If the blade is twisted or too much pressure is applied, the blade may break and cause injury to the hands or arms of the user.

d. Files

Selection of the right kind of file for the job will prevent injuries and lengthen the life of the file. Inasmuch as the extremely hard and brittle steel of the file chips easily, the file should never be cleaned by being struck against a vise or other metal object. A file cleaning card or brush should be used.

For the same reason, a file is not to be hammered or used as a pry. Such abuse frequently results in the file's chipping or breaking causing injury to the user. A file should not be made into a center punch, chisel, or any other type of tool because the hardened steel may fracture in use.

A file is never to be used without a smooth, crack-free handle; if the file should bind, the tang may puncture the palm of the hand, the wrist, or other part of the body. Under some conditions, a

clamp-on raised offset handle may be useful to give extra clearance for the hands. Files are not to be used on lathe stock turning at high speed (faster than three turns per file stroke) because the end of the file may strike the chuck, dog, or face plate and throw the file (or metal chip) back at the operator hard enough to inflict serious injury.

e. Tin Snips

Tin snips should be heavy enough to cut the material so easily that the worker needs only one hand on the snips and can use the other to hold the material. The material is to be well supported before the last cut is made so that cut edges do not press against the hands.

Jaws of snips are to be kept tight and well lubricated.

Employees shall wear safety goggles when trimming corners or slivers of metal because small particles often fly with considerable force. They shall always wear gloves.

f. Cutters

Cutters used on wire, reinforcing rods, or bolts should have ample capacity for the stock; otherwise, the jaws may be sprung or spread. Also, a chip may fly from the cutting edge and injure the user.

Cutters require frequent lubrication. To keep cutting edges from becoming nicked or chipped, **cutters are not to be used as nail pullers or pry bars.**

Cutter jaws should have the hardness specified by the manufacturer for the particular kind of material to be cut. By adjustment of the bumper stop behind the jaws, cutting edges are to be set to have a clearance of 0.003 inch when closed.

2. Wood Cutting Tools

Edged tools are to be used so that if a slip should occur, the direction of force will be away from the body. For efficient and safe work, edged tools are to be kept sharp and ground to the proper angle. A dull tool does a poor job and may stick or bind.

a. Wood Chisels

Inexperienced employees shall be instructed in the proper method of holding and using chisels. Handles are to be free of splinters.

The wood handle of a chisel struck by a mallet is to be protected by a metal or leather cap to prevent it from splitting.

The work to be cut must be free of nails to avoid damage to the blade or cause a chip to fly into the user's face or eye.

b. Saws

Saws should be carefully selected for the work they are to do. For crosscut work on green wood, a coarse saw (4 to 5 points per inch)

is to be used. A fine saw is better for smooth, accurate cutting in dry wood. Saws are to be kept sharp and well set to prevent binding.

c. Axes

An axe person is to make sure that there is a clear circle in which to swing the axe before starting to chop. Also, all vines, brush, and shrubbery within the range should be removed, especially overhead vines that may catch or deflect the axe.

Axe blades shall be protected with a sheath or metal guard wherever possible. When the blade cannot be guarded, it is safer to carry the axe at one's side. The blade on a single edged axe shall be pointed down.

d. Hatchets

Hatchets shall not be used for striking hard metal surfaces since the tempered head may injure the user or others by flying chips. When using a hatchet in a crowded area, employee shall take special care to prevent injury to themselves and other workers. Using a hatchet to drive nails is prohibited.

3. Miscellaneous Cutting Tools

a. Planes, Scrapers, Bits, and Drawknives

Planes, scrapers, bits, and drawknives are to be used only by experienced employees. These tools are to be kept sharp and in good condition.

The principal hazard in the use of knives is that hands may slip from the handle onto the blade or that the knife may strike the body or the free hand. A handle guard or a finger ring (and swivel) on the handle eliminates these hazards. Adequate guarding is important.

Employees who must carry knives with them on the job m in sheaths or holders. Never carry a sheathe knife on the front part of a belt. Always carry it over the right or left hip, toward the back. This will prevent severing a leg artery or vein in case of a fall.

Knives must never be left lying on benches or in other places where they may cause hand injuries. Safe placing and storing of knives is important to knife safety.

Supervisors must make certain that employees who handle knives have ample room in which to work so they are not in danger of being bumped by other workers.

Supervisors should be particularly careful about the hazard of employees leaving knives hidden under a product, under scrap paper or wiping rags, or among other tools in work boxes or drawers. Knives are to be kept separate from other tools to protect the cutting edge of the knife as well as to protect the employee.

Horseplay shall be prohibited around knife operations. Throwing, "fencing", trying to cut objects into smaller and smaller pieces, and similar practices are not only dangerous but reflect inadequate supervision. .

Supervisors shall assure that nothing is cut that requires excessive pressure on the knife. Knives shall not be used as a substitute for can openers, screwdrivers, or ice picks.

4. Torsion Tools.

Socket wrenches are safer to use than adjustable or open-end wrenches.

a. Open End or Box Wrenches

Open end or box wrenches shall be inspected to make sure that they fit properly and are never to be used if jaws are sprung or cracked. When defective they shall be taken out of service until repaired.

b. Socket Wrenches

Socket wrenches give great flexibility in hard to reach places. The use of special types shall be encouraged where there is danger of injury.

c. Adjustable Wrenches

Adjustable wrenches are used for many purposes. They are not intended, however, to take the place of standard open end, box or socket wrenches. They are used mainly for nuts and bolts that do not fit a standard wrench. Pressure is always applied to the fixed jaw.

d. Pipe Wrenches

Pipe wrenches, both straight and chain tong, shall have sharp jaws and be kept clean to prevent slipping.

The adjusting nut of the wrench is to be inspected frequently. If it is cracked, the wrench shall be taken out of service. A cracked nut may break under strain, causing complete failure of the wrench and possible injury to the user.

A piece of pipe "cheater" slipped over the handle shall not be used to give added leverage because this can strain a pipe wrench to the breaking point. The handle of every wrench is designed to be long enough for the maximum allowable safe pressure.

A pipe wrench should never be used on nuts or bolts, the corners of which will break the teeth of the wrench, making it unsafe to use on pipe and fittings. Also, a pipe wrench, when used on nuts and bolts, damages their heads. A pipe wrench shall not be used on valves, struck with a hammer, nor used as a hammer.

e. Pliers

Side cutting pliers sometimes cause injuries when short ends of wires are cut. A guard over the cutting edge and the use of safety glasses will help prevent eye injuries.

The handles of electricians' pliers are to be insulated. In addition, employees shall wear the proper electrical rated gloves if they are to work on energized lines.

Pliers shall not be used as a substitute for a wrench.

f. Special Cutters

Special cutters include those for cutting banding wire and strap. Claw hammers and pry bars shall not be used to snap metal banding material.

g. Pipe Tongs

Employees must neither stand nor jump on the tongs nor place extensions on the handles to obtain more leverage. They should use larger tongs.

h. Screwdrivers

The practice of using screwdrivers for punches, wedges, pinch bars, or pries shall not be allowed.

Cross slot (Phillips head) screwdrivers are safer than the square bit type, because they have less tendency to slip. The tip must be kept clean and sharp, however, to permit a good grip on the head of the screw.

The part to be worked upon must never be held in the hands; it should be laid on a bench or flat surface or held in a vise.

No screwdriver used for electrical work shall have the blade or rivet extending through the handle. Both blade and handle shall be insulated except at the tip.

5. SHOCK TOOLS

a. Hammers

A hammer is to have a securely wedged handle suited to the type of head used. The handle shall be smooth, without cracks or splinters, free of oil, shaped to fit the hand, and of the specified size and length. Employees shall be warned against using a steel hammer on hardened steel surfaces. Instead, a soft head hammer or one with a plastic, wood, or rawhide head should be used. Safety goggles or safety glasses shall be worn to protect against flying chips, nails, or scale.

b. Riveting Hammers

Riveting hammers, often used by sheet metal workers, must have the same kind of use and care as ball pen hammers and should be watched closely for cracked or chipped faces.

c. Carpenter's or Claw Hammers

The faces shall be kept well dressed at all times to reduce the hazard of flying nails while they are being started into a piece of wood. A checker faced head is sometimes used to reduce this hazard.

Eye protection is advisable for all nailers and all employees working in the same area.

6. SPARK-RESISTANT TOOLS

Around flammable substances, sparks produced by iron and steel hand tools can be a dangerous ignition source. Where this hazard exists, spark-resistant tools made from brass, plastic, aluminum, or wood will provide for safety.

Power Tools Precaution

Power tools can be hazardous when improperly used. There are several types of power tools, based on the power source they use: electric, pneumatic, liquid fuel, hydraulic, and powder-actuated.

Employees should be trained in the use of all tools - not just power tools. They should understand the potential hazards as well as the safety precautions to prevent those hazards from occurring.

The following general precautions should be observed by power tool users:

- Never carry a tool by the cord or hose.
- Never yank the cord or the hose to disconnect it from the receptacle.
- Keep cords and hoses away from heat, oil, and sharp edges.
- Disconnect tools when not in use, before servicing, and when changing accessories such as blades, bits and cutters.
- All observers should be kept at a safe distance away from the work area.
- Secure work with clamps or a vise, freeing both hands to operate the tool.
- Avoid accidental starting. The worker should not hold a finger on the switch button while carrying a plugged-in tool.
- Tools should be maintained with care. They should be kept sharp and clean for the best performance. Follow instructions in the user's manual for lubricating and changing accessories.
- Be sure to keep good footing and maintain good balance.
- The proper apparel should be worn. Loose clothing, ties, or jewelry can become caught in moving parts.
- All portable electric tools that are damaged shall be removed from use and tagged "Do Not Use."

HAND AND POWER TOOLS SAFETY

Guards

Hazardous moving parts of a power tool need to be safeguarded. For example, belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating, or moving parts of equipment must be guarded if such parts are exposed to contact by employees.

Guards, as necessary, should be provided to protect the operator and others from the following:

- Point of operation,
- In-running nip points,
- rotating parts, and
- flying chips and sparks.

Safety guards must never be removed when a tool is being used. For example, portable circular saws must be equipped with guards. An upper guard must cover the entire blade of the saw. A retractable lower guard must cover the teeth of the saw, except when it makes contact with the work material. The lower guard must automatically return to the covering position when the tool is withdrawn from the work.

Safety Switches

The following hand-held powered tools must be equipped with a momentary contact "on-off" control switch: drills, tappers, fastener drivers, horizontal, vertical and angle grinders with wheels larger than 2 inches in diameter, disc and belt sanders, reciprocating saws, saber saws, and other similar tools. These tools also may be equipped with a lock-on control provided that turnoff can be accomplished by a single motion of the same finger or fingers that turn it on.

The following hand-held powered tools may be equipped with only a positive "on-off" control switch: platen sanders, disc sanders with discs 2 inches or less in diameter; grinders with wheels 2 inches or less in diameter; routers, planers, laminate trimmers, nibblers, shears, scroll saws and jigsaws with blade shanks <-inch wide or less.

Other hand-held powered tools such as circular saws having a blade diameter greater than 2 inches, chain saws, and percussion tools without positive accessory holding means must be equipped with a constant pressure switch that will shut off the power when the pressure is released.

Electric Tools

Employees using electric tools must be aware of several dangers; the most serious is the possibility of electrocution.

Among the chief hazards of electric-powered tools are burns and slight shocks which can lead to injuries or even heart failure. Under certain conditions, even a small amount of current can result in fibrillation of the heart and eventual death. A shock also can cause the user to fall off a ladder or other elevated work surface.

HAND AND POWER TOOLS SAFETY

To protect the user from shock, tools must either have a three-wire cord with ground and be grounded, be double insulated, or be powered by a low-voltage isolation transformer. Three-wire cords contain two current-carrying conductors and a grounding conductor. One end of the grounding conductor connects to the tool's metal housing. The other end is grounded through a prong on the plug. Anytime an adapter is used to accommodate a two-hole receptacle, the adapter wire must be attached to a known ground. The third prong should never be removed from the plug.

Double insulation is more convenient. The user and the tools are protected in two ways: by normal insulation on the wires inside, and by a housing that cannot conduct electricity to the operator in the event of a malfunction.

These general practices should be followed when using electric tools:

- Electric tools should be operated within their design limitations.
- Gloves and safety footwear are recommended during use of electric tools.
- When not in use, tools should be stored in a dry place.
- Electric tools should not be used in damp or wet locations.
- Work areas should be well lighted.
- Electric cords shall be inspected periodically and kept in good condition. Heavy duty plugs that clamp to the cord should be used to prevent strain on the current carrying parts, if the cord is accidentally pulled.
- Although no guards are available for drill bits, some protection is afforded if drill bits are carefully chosen for the work to be done, such as being no longer than necessary to do the work.
- Where the operator must guide the drill with the hand, the drill is to be equipped with a sleeve that fits over the drill bit. Oversized bits shall not be ground down to fit small electric drills; instead, an adapter should be used that will fit the large bit and provide extra power through a speed reduction gear; however this again is an indication of improper drill size. When drills are used, the pieces of work are to be clamped or anchored to prevent whipping.
- Electric saws are usually well guarded by the manufacturer, but employees must be trained to use the guard as intended. The guard should be checked frequently to be sure that it operates freely and encloses the teeth completely when it is cutting.

- Circular saws shall not be jammed or crowded into the work. The saw is to be started and stopped outside the work.

HAND AND POWER TOOLS SAFETY

Powered Abrasive Wheel Tools

Powered abrasive grinding, cutting, polishing, and wire buffing wheels create special safety problems because they may throw off flying fragments. Before an abrasive wheel is mounted, it should be inspected closely and sound- or ring-tested to be sure that it is free from cracks or defects. To test, wheels should be tapped gently with a light non-metallic instrument. If they sound cracked or dead, they could fly apart in operation and so must not be used. A sound and undamaged wheel will give a clear metallic tone or "ring." To prevent the wheel from cracking, the user should be sure it fits freely on the spindle. The spindle nut must be tightened enough to hold the wheel in place, without distorting the flange. Follow the manufacturer's recommendations. Care must be taken to assure that the spindle wheel will not exceed the abrasive wheel specifications. Due to the possibility of a wheel disintegrating (exploding) during start-up, the employee should never stand directly in front of the wheel as it accelerates to full operating speed. Portable grinding tools need to be equipped with safety guards to protect workers not only from the moving wheel surface, but also from flying fragments in case of breakage.

In addition, when using a powered grinder:

- Always use eye protection.
- Turn off the power when not in use.
- Never clamp a hand-held grinder in a vise.

Use of Abrasive Wheels

1. Floor stand and bench mounted abrasive wheels, used for external grinding shall be provided with safety guards (protection hoods). The maximum regular exposure of the grinding wheel periphery and sides shall be not more than 90 degrees except that, when work requires contact with the wheel below the horizontal plane of the spindle, the angular exposure shall not exceed 125 degrees.

   Safety guards shall be strong enough to withstand the effect of a bursting wheel.
2. Floor and bench mounted grinders shall be provided with work rests which are rigidly supported and readily adjustable. Such work rests shall be kept at a distance not to exceed one eighth inch from the surface of the wheel.
3. Cup type wheels used for external grinding shall be protected by either a revolving cup guard or a band type guard. All other portable abrasive wheels used for external grinding shall be provided with safety guards (protection hoods), except as follows:
   a. When the work location makes it impossible, a wheel equipped with safety flanges shall be used.
   b. When wheels 2 inches or less in diameter which are securely mounted on the end of a steel mandrel are used.

4. Portable abrasive wheels used for internal grinding shall be provided with safety flanges (protection flanges) except as follows:
   a. When wheels 2 inches or less in diameter which are securely mounted on the end of a steel mandrel are used.

5. When safety guards are required, they shall be so mounted as to maintain proper alignment with the wheel, and the guard and its fastenings shall be of sufficient strength to retain fragments of the wheel in case of accidental breakage. The maximum angular exposure of the grinding wheel periphery and sides shall not exceed 180°.
6. When safety flanges are required, they shall be used only with wheels designed to fit the flanges. Only safety flanges, of a type and design and properly assembled so as to ensure that the pieces of the wheel will be retained in case of accidental breakage, shall be used.
7. All abrasive wheels shall be closely inspected and ring tested before mounting to ensure that they are free from cracks and defects.
8. Grinding wheels shall fit freely on the spindle and shall not be forced on. The spindle nut shall be tightened only enough to hold the wheel in place.
9. All employees using abrasive wheels shall be protected by eye protection equipment. Dust type safety goggles or plastic face shields should be worn and, if dust is created, a respirator approved by the National Institute for Occupational Safety & Health (NIOSH) for the exposure should be worn.

If a sander is used steadily, it should be dismantled periodically, as well as thoroughly cleaned every day by being blown out with low pressure air. If compressed air is used the operator shall wear safety goggles or work with a transparent chip guard between his body and the air blast.

Because wood dust presents a fire and explosion hazard, keep dust to a minimum; sanders can be equipped with a dust collection or vacuum bag. Electrical equipment shall be designed to minimize the explosion hazard. Fire extinguishers approved for Class C (electrical) fires should be available.

Pneumatic Tools

Pneumatic tools are powered by compressed air and include chippers, drills, hammers, and sanders.

There are several dangers encountered in the use of pneumatic tools. The main one is the danger of getting hit by one of the tool's attachments or by some kind of fastener the worker is using with the tool.

Eye protection is required and face protection is recommended for

employees working with pneumatic tools.
Noise is another hazard. Working with noisy tools such as jackhammers requires proper, effective use of hearing protection.

When using pneumatic tools, employees must check to see that they are fastened securely to the hose to prevent them from becoming disconnected. A short wire or positive locking device attaching the air hose to the tool will serve as an added safeguard.
A safety clip or retainer must be installed to prevent attachments, such as chisels on a chipping hammer, from being unintentionally shot from the barrel.
Screens must be set up to protect nearby workers from being struck by flying fragments around chippers, riveting guns, staplers, or air drills.
Compressed air guns should never be pointed toward anyone. Users should never "dead-end" it against themselves or anyone else.

a. The operating trigger on portable hand operated utilization equipment shall be so located as to minimize the possibility of its accidental operation and shall be arranged to close the air inlet valve automatically when the pressure of the operator's hand is removed.
b. Pneumatic power tools shall be secured to the hose or whip by some positive means to prevent the tools from becoming accidentally disconnected.
c. Safety clips or retainers shall be securely installed and maintained on pneumatic impact (percussion) tools to prevent attachments from being accidentally expelled.
d. All pneumatically driven nailers, staplers, and other similar equipment provided with automatic fastener feed, which operate at more than 100 p.s.i. pressures 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.
e. Compressed air shall not be used for cleaning purposes except with an air blow gun limited to 30 p.s.i. static pressure at the outlet nozzle and then only with effective chip guard and personal protective equipment.
f. The manufacturer's safe operating pressure for hoses, pipes, valves, filters, and other fitting shall not be exceeded.
g. The use of hoses for hoisting or lowering tools shall not be permitted.
h. All hoses exceeding 1/2 inch inside diameter shall have a safety device at the source of supply or branch line to

	reduce pressure in case of hose failure. i. 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. j. In lieu of the above, a diffuser net 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 in contact with the operator, or other equivalent protection shall be provided.
Fuel Powered Tools	a. All fuel powered tools shall be stopped while being refueled, serviced, or maintained, and fuel shall be transported, handled, and stored in approved safety cans. b. Leakage or spillage of flammable or combustible liquids shall be disposed of promptly and safely. c. When fuel powered tools are used in enclosed spaces, the applicable requirement for concentrations of toxic gases and use of personal protective equipment shall apply.
Hydraulic Power Tools	a. The fluid used in hydraulic powered tools shall be fire resistant and shall retain its operating characteristics at the most extreme temperatures to which it will be exposed. b. The manufacturer's safe operating pressures for hoses, valves, pipes, filters, and other fittings shall not be exceeded.
Jacks	All jacks - lever and ratchet jacks, screw jacks, and hydraulic jacks - must have a device that stops them from jacking up too high. Also, the manufacturer's load limit must be permanently marked in a prominent place on the jack and should not be exceeded. <u>A jack should never be used to support a lifted load. Once the load has been lifted, it must immediately be blocked up.</u> Use wooden blocking under the base if necessary to make the jack level and secure. If the lift surface is metal, place a 1-inch-thick hardwood block or equivalent between it and the metal jack head to reduce the danger of slippage. To set up a jack, make certain of the following: • the base rests on a firm level surface, • the jack is correctly centered, • the jack head bears against a level surface, and • The lift force is applied evenly.

HAND AND POWER TOOLS SAFETY

Proper maintenance of jacks is essential for safety. All jacks must be inspected before each use and lubricated regularly. If a jack is subjected to an abnormal load or shock, it should be thoroughly examined to make sure it has not been damaged.
Hydraulic jacks exposed to freezing temperatures must be filled with adequate antifreeze liquid.

USE AND MAINTENANCE OF POWDER-ACTUATED TOOLS:

These tools should not be used in an explosive or flammable atmosphere.

a. Only employees who have been trained in the operation of the particular tool in use shall be allowed to operate a powder activated tool.
b. The tool shall be tested each day before loading to see that safety devices are in proper working condition. The method of testing shall be in accordance with the manufacturer's recommended procedure.
c. Any tool found not in proper working order or one that has developed a defect during use shall be removed from service immediately and not used until properly repaired.
d. Adequate eye, head, face and/or personal protective equipment as necessitated by working conditions shall be utilized by the operators and persons working in the area.
e. The tool shall be designed so that it cannot be fired unless it is equipped with a standard protective shield or guard or a special shield, guard, fixture, or jib.
f. The firing mechanism shall be designed so that the tool cannot fire during loading or preparation to fire or if the tool is dropped while loaded. Firing of the tools shall be dependent upon at least two separate and distinct operations of the operator, with the final firing movement being separate from the operation of bringing the tool into the firing position.
g. The tool shall be designed so as not to be operable other than against a work surface and unless the operator is holding the tool against the work surface with force at least 5 pounds greater than the weight of the tool.
h. The tool shall be designed so that it will not operate when equipped with the standard guard indexed to the center position if any bearing surface of the guard is tilted more than 8 degrees from contact with the work surface.

i. The tool shall be designed so that positive means of varying the power are available or can be made available to the operator as part of the tool or as an auxiliary, to facilitate selection of a power level adequate to perform the desired work without excessive force.

j. The tool shall be designed so that all breeching parts will be reasonably visible to allow a check for any foreign matter that may be present.

k. Tools shall not be loaded until just prior to the intended firing time. Neither loaded nor empty tools are to be pointed at any employees. Hands shall be kept clear of the open barrel end.

l. Loaded tools shall not be left unattended.

m. 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.

n. 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.

o. No fastener shall be driven into a spalled area caused by an unsatisfactory fastening.

p. Power assisted, hammer driven tools are used for the same purposes as powder actuated tools and generally the same precautions are to be followed.

q. If a powder-actuated tool misfires; the employee should wait at least 30 seconds, then try firing it again. If it still will not fire, the user should wait another 30 seconds so that the faulty cartridge is less likely to explode, than carefully remove the load. The bad cartridge should be put in water.

Woodworking Tools

1. PERSONAL PROTECTIVE EQUIPMENT - All employees using woodworking tools shall be protected by eye protection equipment.
2. Guarding - All portable, power driven circular saws 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 beveled 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 the covering position.

HAND AND POWER TOOLS SAFETY

3. Disconnect Switches - All "fixed" power driven wood working tools shall be provided with a disconnect switch that can either be locked or tagged in the "off" position.
4. Self feed - Automatic feeding devices shall be installed on machines whenever the nature of the work will permit. Feeder attachments shall have the feed rolls or other moving parts covered or guarded so as to protect the operator from hazardous points.
5. Speeds - The operating speed shall be etched or otherwise permanently marked on all circular saws over 20 inches in diameter or operating at over 10,000 peripheral feet per minute. Any saw so marked shall not be operated at a speed other than that marked on the blade. When a marked saw is retensioned for a different speed, the marking shall be corrected to show the new speed.

EXTENSION / POWER SUPPLY CORD QUARTERLY INSPECTION

Every **January, April, July** and **October** all of the power cords and extension cords on all of our shop, office and other equipment must be inspected for damage, wear and any unsafe condition. These inspections will include abrasion, signs of heating, cuts, poorly repaired cords, existence of grounding lugs where originally installed cracked or failing insulation, bent stabs, etc.. This inspection is also to include power-strips; UPS' and an external look at the outlet covers and receptacles.

The following color code will be used to mark the inspected equipment:

White	Use white electrical tape for **Winter** inspection.
Green	Use green electrical tape for **Spring** inspection.
Yellow	Use yellow electrical tape for **Summer** inspection.
Orange	Use orange electrical tape for **Autumn** inspection.

Cords or equipment that are found to be defective must be marked, tagged out of service and directed to the safety coordinator for repair / replacement. This includes all cords on premises; company or individually owned. Any damaged or defective outlets and/or covers need to be reported and replaced.

FORMS

TRAINING SAFETY FORM

DATE: _____ LOCATION: _____

SUBJECT OF TRAINING (Circle one or more below or describe): _____

_____

- ❑ Prevention of Back Injuries
- ❑ Bloodborne Pathogens
- ❑ CPR
- ❑ Confined Space Entry
- ❑ DOT Drug Plan - Supervisors
- ❑ Defensive Driving
- ❑ DOT HM 126
- ❑ PSM - General Overview
- ❑ Electrical Safety
- ❑ Emergency Action Plan
- ❑ Excavation
- ❑ Fall Protection
- ❑ Fire Protection
- ❑ First Aid
- ❑ Respiratory Protection
- ❑ Hot Work Permit
- ❑ Hazwoper Operations Level
- ❑ Hazard Communication
- ❑ Incident Commander
- ❑ Incident Investigation
- ❑ SPCC
- ❑ Lockout/Tagout
- ❑ Noise and Hearing Protection
- ❑ NORM
- ❑ Personal Protective Equipment

DURATION OF TRAINING (Hours) - _____

METHOD OF TRAINING (Video, Instructor, Computer, Etc.) - _____

If Instructor, Instructor's Name - _____

WAS TEST TAKEN (If yes, attach copy of exam) - _____

PERSONS ATTENDING TRAINING **(Attachment with names and signatures is adequate)**

Name (print)	Social Security #	Work Location	Signature

FORMS

Safety Meeting Documentation		
☐ Scheduled Safety Meeting	☐ Tailgate Safety Meeting	
Location -	Date -	
Primary Safety Topic –	Person Leading Discussion – Company -	
Unsafe Conditions		
New Hazards Reported	Old Hazards Repaired	Old Hazards Not Repaired
Safety Topics Discussed (New or Old Items)		
Names of Attendees		
Next Meeting Date -	Person Responsible -	
Safety Topic -		

FORMS

Name	ID #	Date
Work Requested:		Area
		Spec.
Requested By:	Request Approved:	Account Code

SAFETY REQUIREMENTS		
Depressure		
Drain		
Purge or Flush Clean		
Vehicle Entry Permit		
Breathing Air Masks		
Protective Clothing		
Work Permit	Safe	Hot

Description of Work Performed:

Note - Does this work trigger PSM Management of change?
☐ Yes ☐ No

Possible Exposure To:		Equipment Used	Work Completed
Work Completed as Requested			Date:
Operator	Date		By:
Manager	Date		

Time From AM PM To AM PM	Area	Received By:
Work Description		Issue 2☐ 1☐

TYPE OF PERMIT	SPECIAL PREPARATIONS			
☐ Safe Work Permit	☐	Oxygen Content Checked	☐	Nitrogen Purged
☐ Hot Work Permit	☐	Explosion Meter Checked	☐	Decontaminated
☐ Vessel Entry (see CSE permit)	☐	Toxic Gas Checked	☐	Air Mover in Service
☐ Vehicle Entry Permit	☐	Freed of Hazardous Chemicals	☐	Blinds installed and tagged
☐ Hazardous Work Permit	☐	Area Barricaded	☐	Deposits
List Hazard:	☐	Lockout/Tagout Procedure Complete	☐	Taken Precaution against Iron Sulfide
	☐	Equipment Drained and Depressured	☐	Circuit Breaker Locked
For confined space entry, appropriate rescue service must be available. Use CSE permit for more information.	☐	Fuel Gas Purged	☐	Other

SAFETY EQUIPMENT REQUIRED			Comments:
☐ Asbestos Gloves	☐ Fire Shield	☐ Wrist Line	
☐ Leather Gloves	☐ Chemical Goggles	☐ Life Line	
☐ Rubber Gloves	☐ Chipping Goggles	☐ Vehicle Watchman	
☐ Rubber Coat	☐ Particle Mask	☐ Man on Standby	
☐ Rubber Boots	☐ Gas Mask	☐ Scaffolding	
☐ Acid Suit	☐ Breathing Equipment	☐ Fire Extinguisher	For all hot work, area must be free of flammable/combustible materials prior to start of work Permit is only valid until end of shift.
☐ Face Shield		☐ Light Water Supply	
☐ Other			

Gas Test	Oxygen Test	Toxic Gas Test
% of LEL	%	PPM
Taken By	Taken By	Taken By

FORMS

Signed (operator)			Signed (manager)	
Job Status	☐ Complete	☐ Incomplete	Time AM PM	Operator

A. Space Description

Type of confined space _____
ID #_____
Location_____
Entry Purpose_____
Hazard Identification_____

Start Date _____

Start Time _____a.m./p.m.

Scheduled Expiration_____a.m./p.m.

B. Personnel

The following person(s) trained in confined space procedures are assigned work in connection with a confined space entry, in accordance with this permit:

Entrants: Name (Printed) Name (Printed)
_____

_____
Attendants: Name (Printed) Name (Printed)
_____

_____

C. Type of Entry

☐ Permit-Required Confined Space

☐ Alternate entry

a. _____All employees trained
b. _____Atmospheric hazard (identify) _____
c. _____Atmospheric data available
d. _____Ventilation and monitoring without entry
e. _____Space atmosphere tested/no hazardous atmosphere
f. _____Continuous ventilation during entry
g. _____Continuous monitoring during entry

☐ Reclassify space from Permit to Non-permit

a. _____No atmospheric hazard present
b. _____All other hazards eliminated before entry (list)_____
_____

_____
Signature of Entry Supervisor

D. Safety Requirements

	Yes	No	Date/Time	Checked By
Area secured_____	____	____	_____	_____
Piping disconnected_____	____	____	_____	_____
Energy sources and mechanical hazards locked/tagged out____	____	____	_____	_____
Cleaning (flushing/washing) done_____	____	____	_____	_____

FORMS

Required purging or venting done_____	____	____	_____	_____
Sources of ignition controlled_____	____	____	_____	_____
Cutting, welding permit obtained_____	____	____	_____	_____
Use of hazardous or flammable materials approved_____	____	____	_____	_____
Other_____	____	____	_____	_____

FORMS

FORK TRUCK WEEKLY INSPECTION

Please check these items before each shift. Note on back of sheet or correct if possible any discrepancies.

OK		BAD
	Amber strobe light	
	Driving lights	
	Brake Lights	
	Park Brake	
	Control Pedals: brake/accelerator	
	Marker lights	
	Back up alarm	
	Horn	
	Seat Safety Switch	
	Hydraulic Hoses	
	Hydraulic reservoir oil level	
	Engine oil level	
	Anti-freeze level	
	Brake fluid level	
	Transmission oil level	
	Fuel/propane level (fill at ½ tank for gasoline and diesel)	
	Fuel leaks	
	Oil leaks	
	Coolant leaks	
	Other fluid leaks	
	Ram seals	
	Drive belts	
	Coolant hoses	
	Tires / wheels / lugs	
	Fire extinguisher	
	Cleanliness	
	Tow pin / tow bar	
	Lift ram chains	
	Guide ways and wheels	
	Forks, tips, bent, damaged	
	Fork guard back rack	
	Body damage	
	Roll cage	
	Windows	
	Wipers	
	Heater / cooler	
	Hour Meter: _____	

Date:	
Shift:	
Time:	
Operator:	
Supervisor:	
Notes:	

Please return this completed for to your shift supervisor. In the event there are conditions that prevent this equipment from being operated in a safe manner it is your responsibility to lock and tag out this equipment until these conditions can be addressed and corrected.

NOBODY GETS HURT

Behavior Based Safety Program

Behavior Based Safety

Program Overview

A quick review of many corporate industrial records, as well as data collected and reported by regulatory agencies, clearly indicates that the success or failure in managing industrial performance is judged through use of indicators such as, number of regulatory or permit violations, number of spills or incidents, and the cost of fines/penalties assessed or paid. All of these being "lagging" or more simply a record of the incident after it has occurred. While these certainly indicate how well a company has performed - or more accurately not performed - it typically provides little information on how to best manage future actions in preventing the next industrial incident.

One of the keys to prevention is managing the human behaviors and actions that result in industrial incidents. Often these behaviors are not adequately identified and explored even when performing incident root cause analyses. There is ample anecdotal evidence to suggest that human behaviors whether positive or negative are the true root causes of the majority of incidents. If these behaviors and their associated actions (or inactions) can be identified, measured, and controlled it may be possible to proactively manage the follow-on work processes and prevent future industrial incidents before they occur.

One of the often overlooked keys to preventing industrial incidents is managing the human behaviors and actions that contribute to the probability and severity of an incident. The industrial industry has utilized behavior based safety practices for many years to assess safe behaviors and prevent accidents from occurring. In some ways, behavior based safety has always included industrial aspects that are intertwined with safety, specifically when they include use of hazardous materials and general good housekeeping practices. However, other behaviors that could lead to non-compliant industrial practices are typically not included in such safety observation programs.

If these behaviors and their associated actions (or inactions) can be identified, measured, and controlled it may be possible to proactively manage the follow-on work processes and prevent future industrial incidents before they occur. By leveraging two tools – behavior based safety and pre-task planning analysis, both proven successful in reducing accidents in the safety arena, preventing that next industrial incident can become reality, not a dream.

Processes

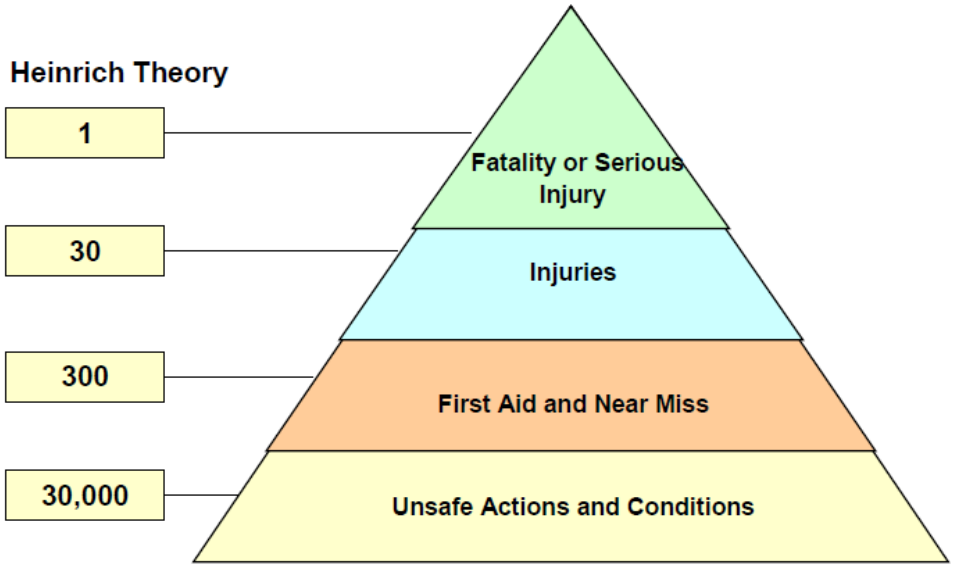
However, there is no correlation between behavior (actions), which are leading indicators and industrial consequences, which are lagging indicators. Additionally, records of other indicators such as non-reportable industrial incidents are often not maintained and/or used to correlate such data.

Behavior Based Observation Process

In the early 1990s, the concept of behavior based safety was being embraced by the industrial industry1. However, the origin of behavior based safety actually dates back to 1931, when H.W. Heinrich, an assistant superintendent of engineering and inspection for the Travelers Insurance Company, in examining hundreds of thousands of accidents found that 88 percent were caused by workers' unsafe actions. Heinrich is the creator of the "safety triangle"2. Figure 1 is an example of a safety triangle with the ratios proposed by Heinrich.

Behavior Based Safety Program

Figure 1: Accident Triangle



The goal of a behavior based process from a safety perspective is to achieve 100% safe work behaviors. This is accomplished by using an observation feedback process (OFP) that provides data regarding safe and at-risk behaviors actually occurring on a work site [1] – the unsafe actions and conditions at the base of Heinrich's "safety triangle". By reducing the base of the triangle, the numbers of subsequent accidents are reduced.

Instead of simply focusing on the number and cost of industrial incidents (lagging indicators) at the top of the "triangle", we instead focus on the base where the more numerous potential non-compliant actions and conditions exist. These actions and conditions represent in large part the behaviors and actions of workers. In a sense they are the seeds of more potentially more serious incidents.

In learning to better control these actions and conditions, we can more effectively prevent the more serious incidents from occurring. The measured success of this control – minimizing the existence of potential non-compliant actions and conditions – can be viewed as a leading indicator for preventing incidents. The methodology proposed for this control is behavior based observation. By collecting and analyzing the data from a industrial behavior based observation program, possible correlation between the reduction in potentially non-complaint actions and conditions and the elimination of industrial incidents could be established.

Observation Process Training

Appropriate personnel will be trained on the Observation Process established. [2]

Behavior Based Safety Program

The training program shall:
Define who is trained and how much
General employee awareness
Ensure that all employees involved are trained in the classroom or on the job

Types of training shall include:
Management training
New employee training
Refresher training

This training will include:
Program objectives and incident metrics reviewed
How to conduct the observation
How to complete the observation form
What do the behaviors mean
Feedback training and role play (mentoring and coaching)
Employees should be aware they may be observed at any time

Observation Feedback Process

During the Observation Feedback Process (OFP), workers gain an understanding of how their behaviors, or lack of, contribute to sound or unsound industrial conditions. Just as with safety, by identifying sound behaviors and positively reinforcing these with the worker, they are more likely to continue to practice such behaviors leading to improved industrial performance. In contrast, the same feedback process allows for the identification of the behaviors that are unsound.

Upon completion of an observation, the observer is expected to have a discussion with the observed to get feedback. [3]

The observer will:
Review the observation with observed employee
Start with positive comments
Reinforce safe behaviors observed first
Describe and discuss what was unsafe
Solicit explanation from the employee of the unsafe behavior with open-ended questions
Re-emphasize no consequence to observed employee.

Open discussion with the worker regarding the potential adverse industrial impacts of their behavior and engagement with them to identify their own ideas for how to alternatively perform their work in a sound manner again leads to improved performance. The focused behavior based process follows the same basic steps or activities as the safety process:
• Initial project engagement
• Team identification
• Team education (behavior observation team – BOT)
• Observation Feedback Process (OFP)
• Data analysis and reporting
• Process improvement identification and implementation

Behavior Based Safety Program

The team education would include the DO IT process, that is:
• Define behaviors to target
• Observe to collect baseline data
• Intervene to influence target behaviors
• Test to measure effectiveness of the interventions

Pre-Task Planning to Reduce the Risk of Incidents

Risk in the sciences is typically defined as the product of the probability and consequences of harm. Therefore, the reduction of risk involves both reducing the probability that a harmful condition/event will occur and reducing the consequences or severity of the harmful condition/event if it was to occur. In the industrial arena, risk reduction takes many forms focusing on either or both probability and consequences. One of the most basic industrial risk reduction methodologies for new industrial is the development of comprehensive pre-industrial industrial impact studies and plans. These studies and plans include measures taken to mitigate or eliminate the most significant unavoidable adverse impacts.

Individual departments, the RSO, Darren Cameron, and VRC Protx as a whole will compare these measurements and track these results by an acceptable method so that numerical and statistical comparisons can be made over time. [4]

The conclusions reached by the studies are often used directly by regulatory agencies in determining both whether to issue permits for the work and to impose specific conditions when performing the work. In a way, the permits and associated conditions "acknowledge and anticipate" the adverse industrial impacts of the work and strive to provide controls – administrative and field based - to minimize or eliminate the impacts.

Action Plan

Once trend analysis is complete, appropriate action plans must be developed to address unsafe behaviors. [5]

Action planning will include:
Evaluate unsafe behaviors from trend analysis and prioritize
Develop action plan for unsafe behaviors based on comments and feedback from data
Designate responsible parties and timeframes within the action plan
Define who is responsible for action planning
Ensure management support

Action Plans are carried out over the course of a set time period. Follow-up is necessary to ensure the closure of all actions listed within the Action Plan. [6]

The follow-up process will include:
Define a frequency for review of action plans
Assign accountability for closeout of action plans within the organization
Archive action plans

Pre-task planning is one follow-on method that can be used to reinforce this "acknowledge and anticipate" adverse impact control process. It can be used to identify and review the controls (i.e.,

Behavior Based Safety Program

requirements) imposed by permits and allow for the planning and implementation of measures to eliminate or minimize the risk of adverse industrial impacts. By focusing attention on the required control measures and discussing in a systematic way the possible industrial consequences of the activities to be performed, those managing and performing the work are better able to plan for and react to conditions that would cause adverse industrial impacts. Simply put, pre-task planning involving supervision and employees directly performing the work, can reduce both the probability and the severity of harm (i.e., risk) resulting from the work.

Summary

There is evidence that significant reductions in industrial incidents can be achieved by some commonly used safety processes. Behavior based observations and pre-task planning can be utilized effectively as industrial management tools to prevent that next industrial incident. By focusing on the behaviors/activities and risks (leading indicators) rather than the result – an injury or fatality (lagging indicators), the possibility and more importantly the probability of being able to prevent that next industrial incident improves dramatically. We need to continually collect industrial behavioral observation data to capture the bottom three layers of the Heinrich triangle. Future collection of behavior based and pre-task planning data will show the relationship between utilizing these two tools to decrease the number and severity of non-reportable incidents, reportable incidents and regulatory infractions – making Zero Industrial Incidents a reality.

Access to Medical and Exposure Records Program

Medical Records

In addition, if VRC Protx possesses any employee medical records, the affected employee or their representative will have access to the records. "Employee medical record" means a record concerning the health status of an employee which is made or maintained by a physician, nurse, or other health care personnel, or technician. [1] All employee medical records, and records of exposure are retained for the duration of employment plus 30 years. [2]

Exposure Records

VRC Protx maintains records of employee exposure to hazardous materials. These exposure records can take the form of environmental (workplace) monitoring or measuring of a toxic substance or harmful physical agent, including personal, area, grab, wipe, or other form of sampling, as well as related collection and analytical methodologies, calculations, and other background data relevant to interpretation of the results obtained; or biological monitoring results which directly assess the absorption of a toxic substance or harmful physical agent by body systems (e.g., the level of a chemical in the blood, urine, breath, hair, fingernails, etc.) but not including results which assess the biological effect of a substance or agent or which assess an employee's use of alcohol or drugs; and material safety data sheets indicating that the material may pose a hazard to human health; or in the absence, a chemical inventory or any other record which reveals where and when used and the identity (e.g., chemical, common, or trade name) of a toxic substance or harmful physical agent. [3] Employee exposure records must be retained for 30 years. [4]

Injury and Illness Records

Copies of required accident investigations and certification of employee safety training shall be maintained by the Responsible Safety Officer. A written report will be maintained on each accident, injury or on-the-job illness requiring medical treatment. A record of each such injury or illness is recorded on OSHA Log and Summary of Occupational Injuries Form 300 according to its instructions. Supplemental records of each injury are maintained on OSHA Form 301, or Employers Report of Injury or Illness Form 5020. Every year, a summary of all reported injuries or illnesses is posted no later than February 1, for three months, until April 30, on OSHA Form 301. These records are maintained for five years from the date of preparation.

Access to Records

Access to records must be provided in a reasonable time, place, and manner. If access to records cannot reasonably be provided within fifteen (15) working days, the employer shall within the fifteen (15) working days apprise the employee or designated representative requesting the record of the reason for the delay and the earliest date when the record can be made available. [5] Whenever an employee or designated representative requests a copy of a record, that record must be provided at no cost.

Whenever access is requested to an analysis which reports the contents of employee medical records by either direct identifier (name, address, social security number, payroll number, etc.) or by

Access to Medical and Exposure Records Program

information which could reasonably be used under the circumstances indirectly to identify specific employees (exact age, height, weight, race, sex, date of initial employment, job title, etc.), personal identifiers must be removed before access is provided. [7]

Providing Information to Employees

Upon an employee's first entering into employment, and at least annually thereafter, information must be given to current employees of the existence, location, availability and the person responsible for maintaining and providing access to records and each employee's rights of access to these records. [8]

Records Succession

Whenever an employer is ceasing to do business, the employer shall transfer all records subject to this section to the successor employer. Whenever an employer either is ceasing to do business and there is no successor employer to receive and maintain the records, or intends to dispose of any records required to be preserved for at least thirty (30) years, the employer shall transfer the records to the Director of the National Institute for Occupational Safety and Health (NIOSH) if so required by a specific occupational safety and health standard. [9]

Emergency Action Plan

Organization

VRC Protx requires that during every emergency an organized effort be made to protect personnel from further injury and to minimize property damage.

All of VRC Protx resources can be made available to respond to an emergency. Each supervisor must know what to do during an emergency in his or her area and must be certain that his or her employees understand their roles.

Emergency Action Plan

A responsible party must be designated by the Director of Safety and oriented for each workplace or jobsite. Generally, the Director of Safety or designated representative is the person in charge of a workplace or jobsite. This person has specific responsibility for the preparation, updating, and implementation of the emergency plan. This responsibility includes recommending personnel to attend indoctrination and training programs.

Specifically, each plan must contain the following information and procedures as appropriate for each workplace.

Emergency Escape Procedures

Floor plans showing evacuation routes, the location of shutoff switches and valves for the utility systems (water, gas, electricity), and the locations of emergency equipment and supplies (including medical) shall be determined prior to the start of work at each at each jobsite or workplace. Indications on the floor plans of areas where specific hazards (i.e., toxic, flammable, and/or radioactive materials) exist. The location and description of special hazards or hazardous devices should be included in the text together with shutdown procedures if applicable.

Emergency Operator Personnel

A list of people with specific duties during an emergency and a description of their duties shall be provided. For example, specific people should be assigned to supervise evacuation and to carry out a rapid search of the area (assuming this can be done safely).

Accounting for All Employees

A designation of a primary assembly point for accounting for all employees that is well away from the building shall be determined before the start of the project. An alternate site should also be designated in case the first choice cannot be used.

Emergency Action Plan

Reentry procedures

No one shall reenter an evacuated building or area without specific instructions from the Director of Safety or other person in charge.

Rescue Medical Duties

Proceed with first aid or attempt to control the incident only if you can do so safely and have been trained in first aid or the emergency response necessary to control the incident.

Reporting Fires and Other Emergencies

Report the emergency immediately. State what happened, the specific location, whether anyone was injured, and your name and phone number in addition to any other applicable information.

Additional Contacts for More Information

VRC Protx has designated personnel at the central office for additional information. If you have any questions, please contact the Director of Safety, Darren Cameron.

Jobsite Alarm Systems

An employee alarm system shall be in accordance with CFR Part 1926.159. The Director of Safety shall determine the particular alarm system to be utilized for each jobsite to alert all employees in the area of an emergency. The alarm system shall be distinctive and recognizable as a signal to evacuate the work area or perform actions designated under the emergency action plan. For those employers with 10 or fewer employees in a particular workplace, direct voice communication is an acceptable procedure for sounding the alarm provided all employees can hear the alarm.

Types of Evacuation

The Director of Safety or designated person shall review each particular jobsite or workplace to determine the type of evacuation to be utilized in emergency circumstances.

Supervisors Responsibilities

During an emergency, the supervisor must:

Ensure that those under his or her supervision are familiar with the plan for the workplace, particularly the recommended exit routes and how to report an emergency.

Render assistance to the person in charge during an emergency, as required.

Maintain familiarity with the shutdown procedures for all equipment used by those under his or her supervision. There are no critical plant operations that require VRC Protx employees to

remain to operate critical equipment.

Know the location and use of all safety equipment.

Keep employees from reentering an evacuated area until reentry is safe.

No Loitering Policy

Employees not involved in the emergency must stay away from the scene and follow the instructions issued over the public address system or directly from the person in charge. The sounding of a fire bell or other alarm system as designated by the Director of Safety means immediate evacuation by the nearest exit. Employees must not reenter an area that they have evacuated until notified that it is safe to return.

Employee Responsibilities

Employees, other than emergency-response groups, involved in any emergency greater than a minor incident are expected to act as follows:

Comply with all guidelines and procedures as outlined by the Director of Safety or designated person regarding the Emergency Action Plan. In an emergency situation the employee may, if there is threat of further injury or further exposure to the hazard, remove all injured persons if possible and leave the immediate vicinity. If there is no threat of further injury or exposure, the employee should leave seriously injured personnel where they are.

Show the ranking emergency-response officer where the incident occurred, inform him or her of the hazards associated with the area, provide any other information that will help avoid injuries, and do as he or she requests.

Training Requirements

VRC Protx, shall ensure all affected employees are trained to assist in a safe and orderly evacuation of other employees.

Plan Review Requirements

VRC Protx shall review the Employee Emergency Action Plan with each applicable employee; initially when the plan is developed, when the employee's responsibilities or designated duties change, and, whenever the plan is changed.

Applicability

Employers with 10 (ten) or fewer employees may communicate the plan orally, however, VRC Protx will maintain a written plan in the workplace, available for all employees to review.

PSM Program

Process Safety Management Compliance Program

VRC PROTX has processes within our operations which involve certain hazards. In order to protect our employees and the environment VRC PROTX has developed this Process Safety Management Compliance Program.

The requirements of the PSM standard are intended to eliminate or mitigate the consequences of such hazards. The standard emphasizes the application of management
controls when addressing the risks associated with handling or working near valves.

Administration

VRC PROTX , Safety Manager is responsible for ensuring that this program is fully implemented and updated to ensure its effectiveness. The company's Process Safety Management Program is located in the Safety Manager's office.

Introduction

This Program has been developed for the process of valve repair and testing at VRC PROTX). Additional program requirements have been taken from applicable ANSI & ASME and VR and NB Standards.

Responsibilities

Company Management

Management assigns sufficient resources and qualified operators to ensure safe operating and material conditions are maintained.

Management will assign a qualified supervisor to oversee and direct process of valve repair and testing operations, maintenance and training involved in the process of valve repair and testing operators in the various elements of this program request, as necessary, assistance from Company Engineering to execute the PSM Program and conduct effective audits.

Process of valve repair and testing *Manager*

The Process Manager will train all valve repair and testing operators in hazards of the valve repair and testing process, safe operating procedures, and good engineering practices assign tasks based on operators level of knowledge monitor maintenance and operations activities to ensure they comply with good engineering practice ensure contractors are provided the information required by this program document the information, activities, inspections, etc required by this program.

Valve repair and testing *Operators*

PSM Program

Process Operators actively participate in the PSM program exercise good engineering practices in the operation and maintenance of the valve repair and testing systems comply with all safety procedures.

Human Resource Manager

The Human Resource Department provides PSM overview indoctrination training for all new employees as part of the New Hire Safety Orientation training.

PSM Elements

The PSM Standard contains 14 Elements that must be addressed in this program.

- Employee Participation
- Process Safety Information (PSI)
- Process Hazard Analysis (PHA)
- Operating Procedures
- Training
- Contractor Safety
- Pre-Startup Safety Review
- Mechanical Integrity
- Management of Change (MOC)
- Incident Investigation
- Emergency Planning and Response
- Compliance Audits
- Trade Secrets

Employee Participation

VRC PROTX has developed a Plan of Action for implementation of Employee Involvement. The Company has consulted with employees on the conduct of the development of PSM Elements. The Company provides Employee access to PSM information.

Process Safety Information (PSI)

VRC PROTX has compiled technical information on the process and equipment in the valve repair and testing system. This requirement is to allow for PHA and maintaining information on the system for Operator training and reference.

Specifically:

– Hazards of valve repair and testing pertaining to the technology of the valve repair and testing system.

– Information pertaining to the equipment in the process.

– Documentation that equipment complies with recognized and generally accepted good engineering practices.

Process Hazard Analysis

At VRC PROTX an initial process hazard analysis has been conducted by a team with expertise in engineering and process operations, including at least one employee who has experience and knowledge on the valve repair and testing system.

After Initial PHA

The Company has established a system to

– Promptly address the team's findings and recommendations.
– Assure that the recommendations are resolved in a timely manner.
– Document resolutions.
– Document what actions are to be taken.
– Complete actions as soon as possible.
– Develop a written schedule of when these actions are to be completed.
– Communicate the actions to operating, maintenance.

PHA review is required at least every five (5) years to updated and revalidate by a qualified person to assure that the process hazard analysis is consistent with the current process.

PSM Program

PHA must address:

– The hazards of the process;
– Identify previous incident which had a likely potential for catastrophic consequences in the workplace;
– Engineering and administrative controls;
– Consequences of failure of engineering and administrative controls;
– Human factors ; and
– Qualitative evaluation of a range of the possible safety and health effects of failure of controls on employees.

Operating Procedures

VRC PROTX has developed and implemented written operating procedures that provide clear instructions for safely conducting operations and maintenance. Operating procedures will be readily accessible to employees. The operating procedures will be reviewed as often as necessary to assure that they reflect current operating practice. The Company will certify annually that these operating procedures are current and accurate.

The Company will develop and implement safe work practices to provide for the control of hazards during operations such as lockout/tagout; confined space entry; opening process equipment or piping; and control over entrance into a facility by maintenance, contractor, laboratory, or other support personnel. These safe work practices will apply to employees and contractor employees.

Procedures will include:

1. Initial startup.
2. Normal, temporary and emergency operations.
3. Normal shutdown.
4. Startup following a turnaround or after an emergency shutdown.
5. Operating limits.
6. Consequences of deviation & Steps required to correct or avoid deviation.
7. Safety and health considerations.
8. Precautions necessary to prevent exposure, including engineering controls.
9. Administrative controls, and personal protective equipment.
10. Control measures to be taken if physical contact or airborne exposure occurs.
11. Quality control for raw materials and control of hazardous chemical inventory levels.
12. Safety systems and their functions.

Training

Initial Training

Each operator will be trained in an overview of the process and in the operating procedures. The training will include emphasis on the specific safety and health hazards, emergency operations including shutdown, and safe work practices applicable to the employee's job tasks.

Refresher Training

Refresher training will be provided at least every three years, and more often if necessary, to each employee involved in operating a process to assure that the employee understands and adheres to the current operating procedures of the process. The Company, in consultation with the employees involved in operating the process, will determine the appropriate frequency of refresher training.

Training Documentation

The Company will ascertain that each employee involved in operating a process has received and understood the training required by this paragraph. The Company will prepare a record that contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training.

Contractors

In regard to contractors, VRC PROTX will do the following:

– Obtain and evaluate information regarding the contract Company's safety performance and programs.

– Inform all contractors of the applicable provisions of the emergency action plan.

– Develop and implement safe work practices to control the entrance, presence and exit of contract personnel.

– Evaluate the performance of contract Companies in fulfilling their obligations.

– Maintain a contract employee injury and illness log related to the contractor's work in process areas.

PSM Program

Pre-Startup Safety Review

The Company will perform a pre-startup safety review for new facilities and for modified facilities when the modification is significant enough to require a change in the process safety information. The purpose of the Pre-Startup Review is to confirm that, prior to the introduction of highly hazardous chemicals to a process:

– Construction and equipment is in accordance with design specifications;
– Safety, operating, maintenance, and emergency procedures are in place and are adequate;
– Modified facilities meet the requirements contained in Management of Change; and
– Training of each employee involved in operating a process has been completed.

Mechanical Integrity

VRC PROTX will establish and implement written procedures to maintain the on-going integrity of valve repair and testing equipment. This includes:

– Test & Inspections (T&Is) on equipment following recognized and generally accepted good engineering practices, manufacturers recommendations and operating experience for the conduct and frequency;

– Documentation of T&Is, identifying:

- Date
- name of the person performing T&I
- serial number or other identifier of the description of the inspection or test performed
- results

– Equipment Deficiencies

Correct deficiencies in equipment that are outside acceptable limits before further use or in a safe and timely manner when necessary means are taken to assure safe operation.

– New Equipment

Assure that equipment as it is fabricated is suitable for the process application for which they will be used. Additionally, conduct appropriate checks and inspections to assure that equipment is installed properly and consistent with design specifications and the manufacturer's instructions.

 Material Control

Assure that maintenance materials, spare parts and equipment are suitable for the process application for which they will be used.

Management of Change (MOC)

VRC PROTX will establish and implement written procedures to manage changes (except for "replacements in kind") to process chemicals, technology, equipment, and procedures; and, changes to facilities that affect a covered process.

Prior to the change, address the following considerations:

- The technical basis for the proposed change;
- Impact of change on safety and health;
- Modifications to operating procedures;
- Necessary time period for the change; and,
- Authorization requirements for the proposed change.

The Company will train affected employees and contract employees in the change prior to start-up of the process or affected part of the process.

The Company will up-date PSI, PHA and Operating Procedures.

Incident Investigation

VRC PROTX will investigate each incident that resulted in, or could reasonably have resulted in a catastrophic release of highly hazardous chemical in the workplace. An incident investigation will be initiated as promptly as possible, but not later than 48 hours following the incident.
Establish an incident investigation team which consists of at least one person knowledgeable in the process involved, including a contract employee if the incident involved work of the contractor, and other persons with appropriate knowledge and experience to thoroughly investigate and analyze the incident

An incident report will be prepared at the conclusion of the investigation that includes at a minimum:

- Date of incident
- Date investigation began
- Description of the incident
- Factors that contributed to the incident
- Recommendations resulting from the investigation

Corrective Actions

The company will establish a system to promptly address and resolve the incident report findings and recommendations. Resolutions and corrective actions will be documented

Report Review

The report will be reviewed with all affected personnel whose job tasks are relevant to the incident findings including contract employees where applicable. Incident investigation reports will be retained for five years

Emergency Planning & Response

VRC PROTX will establish and implement an emergency action plan for the entire plant in accordance with the provisions of 29 CFR 1910.38(a). and 29 CFR 1910.120(a), (p) and (q). In addition, the emergency action plan will include procedures for handling small releases.

Compliance Audits

The Company will certify compliance with the provisions of the PSM Standard at least every three years to verify that the procedures and practices developed under the standard are adequate and are being followed.

The compliance audit will be conducted by at least one person knowledgeable in the process.

A report of the findings of the audit will be developed.

The Company will promptly determine and document an appropriate response to each of the findings of the compliance audit, and document that deficiencies have been corrected.

The Company will retain the two (2) most recent compliance audit reports.

Trade Secrets

VRC PROTX will make all information necessary to comply with the section available to those persons responsible for compiling the process safety information, those assisting in the development of the process hazard analysis, those responsible for developing the operating procedures, and those involved in incident investigations, emergency planning and response and compliance audits without regard to possible trade secret status of such information.

There is no restriction in the OSHA Standard 1910.119 which prevents the company from requiring any persons to whom the information is made available to enter into confidentiality agreements not to disclose the information.

Rules and procedures set forth in OSHA Standard 1910.1200, employees and their designated representatives will have access to trade secret information contained within the process hazard analysis and other documents required to be developed by this standard.

Employee Participation Plan of Action

General

There are between 10 to 30 employees at VRC PROTX , involved in the valve repair and testing. Since there is a relatively small number of personnel in the process, they will be involved on almost a daily basis in the various elements of the PSM program.

Documentation

A combination of historical narrative, one-line entry log, training summary sheets, and other documents for the various elements will be used to document employee participation. The following Employee Participation Plan of Action will be followed for PSM activities:

Plan of Action

Operator & Technicians will be:

- Included in collection and review of Process Safety Information (PSI)
- Included in the Process Hazard Analysis (PHA)

- Included and utilized in the development of operating procedures
- Trained in all aspects of operation of the refrigeration systems to ensure they are able to safely conduct assigned tasks
- Trained to monitor Contractor Employees for compliance with good engineering practices and safety procedures
- Included in all Pre-Startup Safety Reviews
- Used for conducting Mechanical Integrity Inspections
- Trained in the Company Hot Work Program
- Included in the Management of Change (MOC) process
- Included in al Incident Investigations
- Trained in the Plant Emergency Response Plan
- Utilized and interviewed for compliance audits
- Provided access to all PSM information
- All Employees will be provided PSM Overview Training

Process Hazard Analysis

General

VRC PROTX established a PHA team to identify equipment, operating procedures, and conditions where the potential exists for employee exposure and environmental hazards associated with valve repair and testing.

Environmental hazards occur when vapor releases or liquid spills reach beyond the property line, into the atmosphere, or into the ground.

PHA Team

The team consists of Operator/Technicians experienced in valve repair and testing and have received training in Process Hazard Analysis.

PHA Method

The What-If methodology has been selected as the process for PHA at this Company. The team develops What-If questions using sub-systems from the PI&Ds, and identified consequences, identified safeguards, identified recommendations, and ranked severity and likelihood.

Recommendations are made based upon the What-If questions and are submitted to Engineering for review.

PHAs are conducted for initial program development, when there are changes to PSI, and are revalidated at least every 5 years.

PHA Resolution System

When PHAs are completed/reviewed by the team, the recommendations will be sent to Company Engineering for comment. After Engineering review is completed, the PHA Team Leader will develop a plan of action for:

- Documenting reasons recommendations were not utilized
- Implementing necessary recommendations
- Documenting system changes in PSI
- Documenting PHA Recommendation completed items

Basic Resolution Time Frame Guidelines:

- Submit PHAs to Engineering within 1 week of completion
- Document Engineering review when returned
- Develop PHA resolution POA within 2 weeks after Engineering Review

Process Safety Information (PSI)

General

Process Safety Information is the technical information on the process and equipment in the valve repair and testing system. This information allows for accurate Process Hazard Analysis and maintaining information on the system for operator training and reference.

Records

PSI Records are contained in this section, equipment manuals, Operating Procedures section, Mechanical Integrity section, and in the Evanston, WY Office files.

Record maintenance and update is the responsibility of the valve repair and testing Manager.

Record Content

Specific Technical Information includes:

– Hazards of valve repair and testing
– Block Flow Diagram
– Piping and Instrument Diagrams
– Process Chemistry
– Maximum Intended Inventory
– Technology of Process Changes
– Materials of Construction
– Pressure Relief System
– Ventilation System Design
– Material and Energy Balances for Processes Built After May 26, 1992.
– Safety Systems
– Equipment List and Specifications
– Design Codes and Standards Employed and Documentation that equipment complies with recognized and generally accepted good engineering practices.
– For existing equipment designed and constructed in accordance with codes, standards, or practices that are no longer in general use, the Company will determine and document that the equipment is designed, maintained, inspected, tested, and operating in a safe manner.
– Site Plan which includes: The valve repair and testing facility, warehouses and buildings, roads and parking areas, access ways and walkways, fences, gates, and property lines.

Operating Procedures

General

Written Operating Procedures have been developed for valve repair and testing system. The Operating Procedures are located in binders and in the manufacturer's equipment manuals. Operating Procedures are available to the operating employees, maintenance employees, contractor employees, and representatives.

Operating Procedure Format

Most Operating Procedures will follow the following format:

– Description/Purpose of the equipment
– Name of the procedure
– Listing of equipment involved in the procedure

– Desired operating ranges for temperature, pressure, etc.
– Consequences of deviation from desired temperature, etc.
– Steps required to correct and/or avoid deviation
– Safety systems
– Safety and health considerations
– Operator requirements
– Step by step procedures
– Comments, table of contents, and/or revisions section, with original date
– Developed and revision dates and distribution instructions.

Operating Procedure Content

The following procedures will be addressed, as applicable, in each Operating:

– Procedure
– Initial startup
– Normal operations
– Temporary operations
– Emergency operations
– Power failure
– Emergency shutdown
– Normal shutdown
– Startup following a turnaround or emergency shutdown
– Alarm testing and response
– Changes in operating limits and alarms during modes other than normal operation

Equipment Procedures

Operating Procedures are to be maintained for the following equipment:

– Compressors
– Pressure Vessels
– Pumps
– Alarm systems
– Distribution stations

Training

General

Training is an essential part of the PSM Program. It provides a means of conveying information and ensuring comprehension of information.

PSM Program

There are 3 categories of persons who must have training as required by the OSHA PSM Standard:

1. Operators/Technicians
2. Other employees
3. Contractor Employees (this training is discussed in the Contractor Safety Element)

Valve repair and testing *Operator/Technician Training*

The (Safety Manager) is responsible for conducting and ensuring effective training of Operators and Technicians. There are 4 types' phases of Operator Training:

1. Initial training covering the elements of the PSM Program and an overview of the process and operating procedures. The training will include emphasis on the specific safety and health hazards, normal and emergency operations including shutdown, and safe work practices applicable to the employee's job tasks. Initial training will also include understanding various parameters, identification of abnormal conditions and the procedures for restoring the system to normal. This training is required before any unsupervised tasks are assigned. Additional Emergency Response Team Training and training in other Safety Programs will be conducted in the same manner as for other employees.

Materials such as IIAR, Videos and computer review and examinations will be used to ensure the quality and correctness of the training.

Other training material will include documents such as PHA, PSI Operating Procedures specific to the equipment at this location.

2. On-the-Job Training on the system and the hazards associated will be a continuous process for each Operator. This continuing training will be accomplished by:

a. Assigning newer employees to assist more experienced Operators in complex tasks and evolutions.
b. Having Operators review the latest technical material such as IIAR Bulletins
c. Operator participation in Safety Meetings

3. Refresher Training will be conducted periodically by knowledgeable individuals covering all aspects of the initial training. Refresher Training will be conducted at least every 3 years.

4. Training on changes in the process or systems will occur when the Management of Change procedures dictates the need.

Other Employees

PSM Program

Employees who do not work with the valve repair and testing system are provided a brief and written information on the PSM program as part of the New Employee Indoctrination Program conducted by the Human Resources Department.

Documentation

Valve repair and testing Operators: A training file is maintained on each Operator and Technician. This file documents all training and involvement in the PSM / Safety Programs. The Safety Manager maintains these training files.

Other Employees: Training records, required by the PSM Program, for other Employees are maintained by the Human Resources Manager.

Pre-Startup Safety Review

General

The purpose of the Pre-Startup Safety Review is to:

1. Verify that all construction is in accordance with specifications
2. Ensure that appropriate tests and inspections have been performed
3. Ensure safety, operating, and maintenance procedures are adequate
4. PHA has been conducted
5. PHA recommendations have been addressed prior to start up
6. Operating Procedures are current, reflecting system modifications
7. Training of operating personnel in changes has been completed

Conduct of Review

Pre-Startup Safety Reviews will be conducted by the Safety Manager or designated alternate prior to introducing valve repair and testing into the system when:

1. New additions are made to the system.
2. Modifications are made that change Process Safety Information.

Contractors

General

Contractors under the Process Safety Management program are those who are involved in the installation or maintenance of valve repair and testing equipment and systems at this Company. All contractors, covered in this PSM Program will be

provided necessary information concerning the valve repair and testing process, equipment and procedures.

Specific Requirements

Pre-Work Review: Prior to allowing a contracting company to commence work in the valve repair and testing process the following requirements must be met:

– Obtain and evaluate information regarding the contract Company's safety performance and programs (written documentation required

– Inform contract Company's of the known potential fire, explosion, or toxic release hazards related to the contractor's work and the process

– Explain to contract Company's the applicable provisions of the emergency action plan.

– Provide contractors with copies of local safety programs, safety and emergency procedures and a copy of this PSM program.

– Complete all the requirements of the Company Contractors Liability Agreement.

– Inform the contractor that a periodic performance evaluation will be conducted to ensure the contractor and contract employees are fulfilling their obligations

– Inform the Contractor that a contract employee injury and illness log related to the contractor's work in process areas must be maintained on site for the duration of the contract work.

– The contractor Company must provide information relating to any unique hazards presented by the contractor employees work or any hazards found by the contractor employees.

– Prior to the start of any work the Contractor must provide the following documentation:

- Their safety program information and other documentation required by the Company contractors Liability and Safety Agreement.

- Certification that they have informed their employees of potential fire, explosion, or toxic release hazards may exist at or near their work area at this Company and that they have explained the Company Emergency Action Plan to their employees.

- Training documentation concerning training provided to their employees to insure they understand the safe work necessary to safely perform tasks.

- Certification that they have explained the Company Hot Works Permit Program and other permits Company uses that will be needed during their time on Company property.

- Agreement to advise Company of any unique hazards presented by their work any found during their work.

- Certification that materials, parts and equipment to be installed in the valve repair and testing system meet industry and engineering standards for the application used.

The valve repair and testing Superintendent is responsible for issuing information and documents to the contractor and collection and review of contractor information and certifications

Access Control

VRC PROTX maintains security around the Company and process area to insure that no unauthorized contractors or contractor employees have entrance or presence in or to the process area, and that a safe exit is provided and maintained.

Emergency Planning & Response

General

Emergency plans have been established for this Company to coordinate actions in the event of a chemical release or other emergency event. The Emergency Action Plan is published under a separate binder.

The plan uses the Incident Command Structure for organization of response teams, actions and coordination with outside local emergency response agencies.

Management of Change

General

The Management of Change Program is an aid to ensure:
- Proper material and equipment is placed in the system
- Management and Engineering review of proposed changes
- PHA is conducted prior to changes
- PSI is updated

– Operator Training is accomplished for the changes

Scope

This Management of Change procedure is applies to:

1. All modifications to equipment in the valve repair and testing system;
2. All changes in procedures;
3. All changes to control, indication or alarm systems;
4. Changes to facilities that affect the valve repair and testing process;

Management of Change does not apply to:

1. Changes in-kind;
2. Minor clarification revisions to operating, test or maintenance procedures;

Management of Change Procedure

When a need for change is identified, the valve repair and testing Supervisor will initiate the Management of Change procedure. Approval from Company Engineering is required prior to implementing any changes in the valve repair and testing System design, parts or equipment.

Procedure

1. Initiate MOC form, providing all required information
2. Conduct and document PHA for proposed change
3. Submit MOC form and documents to local management for review
4. Forward to Company Engineering for Approval
5. Obtain approval for change from Company Engineering
6. Obtain certification documents on all parts and equipment to be added to the system
7. Document all contractor requirements met
8. Conduct Change
9. Update and document PSI changes
10. Conduct and document Operator Training
11. Conduct and document Pre-Startup Review

Definitions

Change: Any modification which affects the capability of a process to maintain control of the physical and chemical transformations taking place; including all modifications to equipment, procedures, raw materials and processing conditions other than "replacement in kind".

Change in Equipment: Temporary or permanent modifications made to operating equipment. Examples:

– Substitution of a material of construction with a different material.
– Replacement of a vessel with one of a different pressure rating.
– Piping changes.
– Replacing an existing field mounted, local pump control panel with a logic computer.
– Changing the elevation of a vessel nozzle or the discharge location of a vessel
– Installation of a bypass around a section of equipment.
– Installation of a parallel piece of equipment, such as a standby pump.
– Replacing a control valve with one of a different size.

Changes in Company: A change in facilities occurs whenever a change is made to plant services or utilities would not necessarily appear on a P & ID. Examples:

– Emergency back-up systems.
– Power supply system.
– Plant security.
– Fire detection and prevention system.
– Adjacent processes/equipment.
– New construction (offices, warehouses)

Changes in Procedures: Temporary or permanent modifications of written procedures. Examples (except minor changes for clarification):

– Standard Operating Procedures.
– Preventative maintenance procedures.
– Inspection and testing procedures.

– Emergency operating procedures.
– Training procedures and requirements.

Changes in Process Technology: A change in the process technology occurs when the process or mechanical design is altered. A change in process technology may occur as a result of changes in the operating parameters (e.g., pressure, temperature), design inventories, instrumentation and control systems, or materials of construction. Examples:

– An increase in the valve repair and testing inventory.
– Equipment unavailability.
– Installation of new equipment, such as a computer.
– Change in operating pressure (or temperature, or flow rate, etc.)

Major Change: A modification which has significant impact on process conditions or system parameters. Examples:

– Installation of an additional pumping system
– Increase in toxic chemical inventory
– Decommissioning major pieces of equipment
– Installation of a significant amount of temporary piping
– Installation of a distributed control system
– Change in process variables, such as a significant increase or decrease in flow, temperature, or pressure

Minor Change: A modification which does not have a major impact on process conditions or system parameters. Examples:

– Installation of process instrumentation
– Change in written Standard Operating Procedure
– Revision to document forms
– Replacement in Kind
– Any process or equipment change performed in accordance with established design specifications.

Management of Change Procedure

Examples:

– Replacement of parts or equipment that meet the same design requirements and specifications
– Replacement of parts or equipment that require no changes to PSI

Temporary Change: A change with a limited and clearly specified duration. The time limit for a temporary change is not to exceed seven days. If necessary, a seven day extension may be requested. No more than two extensions should be required. Any change with duration of greater than six weeks should follow procedures for a permanent change. Examples:

– Temporary piping, clamps, connections, utility connections, or hoses
– Temporary operation with specific safeguards bypassed or inoperative
– Temporary changes to operating procedures

Emergency Procedures

A situation may be treated as an emergency in order to prevent an incident that could result in exposure of personnel, the environment, or the company to unreasonable risk. A situation only qualifies as an emergency if applying the normal MOC procedure would not mitigate the situation in time to avoid potential accidents. In emergency situations, the following procedure will be used:

1. Assemble an emergency task team composed of two or three trained and qualified operators Contact the valve repair and testing Supervisor for approval of changes.

2. Emergency team examines the safety and environmental aspects of the change.

3. If the change can be implemented safely, conduct the change.

4. Complete the MOC form as soon as possible after the emergency.

Maintenance, Tests & Inspections

General

The Planned Maintenance System is an important part of the Mechanical Integrity Program. It provides for:

– Identification and scheduling of tests and inspections
– Documentation of tests and inspections
– Development of maintenance procedures
– Scheduling of periodic maintenance procedures

The 3 sections of the Planned Maintenance System are:
1. Inspections
2. Testing
3. Maintenance

Inspections

Daily Inspections are carried out as operators tour the Company and record system parameters. They are trained to recognize deficiencies in material conditions and out of specification parameters. Inspections that are scheduled for daily accomplishment are listed and recorded on the daily logs.

Other Inspections range from simple monthly checks of air units to complex annual system inspection. These inspections are scheduled by the valve repair and testing Supervisor.

Testing

Tests are more complex than inspections. They require either removal of a component from the system or abnormal manipulation of the system to ensure a component functions properly. All tests are scheduled and controlled by the valve repair and testing Supervisor.

Planned Maintenance

Planned Maintenance items generally require a high level of system knowledge to properly align, isolate and prepare the system for maintenance. The opportunity for accidental release of valve repair and testing is greater during these times than during normal operation. The valve repair and testing Supervisor will:

1. Schedule all maintenance
2. Assign personnel who have the knowledge and experience
3. Oversee the conduct and completion of maintenance

Incident Investigations

General

Incident investigation is the process of identifying the underlying or basic causes of incidents and implementing steps to prevent similar events from occurring. The intent of an incident investigation is to learn from past experiences and avoid future events of the same nature.

As an aid to prevention all incidents that resulted in, or could reasonably have resulted in a catastrophic release of highly hazardous chemical in the workplace will be thoroughly investigated. An incident investigation will be initiated as promptly as possible, but no later than 48 hours following the incident.

Investigation Team

An investigation team, consisting of the Plant Safety Coordinator, valve repair and testing Supervisor, one valve repair and testing Operator/Technician, and one contractor representative (if contractors are involved) will thoroughly investigate and analyze the incident. Other members may be added at the discretion of management

Incident Report

A report will be prepared at the conclusion of the investigation that includes at a minimum:
– Date of incident
– Date investigation began
– Description of the incident
– Factors that contributed to the incident
– Recommendations resulting from the investigation
– Post Incident Actions

Corrective Actions detailed in the incident report will be promptly addressed and resolved along with other report findings and recommendations. Resolutions and corrective actions will be documented.

Report Review will be conducted with all affected personnel whose job tasks are relevant to the incident findings including contract employees where applicable. Incident investigation reports will be retained for five years

Process Safety Management

Valve repair and testing

VRC PROTX at 117 Commerce Dr, Evanston, Wyoming has implemented a Process Safety Management (PSM) Program in compliance with OSHA Standard 29 CFR 1910.119. The purpose of this program is to prevent or minimize the consequences of catastrophic releases of toxic, reactive, flammable or explosive chemicals and to ensure that employees are not exposed to undue risk.

Our PSM program details specific precautions and procedures affecting the safe operation and maintenance of our valve repair and testing process. This program has been developed with the participation of employees involved with the operation and maintenance of this process.

All employees have access to the PSM manuals and files, under the following conditions:

1. Approval is required to remove any documents from the file.
2. Original documents may not be removed from the file area.
3. Copies of original documents will be provided, upon request, within 10 working days.
4. No markings will be made on original documents.

PSM Program

Training

Those employees involved with the operation and maintenance of the refrigeration system, including any contractor employees, will complete specific training as detailed in the PSM program

I verify that I have read (or had read to me) and understand I have been informed of the existence of the Process Safety Management program for valve repair and testing. I acknowledge that I may contact the Safety Coordinator for answers to any questions I may have about this program.

Employee Name _____
Department _____
Date _____
Signature _____

Process Safety Information

List of Process Equipment

ITEM	CATEGORY	Description	MFG	MDL #	Type	Location	Qty

In Plant Rail Safety Program

In Plant Rail Safety

GENERAL

Nearly every plant with rail operations has identified working around and on railroad tracks as high-risk and countermeasures need to be taken to prevent rail-related accidents. In most cases, the railroad is an internal plant department, but some companies have outsourced this function to contractors. In-plant railroads are typically under OSHA's general industry regulations. However, there are minimal references to rail activity in the regulations, and as such, most rail safety violations are addressed under the General Duty "catchall" clause. The Federal Railroad Administration (FRA) has established extensive safety requirements under 49 CFR; however, in-plant railroads do not come under FRA jurisdiction. Appropriate training based on complexity of the job and potential hazards related to in plant rail shall be provided to all applicable employees. Assessments shall be used to determine whether the personnel have the knowledge and have demonstrated skills to safely perform their work assignments. The Responsible Safety Officer, VRC Protx will document all training, including employee identification, the date(s) training occurred time(s) spent, and subject matter covered. [2] Retraining and testing shall be required for unsatisfactory/ unsafe performance of job assignments. [3]

Most rail-related injuries to construction workers fall into two categories: crushing injuries between and under cars and struck-by injuries. Contractors with the most success in preventing rail-related incidents have adopted a set of cardinal rules pertaining to railroad safety. Although the cardinal rules may vary slightly from company to company, the following list is representative of the important items that many companies want their employees to be aware of:

• **Parking and Walking Around Tracks** — No vehicle or equipment should be parked within 8 feet of the center of the tracks. This assures that moving rail equipment will not strike other equipment. In all cases pedestrians/employees shall cross at existing designated pedestrian rail crossings where provided. Additionally, vehicle crossings are not intended as pedestrian crossings unless they are so identified and/or located, and no other pedestrian crossings exist in the area. [4] In addition, pedestrians should never walk inside the rails, but rather walk at least 6 feet from the outside of the rail. Approved hard hats, approved metatarsal boots and approved safety glasses with permanently attached side shields shall be worn in designated areas [1]

• **Crossing Railroad Tracks** — Pedestrians, vehicles and equipment should cross railroad tracks only at designated crossings. Furthermore, no crossing is permitted when lights and bells are activated and there is railcar movement in sight. If a designated crossing is not available, do not cross within 10 feet of the end of a parked rail car, do not cross between uncoupled cars, stop, look and listen prior to proceeding across the tracks, and never step on rails, as they may be slippery. [5]

• **Head-End Protection** — Simply put, this refers to positioning a worker at the front end of the train in order to watch for pedestrians or other equipment that may be in the direction of travel. This can be the locomotive operator if he/she has a clear view of the rails ahead. It may also be a brakeman or switchman who is in radio contact with the locomotive operator. If the locomotive is operated by a radio-controlled remote, then the remote operator must be at the front of the train, watching in the direction of travel.

In Plant Rail Safety Program

• **Work On or Near Tracks** — Prior to performing work within six (6) feet of any railroad track, permission must be obtained from railroad Supervisor/Designated person to take the track out of service [8] When any type of maintenance or repair is being performed on or near railroad tracks, some form of positive track protection should be utilized. This could be in the form of a derailer placed in front of the work area or a switch that has been diverted and locked out. In addition, a warning device such as a blue flag or light should be placed in front of the work area. Never attempt to crawl under rail equipment or climb over moving rail equipment or attempt to cross in front of moving equipment. [6] The positive protection and warning devices may need to be placed on both sides of the work area if rail equipment can travel both ways.

• **Work Between the Rails** — Many of the injuries and fatalities that have occurred in plant railyards have occurred when employees positioned themselves between the rails. Never position any part of the body in a potential pinch point. Rail equipment can move in either direction at anytime [7] When coupling or uncoupling, it is safer to work with one foot outside the rails whenever possible. Also, workers should avoid kicking couplers when they stick, since this activity increases the likelihood of falling between the rails.

• **Riding on Railcars** — Riding on railcars is a risky venture in the best case. Companies that permit this practice require that workers board or de-board the car only when the train is stopped. Furthermore, four points of contact should be maintained while riding, and one should never ride on the side or end sills or the couplers.

These cardinal rules by no means define the entire scope of a safe railroad operation in a plant. Safe railroad operations involve a significant number of rules, safe work procedures and comprehensive employee training. Railroad operations are inherently dangerous due to the sheer size of railroad equipment and the fact that there is often an abundance of equipment operating simultaneously. However, many companies can and do operate rail equipment safely. It all comes down to following the established rules and procedures to the letter.

RIGGING AND MATERIAL HANDLING

VRC Protx, LLC

Rigging equipment for material handling shall be inspected prior to use on each shift and as necessary during its use to ensure that it is safe. Defective rigging equipment shall be removed from service.

Rigging equipment shall not be loaded in excess of its recommended safe working load, as prescribed in Tables H-1 through H-20 in this subpart, following 1926.252(e) for the specific equipment.

Rigging equipment, when not in use, shall be removed from the immediate work area so as not to present a hazard to employees.

Special custom design grabs, hooks, clamps, or other lifting accessories, for such units as modular panels, prefabricated structures and similar materials, shall be marked to indicate the safe working loads and shall be proof-tested prior to use to 125 percent of their rated load.

"Scope." This section applies to slings used in conjunction with other material handling equipment for the movement of material by hoisting, in employments covered by this part. The types of slings covered are those made from alloy steel chain, wire rope, metal mesh, natural or synthetic fiber rope (conventional three strand construction), and synthetic web (nylon, polyester, and polypropylene).

"Inspections." Each day before being used, the sling and all fastenings and attachments shall be inspected for damage or defects by a competent person designated by the employer. Additional inspections shall be performed during sling use, where service conditions warrant. Damaged or defective slings shall be immediately removed from service.

Alloy steel chains.

Welded alloy steel chain slings shall have permanently affixed durable identification stating size, grade, rated capacity, and sling manufacturer.

Hooks, rings, oblong links, pear-shaped links, welded or mechanical coupling links, or other attachments, when used with alloy steel chains, shall have a rated capacity at least equal to that of the chain.

Job or shop hooks and links, or makeshift fasteners, formed from bolts, rods, etc., or other such attachments, shall not be used.

Rated capacity (working load limit) for alloy steel chain slings shall conform to the values shown in Table H-1.

Whenever wear at any point of any chain link exceeds that shown in Table H-2, the assembly shall be removed from service.

"Inspections."

In addition to the inspection required by other paragraphs of this section, a thorough periodic inspection of alloy steel chain slings in use shall be made on a regular basis, to be determined on the basis of (A) frequency of sling use; (B) severity of service conditions; (C) nature of lifts being made; and (D) experience gained on the service life of slings used in similar circumstances. Such inspections shall in no event be at intervals greater than once every 12 months.

Rigging and Material Handling

The employer shall make and maintain a record of the most recent month in which each alloy steel chain sling was thoroughly inspected, and shall make such record available for examination.

Wire rope.

Tables H-3 through H-14 shall be used to determine the safe working loads of various sizes and classifications of improved plow steel wire rope and wire rope slings with various types of terminals. For sizes, classifications, and grades not included in these tables, the safe working load recommended by the manufacturer for specific, identifiable products shall be followed, provided that a safety factor of not less than 5 is maintained.

Protruding ends of strands in splices on slings and bridles shall be covered or blunted.

Wire rope shall not be secured by knots, except on haul back lines on scrapers.

The following limitations shall apply to the use of wire rope:

An eye splice made in any wire rope shall have not less than three full tucks. However, this requirement shall not operate to preclude the use of another form of splice or connection which can be shown to be as efficient and which is not otherwise prohibited.

Except for eye splices in the ends of wires and for endless rope slings, each wire rope used in hoisting or lowering, or in pulling loads, shall consist of one continuous piece without knot or splice.

Eyes in wire rope bridles, slings, or bull wires shall not be formed by wire rope clips or knots.

Wire rope shall not be used if, in any length of eight diameters, the total number of visible broken wires exceeds 10 percent of the total number of wires, or if the rope shows other signs of excessive wear, corrosion, or defect.

When U-bolt wire rope clips are used to form eyes, Table H-20 shall be used to determine the number and spacing of clips.

When used for eye splices, the U-bolt shall be applied so that the "U" section is in contact with the dead end of the rope.

Slings shall not be shortened with knots or bolts or other makeshift devices.

Sling legs shall not be kinked.

Slings used in a basket hitch shall have the loads balanced to prevent slippage.

Slings shall be padded or protected from the sharp edges of their loads.

Hands or fingers shall not be placed between the sling and its load while the sling is being tightened around the load.

Shock loading is prohibited.

A sling shall not be pulled from under a load when the load is resting on the sling.

Rigging and Material Handling

"Minimum sling lengths."

Cable laid and 6 X 19 and 6 X 37 slings shall have minimum clear length of wire rope 10 times the component rope diameter between splices, sleeves or end fittings.

Braided slings shall have a minimum clear length of wire rope 40 times the component rope diameter between the loops or end fittings.

Cable laid grommets, strand laid grommets and endless slings shall have a minimum circumferential length of 96 times their body diameter.

"Safe operating temperatures." Fiber core wire rope slings of all grades shall be permanently removed from service if they are exposed to temperatures in excess of 200 deg. F (93.33 deg. C). When nonfiber core wire rope slings of any grade are used at temperatures above 400 deg. F (204.44 deg. C) or below minus 60 deg. F (15.55 deg. C), recommendations of the sling manufacturer regarding use at that temperature shall be followed.

"End attachments."

Welding of end attachments, except covers to thimbles, shall be performed prior to the assembly of the sling.

All welded end attachments shall not be used unless proof tested by the manufacturer or equivalent entity at twice their rated capacity prior to initial use. The employer shall retain a certificate of proof test, and make it available for examination.

Natural rope, and synthetic fiber-

General. When using natural or synthetic fiber rope slings, Tables H-15, 16, 17, and 18 shall apply.

All splices in rope slings provided by the employer shall be made in accordance with fiber rope manufacturers recommendations.

In manila rope, eye splices shall contain at least three full tucks, and short splices shall contain at least six full tucks (three on each side of the center line of the splice).

In layed synthetic fiber rope, eye splices shall contain at least four full tucks, and short splices shall contain at least eight full tucks (four on each side of the center line of the splice).

Strand end tails shall not be trimmed short (flush with the surface of the rope) immediately adjacent to the full tucks. This precaution applies to both eye and short splices and all types of fiber rope. For fiber ropes under 1-inch diameter, the tails shall project at least six rope diameters beyond the last full tuck. For fiber ropes 1-inch diameter and larger, the tails shall project at least 6 inches beyond the last full tuck. In applications where the projecting tails may be objectionable, the tails shall be tapered and spliced into the body of the rope using at least two additional tucks (which will require a tail length of approximately six rope diameters beyond the last full tuck).

For all eye splices, the eye shall be sufficiently large to provide an included angle of not greater than 60 deg. at the splice when the eye is placed over the load or support.

Knots shall not be used in lieu of splices.

Rigging and Material Handling

"Safe operating temperatures." Natural and synthetic fiber rope slings, except for wet frozen slings, may be used in a temperature range from minus 20 deg. F (-28.88 deg. C) to plus 180 deg. F (82.2 deg. C) without decreasing the working load limit. For operations outside this temperature range and for wet frozen slings, the sling manufacturer's recommendations shall be followed.

"Splicing." Spliced fiber rope slings shall not be used unless they have been spliced in accordance with the following minimum requirements and in accordance with any additional recommendations of the manufacturer:

In manila rope, eye splices shall consist of at least three full tucks, and short splices shall consist of at least six full tucks, three on each side of the splice center line.

In synthetic fiber rope, eye splices shall consist of at least four full tucks, and short splices shall consist of at least eight full tucks, four on each side of the center line.

Strand end tails shall not be trimmed flush with the surface of the rope immediately adjacent to the full tucks. This applies to all types of fiber rope and both eye and short splices. For fiber rope under 1 inch (2.54 cm) in diameter, the tail shall project at least six rope diameters beyond the last full tuck. For fiber rope 1 inch (2.54 cm) in diameter and larger, the tail shall project at least 6 inches (15.24 cm) beyond the last full tuck. Where a projecting tail interferes with the use of the sling, the tail shall be tapered and spliced into the body of the rope using at lest two additional tucks (which will require a tail length of approximately six rope diameters beyond the last full tuck).

Fiber rope slings shall have a minimum clear length of rope between eye splices equal to 10 times the rope diameter.

Knots shall not be used in lieu of splices.

Clamps not designed specifically for fiber ropes shall not be used for splicing.

For all eye splices, the eye shall be of such size to provide an included angle of not greater than 60 degrees at the splice when the eye is placed over the load or support.

"End attachments." Fiber rope slings shall not be used if end attachments in contact with the rope have sharp edges or projections.

"Removal from service." Natural and synthetic fiber rope slings shall be immediately removed from service if any of the following conditions are present:

Abnormal wear.

Powdered fiber between strands.

Broken or cut fibers.

Variations in the size or roundness of strands.

Discoloration or rotting.

Distortion of hardware in the sling.

Rigging and Material Handling

Synthetic webbing (nylon, polyester, and polypropylene).

The employer shall have each synthetic web sling marked or coded to show:

Name or trademark of manufacturer.

Rated capacities for the type of hitch.

Type of material.

Rated capacity shall not be exceeded.

"Webbing." Synthetic webbing shall be of uniform thickness and width and selvage edges shall not be split from the webbing's width.

"Fittings." Fittings shall be:

Of a minimum breaking strength equal to that of the sling; and

Free of all sharp edges that could in any way damage the webbing.

"Attachment of end fittings to webbing and formation of eyes." Stitching shall be the only method used to attach end fittings to webbing and to form eyes. The thread shall be in an even pattern and contain a sufficient number of stitches to develop the full breaking strength of the sling.

"Environmental conditions." When synthetic web slings are used, the following precautions shall be taken:

Nylon web slings shall not be used where fumes, vapors, sprays, mists or liquids of acids or phenolics are present.

Polyester and polypropylene web slings shall not be used where fumes, vapors, sprays, mists or liquids of caustics are present.

Web slings with aluminum fittings shall not be used where fumes, vapors, sprays, mists or liquids of caustics are present.

"Safe operating temperatures." Synthetic web slings of polyester and nylon shall not be used at temperatures in excess of 180 deg. F (82.2 deg. C). Polypropylene web slings shall not be used at temperatures in excess of 200 deg. F (93.33 deg. C).

"Removal from service." Synthetic web slings shall be immediately removed from service if any of the following conditions are present:

Acid or caustic burns;

Melting or charring of any part of the sling surface;

Rigging and Material Handling

Snags, punctures, tears or cuts;

Broken or worn stitches; or

Distortion of fittings.

Shackles and hooks.

Table H-19 shall be used to determine the safe working loads of various sizes of shackles, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products, provided that a safety factor of not less than 5 is maintained.

The manufacturer's recommendations shall be followed in determining the safe working loads of the various sizes and types of specific and identifiable hooks. All hooks for which no applicable manufacturer's recommendations are available shall be tested to twice the intended safe working load before they are initially put into use. The employer shall maintain a record of the dates and results of such tests.

Heat Stress

During emergency response activities or recovery operations, workers may be required to work in hot environments, and sometimes for extended periods. Heat stress is a common problem encountered in these types of situations. The following frequently asked questions will help workers understand what heat stress is, how it may affect their health and safety, and how it can be prevented.

Where might I be exposed to heat stress?

Any process or job site that is likely to raise the workers deep core temperature (often listed as higher than 100.4 degrees F (38°C)) raises the risk of heat stress. Operations involving high air temperatures, radiant heat sources, high humidity, direct physical contact with hot objects, or strenuous physical activities have a high potential for inducing heat stress in employees. Indoor operations such as foundries, brick-firing and ceramic plants, glass products facilities, rubber products factories, electrical utilities (particularly boiler rooms), bakeries, confectioneries, commercial kitchens, laundries, food canneries, chemical plants, mining sites, smelters, and steam tunnels are examples of industrial locations where problems can occur. Outdoor operations conducted in hot weather, such as construction, refining, asbestos removal, hazardous waste site activities, and emergency response operations, especially those that require workers to wear semi-permeable or impermeable protective clothing, are also likely to cause heat stress among exposed workers.

Are there additional causal factors for heat stress?

Age, weight, degree of physical fitness, degree of acclimatization, metabolism, dehydration, use of alcohol or drugs, and a variety of medical conditions such as hypertension all affect a person's sensitivity to heat. However, even the type of clothing worn must be considered. Prior heat injury predisposes an individual to additional injury. Individual susceptibility varies. In addition, environmental factors include more than the ambient air temperature. Radiant heat, air movement, conduction, and relative humidity all affect an individual's response to heat.

What kind of heat disorders and health effects are possible and how should they be treated?

Heat Stroke is the most serious heat related disorder and occurs when the body's temperature regulation fails and body temperature rises to critical levels. The condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict. Heat stroke is a medical emergency that may result in death. The primary signs and symptoms of heat stroke are confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating (usually); hot, dry skin; and an abnormally high body temperature, e.g., a rectal temperature of 41°C (105.8°F). The elevated metabolic temperatures caused by a combination of work load and environmental heat, both of which contribute to heat stroke, are also highly variable and difficult to predict.

If a worker shows signs of possible heat stroke, professional medical treatment should be obtained immediately. The worker should be placed in a shady, cool area and the outer clothing should be removed. The worker's skin should be wetted and air movement around the worker should be increased to improve evaporative cooling until professional methods of cooling are initiated and the seriousness of the condition can be assessed. Fluids should be replaced as soon as possible. The medical outcome of an episode of heat stroke depends on the victim's physical fitness and the timing and effectiveness of first aid treatment.

Regardless of the worker's protests, no employee suspected of being ill from heat stroke should be sent home or left unattended unless a physician has specifically approved such an order.

Heat Stress

Heat Exhaustion signs and symptoms are headache, nausea, vertigo, weakness, thirst, and giddiness. Fortunately, this condition responds readily to prompt treatment. Heat exhaustion should not be dismissed lightly. Fainting or heat collapse which is often associated with heat exhaustion. In heat collapse, the brain does not receive enough oxygen because blood pools in the extremities. As a result, the exposed individual may lose consciousness. This reaction is similar to that of heat exhaustion and does not affect the body's heat balance. However, the onset of heat collapse is rapid and unpredictable and can be dangerous especially if workers are operating machinery or controlling an operation that should not be left unattended; moreover, the victim may be injured when he or she faints. Also, the signs and symptoms seen in heat exhaustion are similar to those of heat stroke, a medical emergency. Workers suffering from heat exhaustion should be removed from the hot environment and given fluid replacement. They should also be encouraged to get adequate rest and when possible ice packs should be applied.

Heat Cramps are usually caused by performing hard physical labor in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating. Cramps appear to be caused by the lack of water replenishment. Because sweat is a hypotonic solution (±0.3% NaCl), excess salt can build up in the body if the water lost through sweating is not replaced. Thirst cannot be relied on as a guide to the need for water; instead, water must be taken every 15 to 20 minutes in hot environments. Under extreme conditions, such as working for 6 to 8 hours in heavy protective gear, a loss of sodium may occur. Recent studies have shown that drinking commercially available carbohydrate-electrolyte replacement liquids is effective in minimizing physiological disturbances during recovery.

Heat Rashes are the most common problem in hot work environments where the skin is persistently wetted by unevaporated sweat. Prickly heat is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, these papules give rise to a prickling sensation. Heat rash papules may become infected if they are not treated. In most cases, heat rashes will disappear when the affected individual returns to a cool environment.

Heat Fatigue is often caused by a lack of acclimatization. A program of acclimatization and training for work in hot environments is advisable. The signs and symptoms of heat fatigue include impaired performance of skilled manual, mental, or vigilance jobs. There is no treatment for heat fatigue except to remove the heat stress before a more serious heat-related condition develops.

What kind of engineering controls can be utilized?

General ventilation dilutes hot air with cooler air (ideally, bringing in cooler outside air) and in is the most cost effective). A permanently installed ventilation system usually can handle large areas or entire buildings. Portable or local exhaust systems may be more effective or practical in smaller areas.

Air treatment/air cooling differs from ventilation because it reduces the temperature of the air by removing the heat (and sometimes humidity) from the air. **Air conditioning** is a method of air cooling which uses a compressed refrigerant under pressure to remove the heat from the air. This method is expensive to install and operate. An alternative to air conditioning is the use of chillers to circulate unpressurized cool water through heat exchangers over which air from the ventilation system is then passed. Chillers are more efficient in cooler climates or in dry climates where evaporative cooling can be used. **Local air cooling** can be effective in reducing air temperature in specific areas. Two methods have been used successfully in industrial settings. One type, cool rooms, can be used to enclose a specific workplace or to offer a recovery area near hot jobs. The second type is a portable blower with built-in air chiller. The main advantage of a blower, aside from portability, is minimal set-up time.

Another way to reduce heat stress is to cool the employee by increasing the air flow or convection using fans, etc. in the work area. This is generally only effective as long as the air temperature is less than the worker's skin temperature (usually less than 95 degrees F dry bulb). Changes in air speed can help workers stay cooler by increasing both the convective heat exchange (the exchange between the skin surface and the surrounding air) and the rate of evaporation. This does not actually cool the air so moving

Heat Stress

air must impact the worker directly to be effective.

Heat conduction blocking methods include insulating the hot surface that generates the heat and changing the surface itself. Simple devices such as shields, can be used to reduce radiant heat, i.e. heat coming from hot surfaces within the worker's line of sight. Polished surfaces make the best barriers, although special glass or metal mesh surfaces can be used if visibility is a problem With some sources of radiation, such as heating pipes, it is possible to use both insulation and surface modifications to achieve a substantial reduction in radiant heat.

What administrative or work practice controls may be used?

Acclimatize workers by exposing them to work in a hot environment for progressively longer periods. NIOSH (1986) suggests that workers who have had previous experience in jobs where heat levels are high enough to produce heat stress may acclimatize with a regimen of 50% exposure on day one, 60% on day two, 80% on day three, and 100% on day four. For new workers who will be similarly exposed, the regimen should be 20% on day one, with a 20% increase in exposure each additional day.

Replace Fluids by providing cool (50°-60°F) water or any cool liquid (except alcoholic beverages) to workers and encourage them to drink small amounts frequently, e.g., one cup every 20 minutes. Ample supplies of liquids should be placed close to the work area. Although some commercial replacement drinks contain salt, this is not necessary for acclimatized individuals because most people add enough salt to their summer diets.

Reduce the physical demands by reducing physical exertion such as excessive lifting, climbing, or digging with heavy objects. Spread the work over more individuals, use relief workers or assign extra workers. Provide external pacing to minimize overexertion.

Provide recovery areas such as air-conditioned enclosures and rooms and provide intermittent rest periods with water breaks.

Reschedule hot jobs for the cooler part of the day, and routine maintenance and repair work in hot areas should be scheduled for the cooler seasons of the year.

Monitor workers who are at risk of heat stress, such as those wearing semi-permeable or impermeable clothing when the temperature exceeds 70°F, while working at high metabolic loads (greater than 500 kcal/hour). Personal monitoring can be done by checking the heart rate, recovery heart rate, oral temperature, or extent of body water loss.

To check the heart rate, count pulse for 30 seconds at the beginning of the rest period. If the heart rate exceeds 110 beats per minute, shorten the next work period by one third and maintain the same rest period.

The recovery heart rate can be checked by comparing the pulse rate taken at 30 seconds (P1) with the pulse rate taken at 2.5 minutes (P3) after the rest break starts. The two pulse rates can be interpreted using the following criteria.

Heat Stress

Heart rate recovery pattern	P3	Difference between P1 and P3
Satisfactory recovery	<90	--
High recovery (Conditions may require further study)	90	10
No recovery (May indicate too much stress)	90	<10

Check oral temperature with a clinical thermometer after work but before the employee drinks water. If the oral temperature taken under the tongue exceeds 37.6℃, shorten the next work cycle by one third.

Measure body water loss by weighing the worker on a scale at the beginning and end of each work day. The worker's weight loss should not exceed 1.5% of total body weight in a work day. If a weight loss exceeding this amount is observed, fluid intake should increase.

Develop a heat stress training program, and incorporate into health and safety plans at least the following components:

- Knowledge of the hazards of heat stress;
- Recognition of predisposing factors, danger signs, and symptoms;
- Awareness of first-aid procedures for, and the potential health effects of, heat stroke;
- Employee responsibilities in avoiding heat stress;
- Dangers of using drugs, including therapeutic ones, and alcohol in hot work environments;
- Use of protective clothing and equipment; and
- Purpose and coverage of environmental and medical surveillance programs and the advantages of worker participation in such programs.

What Personal Protective Equipment is effective in minimizing heat stress?

Reflective clothing, which can vary from aprons and jackets to suits that completely enclose the worker from neck to feet, can reduce the radiant heat reaching the worker. However, since most reflective clothing does not allow air exchange through the garment, the reduction of radiant heat must more than offset the corresponding loss in evaporative cooling. For this reason, reflective clothing should be worn as loosely as possible. In situations where radiant heat is high, auxiliary cooling systems can be used under the reflective clothing.

Auxiliary body cooling Ice vests, though heavy, may accommodate as many as 72 ice packets, which are usually filled with water. Carbon dioxide (dry ice) can also be used as a coolant. The cooling offered by ice packets lasts only 2 to 4 hours at moderate to heavy heat loads, and frequent replacement is necessary. However, ice vests do not tether the worker and thus permit maximum mobility. Cooling with ice is also relatively inexpensive.

Wetted clothing such as terry cloth coveralls or two-piece, whole-body cotton suits are another simple and inexpensive personal cooling technique. It is effective when reflective or other impermeable protective clothing is worn. This approach to auxiliary cooling can be quite effective under conditions of high temperature, good air flow, and low humidity.

Water-cooled garments range from a hood, which cools only the head, to vests and "long johns," which

Heat Stress

offer partial or complete body cooling. Use of this equipment requires a battery-driven circulating pump, liquid-ice coolant, and a container. Although this system has the advantage of allowing wearer mobility, the weight of the components limits the amount of ice that can be carried and thus reduces the effective use time. The heat transfer rate in liquid cooling systems may limit their use to low-activity jobs; even in such jobs, their service time is only about 20 minutes per pound of cooling ice. To keep outside heat from melting the ice, an outer insulating jacket should be an integral part of these systems.

Circulating air is the most highly effective, as well as the most complicated, personal cooling system. By directing compressed air around the body from a supplied air system, both evaporative and convective cooling are improved. The greatest advantage occurs when circulating air is used with impermeable

garments or double cotton overalls. One type, used when respiratory protection is also necessary, forces exhaust air from a supplied-air hood ("bubble hood") around the neck and down inside an impermeable suit. The air then escapes through openings in the suit. Air can also be supplied directly to the suit without using a hood in three ways: by a single inlet, by a distribution tree, or by a perforated vest. In addition, a vortex tube can reduce the temperature of circulating air. The cooled air from this tube can be introduced either under the clothing or into a bubble hood. The use of a vortex tube separates the air stream into a hot and cold stream; these tubes also can be used to supply heat in cold climates. Circulating air, however, is noisy and requires a constant source of compressed air supplied through an attached air hose. This system tethers the worker and limits his or her mobility. Additionally, since the worker feels comfortable, he or she may not realize that it is important to drink liquids frequently.

Cold Stress

During emergency response activities or recovery operations, workers may be required to work in cold environments, and sometimes for extended periods. Cold stress is a common problem encountered in these types of situations. The following frequently asked questions will help workers understand what cold stress is, how it may affect their health and safety, and how it can be prevented.

How cold is too cold?

When the body is unable to warm itself, cold related stress may result. This may include tissue damage and possibly death. Four factors contribute to cold stress: cold air temperatures, high velocity air movement, dampness of the air, and contact with cold water or surfaces. A cold environment forces the body to work harder to maintain its temperature. Cold air, water, and snow all draw heat from the body. Wind chill is the combination of air temperature and wind speed. For example, when the air temperature is 40°F, and the wind speed is 35 mph, your exposed skin receives conditions equivalent to the air temperature being 11° F. While it is obvious that below freezing conditions combined with inadequate clothing could bring about cold stress, it is also important to understand that it can also be brought about by temperatures in the 50's coupled with some rain and wind.

How does the body react to cold conditions?

When in a cold environment, most of your body's energy is used to keep your internal temperature warm. Over time, your body will begin to shift blood flow from your extremities (hands, feet, arms, and legs) and outer skin to the core (chest and abdomen). This allows exposed skin and the extremities to cool rapidly and increases the risk of frostbite and hypothermia. Combine this with cold water, and trench foot may also be a problem.

What are the most common cold induced problems?

Hypothermia, Frostbite, and Trench Foot.

What is Hypothermia?

Hypothermia which means "*low heat*", is a potentially serious health condition. This occurs when body heat is lost faster than it can be replaced. When the core body temperature drops below the normal 98.6° F to around 95° F, the onset of symptoms normally begins. The person may begin to shiver and stomp their feet in order to generate heat. Workers may lose coordination, have slurred speech, and fumble with items in the hand. The skin will likely be pale and cold. As the body temperature continues to fall these symptoms will worsen and shivering will stop. Workers may be unable to walk or stand. Once the body temperature falls to around 85° F severe hypothermia will develop and the person may become unconscious, and at 78°, the person could die.

Anyone working in a cold environment may be at risk for cold stress. However, older people may be at more risk than younger adults, since older people are not able to generate heat as quickly. Certain medications may prevent the body from generating heat normally. These include *anti-depressants, sedatives, tranquilizers* and *others.*

Treatment depends on the severity of the hypothermia. For cases **of mild hypothermia** move to warm area and stay active. Remove wet clothes and replace with dry clothes or blankets, cover the head. To promote metabolism and assist in raising internal core temperature drink a warm (not hot) sugary drink. Avoid drinks with caffeine. For **more severe cases** do all the above, plus contact emergency medical personnel (Call 911 for an ambulance), cover all extremities completely, place very warm objects, such as

Cold Stress

hot packs or water bottles on the victim's head, neck, chest and groin. Arms and legs should be warmed last. In cases of **severe hypothermia** treat the worker very gently and do not apply external heat to re-warm. Hospital treatment is required.

If worker is in the water and unable to exit, secure collars, belts, hoods, etc. in an attempt to maintain warmer water against the body. Move all extremities as close to the torso as possible to conserve body heat.

What is Frostbite?

Frostbite occurs when the skin actually freezes and loses water. In severe cases, amputation of the frostbitten area may be required. While frostbite usually occurs when the temperatures are 30° F or lower, wind chill factors can allow frostbite to occur in above freezing temperatures. Frostbite typically affects the extremities, particularly the feet and hands. The affected body part will be cold, tingling, stinging or aching followed by numbness. Skin color turns red, then purple, then white, and is cold to the touch. There may be blisters in severe cases.

Do not rub the area to warm it. Wrap the area in a soft cloth, move the worker to a warm area, and contact medical personnel. Do not leave the worker alone. If help is delayed, immerse in warm (maximum 105 ℉), not hot, water. Do not pour water on affected part. If there is a chance that the affected part will get cold again do not warm. Warming and recooling will cause severe tissue damage.

What is Trench Foot?

Trench Foot or immersion foot is caused by having feet immersed in cold water at temperatures above freezing for long periods of time. It is similar to frostbite, but considered less severe. Symptoms usually consist of tingling, itching or burning sensation. Blisters may be present.

Soak feet in warm water, then wrap with dry cloth bandages. Drink a warm, sugary drink.

What preventive measures should I take?

Plan for work in cold weather. Wearing appropriate clothing and being aware of how your body is reacting to the cold are important to preventing cold stress. Avoiding alcohol, certain medications and smoking can also help to minimize the risk.

Protective Clothing is the most important way to avoid cold stress. The type of fabric also makes a difference. Cotton loses its insulation value when it becomes wet. Wool, silk and most synthetics, on the other hand, retain their insulation even when wet. The following are recommendations for working in cold environments:

- Wear at least three layers of clothing. An inner layer of wool, silk or synthetic to wick moisture away from the body. A middle layer of wool or synthetic to provide insulation even when wet. An outer wind and rain protection layer that allows some ventilation to prevent overheating.
- Wear a hat or hood. Up to 40% of body heat can be lost when the head is left exposed.
- Wear insulated boots or other footwear.
- Keep a change of dry clothing available in case work clothes become wet.
- With the exception of the wicking layer do not wear tight clothing. Loose clothing allows better ventilation of heat away from the body.
- Do not underestimate the wetting effects of perspiration. Oftentimes wicking and venting of the body’s sweat and heat are more important than protecting from rain or snow.

Cold Stress

Work Practices and planning are important preventative measures. Drink plenty of liquids, avoiding caffeine and alcohol. It is easy to become dehydrated in cold weather. If possible, heavy work should be scheduled during the warmer parts of the day. Take breaks out of the cold. Try to work in pairs to keep an eye on each other and watch for signs of cold stress. Avoid fatigue since energy is needed to keep muscles warm. Take frequent breaks and consume warm, high calorie food such as pasta to maintain energy reserves.

Engineering controls can be effective in reducing the risk of cold stress. Radiant heaters may be used to warm workers. Shielding work areas from drafts or wind will reduce wind chill. Use insulating material on equipment handles, especially metal handles, when temperatures drop below 30° F.

Training in recognition and treatment is important. Supervisors, workers and coworkers should watch for signs of cold stress and allow workers to interrupt their work if they are extremely uncomfortable. Supervisors should also ensure that work schedules allow appropriate rest periods and ensure liquids are available. They should use appropriate engineering controls, personal protective equipment and work practices to reduce the risk of cold stress. All of these measures should be incorporated into the relevant health and safety plans.

Manual Material Handling Program

Scope

This program applies to all departments and any employee that may conduct manual handling tasks as part of their job responsibility. This program is intended to minimize the potential for a back injury caused by lifting heavy objects. Employees should not lift any object 50 pounds or greater without assistance. All employees whose work requires heavy lifting shall be properly trained, physically qualified, and receive a medical evaluation as required by the job description.

Policy

This program has the following objectives:

1. Ensuring employees are not required to manually lift materials or objects greater than 50 pounds as part of their job functions;
2. Assist in identifying, assessing, and controlling risks associated with manual handling tasks;
3. Reducing the incidence of manual handling injuries; and
4. Establishing an effective system for manual handling.

The Supervisors shall be responsible for:

1. Ensuring affected employees are trained;
2. Ensuring that employees use proper lifting techniques;
3. Making assistance available to employees who manually handle or lift 50 pounds or greater;
4. Insuring all employees who experience work-related injuries follow the appropriate procedures.

The Employee shall be responsible for:

1. Attending the required training;
2. Using proper lifting and material handling techniques;
3. Warming up the back muscles before lifting is conducted;
4. Limiting manual lifting or handling tasks to objects less than 50 pounds;
5. Getting assistance whenever manual handling or lifting materials or objects that are 50 pounds or greater; and
6. Reporting injuries within 24 hours of their occurrence.

General Lifting Techniques

Whether it is during leisure activities or as a part of paid work, everyone lifts, holds, carries, pushes and pulls on a daily basis. Manual material handling involves lifting light, heavy and awkward objects. Safe lifting is a critical aspect of daily activities and should be the focus of any manual material handling. Before you lift, remember the following:

Manual Lifting

- Wear supportive shoes;
- Use lift assist devices (hand dollies, carts, lift tables, forklifts);
- Carry all movements out horizontally (e.g., push and pull rather than lift and lower);
- Always use your body weight and not your feet when pushing;
- Try to have most workplace deliveries placed at hip height;
- Always keep objects in the comfort zone (between hip and shoulder height);
- Keep all loads close to and in front of the body;
- Keep the back aligned while lifting;
- Maintain the center of balance;
- Let the legs do the actual lifting; and
- Reduce the size of the material to keep it light, compact and safe to grasp.

PLAN THE LIFT prior to lifting as follows:

- Size up the load, its weight, shape and position;
- Determine if the load is too large, too heavy or too awkward to move alone;
- Get help from a coworker or use a mechanical aid device to help with the lift when necessary;
- Decide on the route to take;
- Check for any problems or obstacles such as slippery or cluttered floors;
- Investigate the location where the load is going to be placed in order to anticipate any difficulties; and
- Always exercise or warm-up the back prior to lifting.

SQUAT LIFTING should be done for a majority of all lifts. Squat lifting should be performed as follows:

- Stand as close to the load as possible;
- Move your feet shoulder width apart;
- Tighten your stomach muscles so you can tuck your pelvis;
- Bend at the knees, keeping your back straight and stomach tucked;
- Get a good firm grip on the load;
- Hug the load close to the center of your body;
- Lift smoothly with your legs gradually straightening the knees and hips into a standing position; and
- Avoid twisting your body as you lift.

CARRYING LOADS should be done as follows:

- Keep the load close to the center of your body to take full advantage of the mechanical leverage of your body;

Manual Lifting

- Do not change your grip on the load unless it is weight supported;
- Avoid twisting your body without pivoting your feet at the same time;
- If you must change direction, move your feet in that direction instead of twisting your trunk in that direction;
- Make sure you can see over the load;
- Move carefully toward your destination; and
- If a heavier load is carried for some distance, consider storing it closer.

UNLOADING OBJECTS should be done the same way as lifting objects, but in the reverse order as follows:

- Slowly bend your knees to lower the load;
- Keep your back straight and the weight close to the center of your body;
- Allow enough room for fingers and toes when the load is set down;
- Place the load on a bench or table by resting it on the edge and pushing it forward with your arms and body; and
- Secure the load to ensure that it will not fall, tip over, roll or block someone's way.

ONE-ARM LOADS are used when carrying items such as pails or buckets. Lifting and carrying one-arm loads should be performed as follows:

- Bend the knees and at the waist keeping your back straight;
- Reach for the load;
- Grasp the handle of the load firmly;
- Lift with your legs not your shoulders and upper back; and
- Keep your shoulders level while switching hands regularly to reduce overexertion on one side of the body while carrying the load.

TEAM LIFTS are used when objects are too heavy, too large or too awkward for one person to lift. Team lifts should be performed as follows:

- Work with someone of similar build and height, if possible;
- Choose one person to direct the lift (e.g., "lift on the count of three");
- Lift with your legs and raise the load to the desired level at the same time;
- Always keep the load at the same level while carrying;
- Move smoothly and in unison; and
- Set the load down together.

Manual Lifting

OVERHEAD LIFTS should be conducted as follows:

- When lifting or lowering objects from above the shoulders, lighten the load whenever possible;
- Stand on something sturdy such as a step stool or platform to decrease the vertical distance; and
- When you are lowering objects from above the shoulders, slide the load close to your body, grasp the object firmly, slide it down your body and proceed with your move.

Mechanical Aids

Alternative material-handling techniques for carrying or moving loads are to be used whenever possible to minimize lifting and bending requirements. These alternate techniques include the use of: hand trucks, carts, dollies, forklifts, hoists and wheelbarrows. Although mechanical aids are used, safe lifting procedures should still be followed by maintaining the natural curvature of the back, using the legs for any lifting that is encountered and avoid twisting the back. Proper conditioning and training for required work activities are the primary means for prevention of musculoskeletal illnesses and injuries in the workplace.

Safety Disciplinary Action Memo

SAFETY MEMO

October 25, 2012

To all PC and Area Managers:

Effective immediately we will be implementing a new disciplinary action policy to deal with safety infractions.

If any VRC Protx employee violates the safety rules set forth in the company safety program or violates any customer safety policy the following disciplinary actions will be enforced.

First Infraction: Verbal Warning

Second Infraction: Written Warning and the loss of the current calendar month safety bonus.

Third Infraction: Two day suspension without pay and 6 month probation.

Forth Infraction; Termination

The definition of a safety infraction is the violation of any VRC Protx or Customer safety policy or program. It will be up to VRC Management, supervisors, QC Foremen to determine if an infraction has occurred.

Any Dispute regarding any safety infraction will be resolved by the Director of Safety and Technical Services.

Darren H. Cameron
Director of Safety and Technical Services

Gas Hazards Program

General Procedures

There a many gas hazards in plant and other worksite areas. Dangerous gases such as Benzene, Methanol, Hydrogen Sulfide and others may be present in storage, piping, or even naturally occurring in your workplace. Any area where gas hazards have been reported or encountered, or where there is insufficient oxygen, there should be no entry into that area until sufficient tests have been made to determine the extent of the hazard and that the area is purged, ventilated, or otherwise made safe to reduce the hazard to allowable concentrations.

Each employee shall use a portable gas detector as required in all high gas hazard areas For toxic atmospheres, VRC Protx LLC requires proper respiratory and gas monitoring equipment to be used by trained employees that are required to enter or work in the area. Gas monitoring equipment shall be calibrated per manufacturer's recommendations and contain a current calibration sticker on the monitor providing the date of calibration A bump test is 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

Because of the potentially extreme safety hazards of working around gas hazards, gas hazard awareness training must be provided before any initial assignment and annually thereafter.

This Gas Hazard Awareness training should include at a minimum:
a. The locations of any alarm stations in the area
b. Gas Monitoring Equipment- Portable and Fixed Detection
c. Gas Alarms
d. Gas Hazards- Characteristics of gases, to include oxygen deficiency, oxygen or nitrogen enrichment, carbon monoxide and hydrogen sulfide at a minimum. Hazard training must also include any plant or department specific gases of concern. Training must include signs and symptoms of overexposure
e. Personnel Rescue Procedures
f. Use and care of Self-Contained Breathing Apparatus (SCBA)- includes donning and emergency procedures (if applicable)
g. Evacuation Procedures
h. Staging Areas – Primary and Secondary

This Gas Hazard Awareness training shall be documented and available for review. The RSO is responsible for obtaining and keeping these records.

Employees required to enter any confined space should be required to wear a safety harness with tail line for emergency retrieval. A rescue watch, stationed outside of the hazard area with proper rescue equipment is also required to assist in case of emergency. Check with the Responsible Safety Officer (RSO), Darren Cameron for assistance with working in these areas.

Gas Hazards Program

Canister-type filter masks should not be used. Employees should be required to wear self-contained respirators (SCBA) in those atmospheres where tests indicated oxygen content is less than necessary to sustain life. All employees should be trained and periodically refreshed in the use and operation of breathing equipment available on the job.

Employees will be aware of the owners contingency plan provisions including evacuation routes and alarms. Employees should participate in emergency evacuation drills and practice rescue procedures

Medical personnel readily available for consult on matters of occupational health. Emergency numbers should be conspicuously posted. At least one employee, if not more, per shift trained in 1st aid and CPR, and be on-site. Where harmful chemicals are being used, readily accessible facilities should be available for rapid flushing of the eyes and/or skin areas.

General Waste Management Program

General Waste Management Program

INTRODUCTION

This section outlines administrative and procedural requirements for construction waste management activities on our construction site projects. VRC Protx LLC estimates the waste that will be generated prior to work being performed so that the need for containers and waste removal, if necessary, can be determined. Typically on our projects the same wastes or scrap materials are generated for every project.

DEFINITIONS

Construction, Demolition, and Landclearing (CDL) Waste: Includes all non-hazardous solid wastes resulting from construction, remodeling, alterations, repair, demolition and landclearing. Includes material that is recycled, reused, salvaged or disposed as garbage.

Salvage: Recovery of materials for on-site reuse or donation to a third party.

Reuse: Making use of a material without altering its form. Materials can be reused on-site or reused on other projects off-site. Examples include, but are not limited to the following: Grinding of concrete for use as subbase material. Chipping of landclearing debris for use as mulch.

Recycling: The process of sorting, cleaning, treating, and reconstituting materials for the purpose of using the material in the manufacture of a new product.

Source-Separated CDL Recycling: The process of separating recyclable materials in separate containers as they are generated on the job-site. The separated materials are hauled directly to a recycling facility or transfer station.

Co-mingled CDL Recycling: The process of collecting mixed recyclable materials in one container on-site. The container is taken to a material recovery facility where materials are separated for recycling.

Approved Recycling Facility: Any of the following: A facility that can legally accept CDL waste materials for the purpose of processing the materials into an altered form for the manufacture of a new product.

Material Recovery Facility: A general term used to describe a waste-sorting facility. Mechanical, hand-separation, or a combination of both procedures, are used to recover recyclable materials.

CONSTRUCTION WASTE MANAGEMENT, GENERAL

Waste materials should 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 run-off.

Provide containers for CDL waste that is to be recycled clearly labeled as such with a list of acceptable and unacceptable materials. The list of acceptable materials must be the same as the materials recycled at the receiving material recovery facility or recycling processor.

Provide containers for CDL waste that is disposed in a landfill clearly labeled as such.

If possible, include in material purchasing agreements a waste reduction provision requesting that materials and equipment be delivered in packaging made of recyclable material, that they reduce the amount of packaging, that packaging be taken back for reuse or recycling, and to take back all unused product. Insure that subcontractors require the same provisions in their purchase agreements.

Conduct regular visual inspections of dumpsters and recycling bins to remove contaminants.

CDL waste materials that can be salvaged, reused or recycled include, but are not limited to, the

General Waste Management Program

following:

Acoustical ceiling tiles
Asphalt
Asphalt shingles
Cardboard packaging
Carpet and carpet pad
Concrete
Drywall
Fluorescent lights and ballasts
Landclearing debris (vegetation, stumpage, dirt)
Metals
Paint (through hazardous waste outlets)
Wood
Plastic film (sheeting, shrink wrap, packaging)
Window glass
Wood
Field office waste, including office paper, aluminum cans, glass, plastic, and office cardboard.

Employees must be instructed on the proper disposal method for wastes. This may include general instruction on disposal of non-hazardous wastes, trash, or scrap materials. If wastes generated are classified as hazardous, employees must be trained to ensure proper disposal. The RSO, Darren Cameron, or designated representative will determine what level of HazWoper (hazardous waste operations) training is required.

SOURCE SEPARATION

General: VRC Protx LLC encourages proper segregation of waste materials to ensure opportunities for reuse or recycling. Separate recyclable materials from CDL waste to the maximum extent possible. Separate recyclable materials by type.

Provide containers, clearly labeled, by type of separated materials or provide other storage method for managing recyclable materials until they are removed from Project site.

Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

Stockpile materials away from demolition area. Do not store within drip line of remaining trees.

Store components off the ground and protect from weather.

CO-MINGLED RECYCLING

General: Do not put CDL waste that will be disposed in a landfill into a co-mingled CDL waste recycling container.

REMOVAL OF CONSTRUCTION WASTE MATERIALS

Remove CDL waste materials from project site on a regular basis. Do not allow CDL waste to accumulate on-site.

Transport CDL waste materials off Owner's property and legally dispose of them.

Burning of CDL waste is not permitted unless specifically authorized by the site owner and complies with all laws.

NFPA 70E Safety Program

NFPA 70E Safety Program

Policy

It is the policy of VRC Protx to take every reasonable precaution in the performance of work to protect the health and safety of employees and the public and to minimize the probability of damage to property. The electrical safety requirements contained in this chapter are regulations set forth by VRC Protx.

Procedures

It is the policy of VRC Protx to follow the fundamental principles of safety, which are described below. A clear understanding of these principles will improve the safety of working with or around electrical equipment.

Practice proper housekeeping and cleanliness. Poor housekeeping is a major factor in many accidents. A cluttered area is likely to be both unsafe and inefficient. Every employee is responsible for keeping a clean area and every supervisor is responsible for ensuring that his or her areas of responsibility remain clean.

Plan your work. A job briefing should be held before starting each job and include all employees involved. The briefing should cover hazards associated with the job, work procedures involved, special precautions, energy source controls, and PPE requirements.

Identify hazards and anticipate problems. Think through what might go wrong and what the consequences would be. Do not hesitate to discuss any situation or question with your supervisor and coworkers.

Resist "hurry-up" pressure. Program pressures should not cause you to bypass thoughtful consideration and planned procedures.

Design for safety. Consider safety to be an integral part of the design process. Protective devices, warning signs, and administrative procedures are supplements to good design but can never fully compensate for its absence. Completed designs should include provisions for safe maintenance.

Maintain for safety. Good maintenance is essential to safe operations. Maintenance procedures and schedules for servicing and maintaining equipment and facilities, including documentation of repairs, removals, replacements, and disposals, should be established.

Document your work. An up-to-date set of documentation adequate for operation, maintenance, testing, and safety should be available to anyone working on potentially hazardous equipment. Keep drawings and prints up to date. Dispose of obsolete drawings and be certain that active file drawings have the latest corrections. (2) VRC Protx shall advise the site owner of:

a. Any unique hazards presented by VRC Protx's work,

b. Any unanticipated hazards found during VRC Protx's work that the site owner did not

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mention, and

c. The measures VRC Protx took to correct any hazards reported by the site owner to prevent such hazards from recurring in the future.

Have designs reviewed. All systems and modifications to systems performing a safety function or controlling a potentially hazardous operation must be reviewed and approved at the level of project engineer or above.

Have designs and operation verified. All systems performing safety functions or controlling a potentially hazardous operation must be periodically validated by actual test procedures at least once a year, and both the procedures and actual tests must be documented.

Test equipment safety. Tests should be made when the electrical equipment is de-energized, or, at most, energized with reduced hazard. Test instruments, equipment, and their accessories shall meet the requirements of ANSI/ISA-61010-1-Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use -Part 1 General Requirements, for rating and design requirements for voltage measurement and test instruments intended for use on electrical systems 1000 Volts and below. <10> When test instruments are used for the testing for the absence of voltage on conductors or circuit parts operating at 50 volts or more, the operation of the test instrument shall be verified before and after an absence of voltage test is performed.

Only qualified persons shall perform tasks such as testing, troubleshooting, and voltage measuring within the limited approach boundary of energized electrical conductors or circuit parts operating at 50 volts or more or where an electrical hazard exists.

Know emergency procedures. All persons working in areas of high hazard (with high-voltage power supplies, capacitor banks, etc.) must be trained in emergency response procedures, including cardiopulmonary resuscitation (CPR) certification.

Training Requirements

Employees shall be trained in safety-related work practices and procedural requirements as necessary to provide protection from the electrical hazards associated with their respective jobs. Employees shall be trained to identify and understand the relationship between electrical hazards and possible injury. Documentation shall be made when the employee demonstrates proficiency, be maintained for the duration of the employee's employment, and contain each employee's name and date of training.

Re-Training Requirements

Our employees shall receive additional training (or retraining) under any of the following conditions:

(1) If the supervision or annual inspections indicate that the employee is not complying with the safety-related work practices

(2) If new technology, new types of equipment, or changes in procedures necessitate the use of safety-related work practices that are different from those that the employee would normally use

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(3) If he or she must employ safety-related work practices that are not normally used during his or her regular job duties

In any case, VRC Protx's affected employees shall have retraining conducted at intervals not to exceed 3 years.

Working with Energized Equipment

This section contains safety requirements that must be met in constructing electrical equipment and in working on energized electrical equipment. Special emphasis is placed on problems associated with personnel working on hazardous electrical equipment in an energized condition. Such work is permissible, but only after extensive effort to perform the necessary tasks with the equipment in a securely de-energized condition has proven unsuccessful, or if the equipment is so enclosed and protected that contact with hazardous voltages is essentially impossible. Also special care shall be taken when working with conductive materials and equipment such as long dimensional conductor objects (ducts or pipes). Employees who handle may be working with such objects shall work with the RSO, Darren Cameron, to determine if any additional steps for safe work practices need to be taken.

Safety related work practices that pertain to qualified and unqualified electrical workers are listed below.

Employees who face a risk of electric shock but who are not qualified persons shall be trained & familiar with electrically related safety practices. Only qualified persons may work on electric circuit parts or equipment that have not been deenergized. Such persons shall be made familiar with the use of special precautionary techniques, PPE, insulating & shielding materials and insulated tools. Unqualified persons shall not be permitted to enter spaces that are required to be accessible to qualified employees only, unless the electric conductors and equipment involved are in an electrically safe work condition.

2. Employees shall be trained in safety related work practices that pertain to their respective job assignments, and 3. Clearance distances.

Safe work practices shall be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts when work is performed near or on equipment or circuits which are or may be energized. Conductors and parts of electrical equipment that have been deenergized but not been locked or tagged out shall be treated as live parts.

Safety Glasses

Either safety glasses or a face shield must be worn when working on electrical equipment.

Personal Protective Devices

For work on any energized circuitry with a Class B or Class C hazard, the use of personal protective devices (e.g., face shields, blast jackets, gloves, and insulated floor mats) is encouraged,

even if not required. In any case, conductive apparel shall not be worn unless they are rendered non-conductive by covering, wrapping or other insulating means. Conductive items of jewelry or clothing shall not be worn unless they are rendered non-conductive by covering, wrapping or other insulating means. All insulating PPE must be inspected before each day's use and immediately following any incident that can reasonably be suspected of having caused damage. Insulating gloves shall be given an air test, along with the inspection. Such tests include: 1) Blankets-before first issue/every 12 months thereafter, 2) Gloves-before first issue and every 6 months, 3) Sleeves before first issue and every 12 months. Covers and Line hose shall be testing if insulating value is suspect.

Protective Systems/ GFCI's

Equipment must be designed and constructed to provide personnel protection. First-line and backup safeguards should be provided to prevent personnel access to energized circuits. Periodic tests must be established to verify that these protective systems are operative. For all 120 volt, 15 and 20 amp (branch) circuits that are cord/ plug connected, Ground Fault Circuit Interrupters (GFCI's) shall be used. GFCI's are specifically designed to protect workers, and work much faster than standard circuit breakers, and at extremely low amperage – far below the threshold at which a hazardous shock can occur. This is the primary protection, and therefore it is required that GFCI's be used as the first component in any circuit used for tools/ extension cords.

Assured Equipment Grounding Conductor Program (AEGCP)

Secondary protection benefits may be realized from utilizing an Assured Equipment Grounding Conductor Program (AEGCP). This program provides for initial and periodic verification of ground continuity of all electrical power tool and extension cords. If used, continuity checks are made initially and at three month intervals. Cords that are checked shall have distinguishable taped markings placed within one foot of the male end of the cord. This program is not, however mandatory if GFCI's are faithfully used - which is the company policy.

A written assured equipment grounding conductor program continuously enforced at the site by one or more designated persons to ensure that equipment grounding conductors for all cord sets, receptacles that are not a part of the permanent wiring of the building or structure, and equipment connected by cord and plug are installed and maintained in good, properly grounded condition.

The following tests shall be performed on all cord sets, receptacles that are not part of the permanent wiring of the building or structure, and cord- and plug-connected equipment required to be grounded.

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

(2) Each receptacle and attachment plug shall be tested for correct attachment of the equipment grounding conductor. The equipment grounding conductor shall be connected to its proper terminal.

(3) All required tests shall be performed

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(a) Before each use on site,

(b) When there is evidence of damage,

(c) Before equipment is returned to service following any repairs,

(d) At intervals not exceeding 3 months.

The tests required shall be recorded and made available to any authority having jurisdiction.

Safety Practices

Because a wide range of power supplies exist, no one set of considerations can be applied to all cases. Employees shall be trained in the skills and techniques to: distinguish exposed energized electrical conductors and circuit parts from other parts of electrical equipment, to determine the nominal voltage of exposed energized electrical conductors and circuit parts, the approach distances specified in Table 130.2 of NFPA 70E, and the decision making process necessary to determine the degree and extent of the hazard and the personal protective equipment and job planning necessary to perform the task safely. Program elements for working in the limited approach boundary might include: evaluations, anticipating unexpected events, all electrical parts are considered live until proven otherwise, work permits, electrical flash arc hazard analysis. The following classification scheme may be helpful in assessing power-supply hazards.

Power supplies of 50 volts or less with high current capability too often are not considered a shock hazard, although these voltages are capable of producing fatal shocks. Since they are not "high voltage," such power sources frequently are not treated with proper respect.

In addition to the obvious shock and burn hazards, there is also the likelihood of injuries incurred in trying to get away from the source of a shock. Cuts or bruises, and even serious and sometimes fatal falls, have resulted from otherwise insignificant shocks.

Power supplies of 300 volts or more, with lethal current capability, have the same hazards to an even greater degree. Because supplies in this category are considered Class C hazards, they must be treated accordingly.

High-voltage supplies that do not have dangerous current capabilities are not serious shock or burn hazards in themselves and are therefore often treated in a casual manner. However, they are frequently used adjacent to lower-voltage lethal circuits, and a minor shock could cause a rebound into such a circuit. Also, an involuntary reaction to a minor shock could cause a serious fall (for example, from a ladder or from experimental apparatus).

Employees shall not enter spaces containing electrical hazards unless illumination is provided that enables the employees to perform the work safely. Where lack of illumination or an obstruction precludes observation of the work to be performed, employees shall not perform any task within the Limited Approach Boundary of energized electrical conductors or circuit parts operating at 50 volts

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or more or where an electrical hazard exists.

For work considered within the Limited Approach Boundary, a hazard/risk evaluation prior to work being done should be performed. Hazard Analysis should contain event severity, frequency, probability and avoidance to determine the level of safe practices employed.

More than 300 Volts

To work on systems with voltages greater than 300 volts (CLASS B OR C HAZARD): Open the feeder breaker, roll out if possible, tag out, and lock if in enclosure. If work is on circuits of 600 V or more, positive grounding cables should be attached to all three phases. Tag should contain who, why, and when information, and it is of vital importance because a person's life may depend on it. "Vital" in this case means that the presence and status of the tag are inviolate, and the tag must not be altered or removed except by the person who attached it.

Less than 300 Volts

To work on systems with voltages less than 300 volts (CLASS A HAZARD): Turn-off and tag the feeder breaker. Tag is inviolate except on projects where established circuit checkout procedure allows a qualified person to remove it and energize circuit after checkout is complete.

Working On or Near Live Circuits

Working on live circuits means actually touching energized parts. Working near live circuits means working close enough to energized parts to pose a risk even though you make be working on de-energized parts. Employees may not enter spaces containing exposed energized parts unless illumination is provided that enables the employees to work safely. Protective shields, protective barriers or insulating materials as necessary shall be used when working in confined or enclosed work spaces where electrical hazards may exist. Work on energized electrical conductors or circuit parts that are not placed in an electrically safe work condition, shall be considered energized electrical work and shall be performed by written permit only. Common tasks where you need to work on or near live circuits include:

- Taking voltage measurements
- Opening and closing disconnects and breakers
- Removing panels and dead fronts
- Opening electric equipment doors for inspection.

Working on or Around Exposed Powerlines

Proper clearances shall be maintained under and around energized exposed wiring. For wiring 300V and below, the clearance distance for unqualified workers is 3 ft. For overhead lines under 50,000 volts, the minimum clearance is 10ft. around the conductors, or 4ft. when driving under lines for unqualified workers. The lines shall be deenergized and grounded or other protective measures shall be provided before work is started if the worker has to be closer than the above clearance. Since VRC Protx does not perform work necessitating qualified electrical workers, it is the policy of

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VRC Protx that the clearances noted above applies to all VRC Protx workers.

Short Service Employees

Short Service Employee Program

General Policy

The purpose of the Short-Service Employee policy of VRC Protx is to assure that workers with less than six months experience are identified, adequately supervised, trained, and managed so as to prevent injury to themselves or others, property damage, or environmental harm.

Any worker with less than six months service in the same job/position with VRC Protx will be considered a short-service employee (SSE). Experienced workers who are new to a location will be considered by the Supervisor or the RSO, Darren Cameron, for inclusion in the SSE program based on the specifics of their assignment.

Factors to consider would include significant differences in:
Job responsibilities/duties from previous assignments/employers
Work processes/practices from previous assignments/employers
Equipment/tools from previous assignments/employers
Their Skill level, and
Their Familiarity with co-workers

Short-Service Employee Requirements

All VRC Protx SSEs, regardless of job function, shall participate in any necessary site-specific orientations before performing work on project locations. These employees must also complete any additional specific training required by their job assignment that is being visited. SSE requirements may also include the following:

VRC Protx SSEs will wear a hard hat with a distinctive difference in appearance (color, Stripe, Decal, etc.) whenever they are in the field that will allow quick and sure identification of the SSE by other team members. The method used to identify SSEs should be communicated to the Owner Client. This also serves as a reminder of each person's responsibility for the safety of others.

All SSE personnel must be assigned an experienced mentor to assist the 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 he/she is not properly trained. A mentor may only be assigned to one crew that includes Short Service Employees, and he/she must remain on site with them. Each SSE's mentor must be designated on the daily Jobsite Hazard Analysis (JSA) forms.

Formal meetings between the SSE, his/her supervisor and mentor will take place one month and three months after the hire or transfer date (more frequently if necessary). The purpose of these meetings is to provide performance feedback to the SSE and evaluate his/her progress in understanding workplace hazards and VRC Protx health, environmental, and safety (HES) policies.

A final meeting is held at the six-month point to make a formal determination whether the SSE

can work without posing a hazard to himself/herself or others. When the supervisor and mentor have agreed to this, employees are removed from the SSE program.

If concerns remain about the employee's ability to work safely after six months, the supervisor evaluates the situation and develops a forward plan for the employee in consultation with Human Resources. To be removed from SSE status, an employee must exhibit safe behavior for six months (i.e., incident-free performance, proactive participation in HES programs such as incident reporting including near misses, Behavior-Based Safety (BBS), Job Safety Analysis (JSA) development, safety meetings) and have a general awareness and working knowledge of VRC Protx's HES policies. Release from SSE status requires the approval of both the employee's mentor and the supervisor. Documentation should be maintained for a period of one year after an employee has been removed from SSE status.

Working with Experienced Crews

Prior to starting work, the contractor shall notify the Owner Client (project coordinator, contractor contact, and/or on-site supervisor) if Short Service Employees are present on work crews.

Because of the nature of SSE status, a single person "crew" cannot be an SSE. Working multiple SSEs on a crew has the potential to increase the risk of crew injuries; therefore:

Two to five-person crews can have only one SSE per crew, and crews with six to ten persons or more should not exceed 2 SSEs. Exceptions to these requirements require a plan to mitigate the risks and written approval of the RSO. Exceptions for crews with more than 50% SSEs require the approval of the RSO, and supervisor. For purposes of this policy, a crew is defined as those workers working at a single location who are employed by VRC Protx.

Any subcontractors employed by VRC Protx must manage their Short Service Employees in accordance with the requirements of the above Short Service Employee program.

Spill Prevention

Spill Prevention Program

All employees must be aware of the hazards involved when working with chemicals and the remedies that need to be used when a spill does occur. A training program will give instructions on how to handle the chemical being used and first aid to be applied to victims of chemical exposure. First aid and caution signs will be conspicuously posted so as to alert individuals on a constant basis. Charts identifying the chemicals utilized in the workplace, their symptoms and effects must also be posted. The workers must know what the acceptable level of exposure to a chemical is and what safety systems must be in place when working with a chemical. Staff should also be aware of new chemical products which may be available that are less harmful, and they must ensure that facilities are adequately ventilated when using chemicals on the premises.

Any water that is provided to an employee throughout the facility should be clearly identified as to whether it is for drinking, washing or cooking. All restrooms must be kept clean and sanitary.

Employees should be screened before taking positions that may expose them to hazards they are not physically capable of handling. An employee who takes an assignment which requires physical labor must be trained to lift heavy loads properly so as not to damage themselves physically, or cause a spill.

The following requirements must be met for storage locker/cabinets:

Cabinets will be permitted on one side of a corridor only.

Cabinets must end at least 6 ft from a corridor exit door.

Cabinet ends must be at least 12 in. from the edge of a doorway on the latch side and from the edge of the door leaf when fully opened into a corridor.

The cabinets must not be more than 20 in. deep by 37 in. wide by 72-3/4 in. high.

The cabinets must be all metal construction with positive latches to prevent spillage of contents in the event of an earthquake.

All doors must return automatically to the closed position when not held open manually.

A 45 degree-angle fairing must be provided from the wall to the corridor corner of the cabinet. Fairing must be provided at both ends of cabinet or bank of cabinets. * A 45 degree-angle fairing must be provided at the top of the cabinets from the outside corridor edge of cabinet to the wall.

All cabinets must be anchored to the wall firmly enough to withstand 0.5g of lateral acceleration (or a lateral load equal to 1/2 the total dead weight of the cabinet and its contents) in the event of an earthquake.

Spill Prevention

Liquids and chemicals are not to be stored in corridor lockers.

Any deviation from the above requirements must be approved by the Responsible Safety Officer.

Hazardous Chemical Exposures

In any company which utilizes chemical substances, a training program on the handling, hazards, storage, exposure risks, symptoms of chemical exposure, spills and first aid needs to be part of any new employees training. There must also be follow-up training sessions as to any new chemical or processes that may be initiated by the company. Follow-up training sessions act as a reinforcement of safety standards that need to be followed on a daily basis.

In a training program, employees will learn acceptable levels of chemical exposure, proper storage and labeling of chemicals, and usage of protective clothing and equipment for handling chemicals. They will also learn about potential fire and toxicity hazards, when not to have a chemical in a confined area, or to store in closed containers, usage of eye wash fountains and safety showers, and the necessary posting of open, and dangerous areas. It is important that an employee recognize the Threshold Limit Values or Permissible Exposure Limits of airborne contaminants and physical agents in the workplace. Employees must be instructed on the proper response procedures for spilled materials. The training should include materials available for use, proper waste disposal, and communication procedures.

A procedural manual or set of instructions must be part of the program, with periodic inspections that clearly indicate whether an employee may be mishandling a chemical or endangering himself or others. Part of the manual or procedures must establish a standard of when and how to deal with chemical spills, neutralizing, and disposing of spills or overflows. These procedures must also be posted in an area that is easily accessible for reference usage.

In the event of a minor chemical spill, in addition to prompt corrective measures, the RSO or designated representative should be notified after the cleanup of the occurrence. In the event of a major spill, or any highly hazardous substance, notification to the above parties shall be made first before any cleanup is attempted.

First aid training and equipment will be routine in any facility where chemicals are used. Employees must know how to handle equipment in emergency situations, what equipment needs to be used and whether the equipment is adequate for the situation. A proper spill kit must be on hand, and 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.

Respirators may be used either as protective safety equipment or for emergency usage for spills. Therefore, the employee should recognize that respirators need to be stored in a clean, sanitary and convenient location and inspected on a regular basis. Also what respirators are approved by NIOSH for their particular applications.

Spill Prevention

With a first aid program an employee will recognize when a problem may be occurring by exposure to a chemical ranging from headaches, nausea, dermatitis problems to other factors of discomfort when they use solvents or chemicals.

In the design of a facility that transports chemicals from storage to vats, the content of pipes and storage containers must be clearly marked. Within that facility design there must be an emergency shut off system in case of an accident or chemical spill. Each employee will be trained as to these emergency shut-off systems.

Ventilation is another major factor in the design of any facility. Whether by natural means or mechanical, the system must be designed to control dust, fumes, solvents, gases, smoke or vapors which may be generated in the workplace. It is also important that a medical or biological monitoring system be in operation as part of the safety standards. If internal combustion engines are used in the facility, or if there is a chance of leakage or mixture with a chemical that could create a toxic gas, atmospheric gas levels must be monitored. If toxic chemicals are used and stored in the facility they should be located in an isolated area to guarantee safety.

Clean Work Areas

All areas controlled by VRC Protx must be kept in orderly and clean condition and used only for activities or operations for which they have been approved. 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.

Keep stairs, corridors, and aisles clear. Traffic lanes and loading areas must be kept clear and marked appropriately.

Store materials in work rooms or designated storage areas only. Do not use hallways, fan lofts, or boiler and equipment rooms as storage areas. 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 stormwater.

Do not allow exits, passageways, or access to equipment to become obstructed by either stored materials or materials and equipment that is being used.

Arrange stored materials safely to prevent tipping, falling, collapsing, rolling, or spreading - that is, any undesired and unsafe motion.

Do not exceed the rated floor capacity of stored material for the area. The load limit and the maximum height to which material may be stacked must be posted.

Place materials such as cartons, boxes, drums, lumber, pipe, and bar stock in racks or in stable piles as appropriate for the type of material.

Store materials that are radioactive, fissile, flammable, explosive, oxidizing, corrosive, or

Spill Prevention

pyrophoric only under conditions approved for the specific use by the Responsible Safety Officer.

Segregate and store incompatible materials in separate locations.

Remove items that will not be required for extended periods from work areas and put them in warehouse storage. Call for assistance.

Every work location must be provided with illumination that meets OSHA requirements. Evaluation of illumination quality and requirements is made by the Responsible Safety Officer, but the supervisor of an area is responsible for obtaining and maintaining suitable illumination.

Areas without natural lighting and areas where hazardous operations are conducted must be provided with enough automatically activated emergency lighting to permit exit or entry of personnel if the primary lighting fails.

Certain jobs require standard safety apparel and appliances for the protection of the employee. Your supervisor is aware of the requirements and will furnish you with the necessary approved protective appliances. These items shall be worn and effectively maintained as a condition of your continued employment and part of our mutual obligation to comply with the Occupational Safety and Health Act.

Stop Work Authority

STOP WORK AUTHORITY

The purpose of this program is to ensure that all employees are given the responsibility & authority to stop work when employees believe that a situation exists that places them, their Co-worker(s), or the public at risk or in danger; could adversely affect the safe operation or cause damage to the facility; or result in a release of any substance to the environment above regulatory requirements or approvals; and provides a method to resolve the issue. Maintaining a diligent questioning attitude is vital to safe execution of work-scope and is a cornerstone to effective safety management. This responsibility & authority to Stop Work also extends to situations where an employee believes there is a need to clarify work instructions or to propose additional controls. All VRC employees are to be trained in the following Stop Work authority perimeters prior to assignment to a job at a customer's facility or working in a VRC shop.

All personnel have the following responsibilities:

1. The responsibility & authority to stop work or decline to perform an assigned task without fear of reprisal, to discuss & resolve work & safety concerns. The Stop Work may include discussions with co-workers, supervision, or safety representative to resolve work related issues, address potential unsafe conditions, clarify work instructions, propose additional controls, etc.

2. The responsibility & authority to initiate a Stop Work IMMEDIATELY, without fear of reprisal, when the employee believes a situation exists which places him/herself, a co-worker(s), or the environment in danger or at risk.

3. The responsibility to report any condition the employee believes is unsafe or for which they have initiated a Stop Work. Notification should be made to the affected worker(s) and to the supervisor or the supervisor's designee at the location where the activity or condition exists.

4. The responsibility to notify their supervisor if a raised Stop Work issue has not been resolved to their satisfaction through established channels prior to the resumption of work.

In a VRC shop, no work will resume until all issues & concerns have been addressed. The steps of the Stop Work authority are as follows: STOP, NOTIFY, CORRECT & RESUME. All Stop Work interventions shall be documented & reviewed by managers, supervisors & the Safety Director for learning & prevention opportunities. It is also important that once a Stop Work intervention has occurred & has been addressed & work has resumed that the Safety Director and/or supervisor should follow up to be certain the same issue does not re-occur.

_____ _____

Employees Signature Date

Light and Restricted Duty Program

Fit for Duty Program

General

Each employee has an individual responsibility to prevent accidents. It is to the benefit of all employees and VRC Protx that you report any situation or condition you believe may present a safety hazard, including any known or concealed dangers in your work area. In addition, employees must also be responsible for ensuring they are physically and mentally fit to perform their job functions safely. Employees are responsible for notifying their supervisor if they are fatigued to the point of not being able to perform their duties safely. Employees must take responsibility for their own safety as well as not reporting to work in a condition as to endanger the safety of their fellow workers.

VRC Protx encourages you to report your concern either to your immediate supervisor or to a member of the Safety Committee. The supervisor or Safety Committee will take immediate action to investigate the matter.

Pre-Employment

Pre-employment physicals should be included in the hiring process, and also when changing into certain job functions and different environments. These assessments may include functional capacity testing as follows: Strength and endurance of the individual in relation to work goals. Equipment and methods that quantify and measure strength and conditioning levels may be utilized; i.e., ergometers, dynamometers, treadmills, measured walking tolerances; commercial strength and exercise devices, free weights, circuit training. Goals for each worker are dependent on the demands of their respective jobs.

Simulation of the critical work demands, the tasks and the environment of the job the worker will return to. Job simulation tasks that provide for progression in frequency, load and duration are essential. They must be related to the work goal and include a variety of work stations that offer opportunities to practice work related positions and motions, i.e., clerical, plumbing, electrical.

Education that stresses body mechanics, work pacing, safety and injury prevention and that promotes worker responsibility and self-management will be required. The education component may have direct therapist/worker interaction. The role of exercise and the worker's responsibility in self-treatment must be covered.

Training

To be effective, and safe, employees need to be trained in every aspect of their job, such as: training specific to their assigned task. Examples might be welding, instrumentation, scaffold building, equipment operator qualifications, respirator fit test, etc. Training must include VRC Protx's health and safety orientation for new employees plus any additional training specific to the nature of hazards on the job; employees must complete this training before they can work unsupervised. All new employees must attend the new employee orientation within the first month

Light and Restricted Duty Program

of employment.

Managers should identify training needs for the job classifications for which they are responsible. Please refer to specific chapters in this manual for further information on training requirements. Consult with the Responsible Safety Officer about other training needs and requirements. Training not provided by Responsible Safety Officer, such as on-the-job training, is the responsibility of line management. This includes information on procedural changes or system modifications that impact safety. Responsible Safety Officer provides several health and safety training courses, technical assistance on training needs, and resources to help supervisors fulfill their training responsibilities.

Training not provided by Responsible Safety Officer, such as on-the-job training, is the responsibility of line management. This includes information on procedural changes or system modifications that impact safety. Responsible Safety Officer provides several health and safety training courses, technical assistance on training needs, and resources to help supervisors fulfill their training responsibilities. Safe work procedures must be in place. Examples might include, hot work permitting, confined space, LO/TO, PSM, Electrical Safety, Operator Safety, etc.

Educational resources such as fact sheets, hazard summaries, and other written materials, as well as videos or slide shows, are available from Responsible Safety Officer. Supervisors can get a catalog from Responsible Safety Officer describing audio-visual materials that may be used to supplement safety training programs.

All health and safety training must be documented. Supervisors must note the participants' names and employee numbers, topics discussed, instructor(s), and date. Supervisors are responsible for maintaining training records. A copy of this information should be sent to the Responsible Safety Officer training/education coordinator for inclusion in VRC Protx's training data base.

Drug Free Workplace

It is the policy of VRC Protx to have a drug-free workplace. Drug and alcohol testing shall be as prescribed by DOT or host facilities. All employees are expected to report to work in a drug-free physical and mental condition that will allow them to perform their work in a safe, and competent manner.

As part of our substance abuse program, new workers may be given an initial drug screening/ test. Workers who test positive for drugs, or other signs of substance abuse will not be hired. 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. Additionally, random drug testing may be performed throughout your term of employment at VRC Protx's discretion.

Workers already employed by VRC Protx who test positive for drugs may be terminated, or referred to a community substance abuse program for help, disciplinary action, or notification of authorities, at the discretion of the employer. Employee's activities and behaviors should be monitored to determine if employee should be removed from the work site.

Light and Restricted Duty Program

Safety Equipment

Proper safety equipment is necessary for your protection. The company provides the best protective equipment it is possible to obtain.

Use all safeguards, safety appliances, or devices furnished for your protection and comply with all regulations that may concern or affect your safety. Wear your gear properly - all snaps and straps fastened, cuffs not cut or rolled.

Your supervisor will advise you as to what protective equipment is required for your job.

Certain jobs require standard safety apparel and appliances for the protection of the employee. Your supervisor is aware of the requirements and will furnish you with the necessary approved protective appliances. These items shall be worn and effectively maintained as a condition of your continued employment and part of our mutual obligation to comply with the Occupational Safety and Health Act.

Safety goggles, glasses and face shields shall correspond to the degree of hazard, i.e., chemical splashes, welding flashes, impact hazard, dust, etc. Do not alter or replace an approved appliance without permission from your supervisor.

Rubber gloves and rubber aprons shall be worn when working with acids, caustics or other corrosive materials.

Specified footwear must be worn.

No jewelry shall be worn around power equipment.

Hearing protection appliances (approved muffs or plugs) shall be worn by all employees working within any area identified as having excess noise levels. Your supervisor will instruct you in the proper use of the appliance.

Protective Clothing

Proper safety equipment is necessary for your protection. The company provides the best protective equipment it is possible to obtain. Use all safeguards, safety appliances, or devices furnished for your protection and carry out all regulations that may concern or affect your safety. Wear your gear properly - all snaps and straps fastened, cuffs not cut or rolled.

Your supervisor will advise you as to what protective equipment is required for your job.

Modified Work (Light Duty)

It is the policy of VRC Protx to provide modified work to persons who have been injured on the job or become ill because of an occupational exposure. Work provided for employees will be compatible with their work restrictions, and will not expose the employee to additional harm or

Light and Restricted Duty Program

injury.

Employees who are injured or become ill must provide the company with a written medical statement of release from their treating physician or other licensed provider. Upon return to work, this release must be submitted to their supervisor or other authorized company representative prior to being assigned to perform any work.

The policy of VRC Protx is to not schedule persons on modified duty work status to work overtime. Persons who are permitted to return to work on a modified duty status will be scheduled to work their normal work schedule not including any overtime hours they would have normally worked unless the supervisor or other responsible management person directs otherwise.

Non-Occupational Illnesses and Injuries

Employees who are injured or become ill at home or during non-work hours must provide VRC Protx with a written medical release without restrictions upon returning to work. Employees who have been injured severely or have had a contagious illness must provide VRC Protx with written proof that they have recovered from their condition. If an injury or illness is of a serious nature the RSO, Darren Cameron and Human Resources must be consulted before a person is permitted to return to work.

Return to Work Policy

In all cases employees who have sustained an on-the-job injury or illness must provide written medical proof of their condition and ability to perform their work upon their return to work.

SEMS

Safety & Environmental Management System (SEMS) Program

Hazards Analysis
A hazards analysis shall be conducted for all facilities. The purpose of the analysis is to identify, evaluate, and where unacceptable, reduce the likelihood and/or minimize the consequences of uncontrolled releases of oil and gas and other safety or environmental incidents. In addition, a job hazard analysis (operations/task level) shall be performed to identify and evaluate hazards of a job/task for the purpose of hazards control or elimination. For any personnel assigned to work offshore shall be trained in API RP T-1 Orientation Program for Personnel Going Offshore for the First Time (latest edition) prior to working offshore for the first time.
In addition to orientation, additional training qualifications may be required for personnel working offshore. Persons assigned to operate and maintain the facility must possess the required skills and knowledge to carry out their duties and responsibilities. The criteria and determination of any additional, or specialized training required shall be determined by the Responsible Safety Officer, Replace with Safety Peron's Name, depending on each employee's work assignment.
Management of Change

This element would require lessees/operators to document and analyze all proposed facility changes to determine possible adverse safety and environmental impacts, with the exception of replacement in kind. There are a number of specific topics to be covered in this analysis, including changes in: facilities and procedures, personnel, work practices, equipment (including addition of new equipment or modifications to existing equipment), and the safety and environmental implications of these changes.

Operating Procedures

The controller/ owner of the worksite should include management to have requirements for written facility operating procedures designed to enhance efficient, safe, and environmentally sound operations. These procedures should be reviewed separately to ensure that they reflect current practices.

Training

Safety training is an ongoing requirement. Each year lack of worker safety training is one of the top violations OSHA finds in the workplace. Employees who are injured but were trained will likely blame themselves for the injury whereas the untrained worker will certainly blame the employer. Many employees when asked either don't remember, don't believe in your commitment, or don't actually receive safety education.

Also remember that specialized training is required by OSHA for several work operations, and is likely to increase in the future. Employees are to be trained in operating procedures, safe work practices and emergency response/control measures by a qualified instructor. Therefore, an ongoing program of formal or informal training with written records, safety notices in paychecks or posted, and prominent safety programs will convince the doubting or confused employee of your commitment to safety. In addition, employees are to be trained to perform their work in a safe and environmentally sound manner. Hazardous chemicals in particular require safety training as the hazards are not always visible. Storage, handling, transportation, spills, disposal, amounts used, toxicity or other harmful effects, warning signs, supervision, training, protective clothing and equipment. For workplaces that may possible contain or develop Hydrogen Sulfide gas, specialized training must be done on H2S hazards. For those situations that require it, training shall include any site specific safety and environmental procedures as well as rules pertaining to the facility and emergency action plans.

SEMS

Employees may not always adequately retain the knowledge or skills derived from training. Therefore, scheduled and ad hoc periodic refresher training to employees in order to maintain adherence to operating procedures is required. Supervisors need to be aware of and recognize workers who are not acting in a manner consistent with a trained employee in that situation. In such cases, verification of the employee's retention of the required skills and knowledge needed to perform tasks shall be evaluated, and retraining conducted if necessary.

Mechanical Integrity

Equipment shall be designed, fabricated, installed, tested, inspected, monitored, and maintained in a manner consistent with appropriate service requirements, manufacturer's recommendations, and industry standards to promote safe and environmentally sound operations.

Investigation of Incidents

Investigation of any accident is an important management tool for controlling accidents and their related costs. If something is not learned from an accident, it is a total loss. Something causes accidents. The reasons or basic root causes must be determined. The information that is learned can be used to improve the operation involved and make it more safe and efficient. It is, therefore, a policy of VRC Protx that the foreman (or RSO) investigates all injuries requiring a visit to a physician, clinic or hospital and any property damage incidents or near misses that had the potential to result in an accident.

However, even if no report is submitted, all incidents, including "near misses," should be questioned using the same investigative techniques in order that corrective action may be taken to prevent a similar incident from occurring. Accidents are usually the result of conditions or actions that the supervisors and employees are often in the best position to control. An accident is simply an unplanned event that interrupts operations and results in loss of time, property damage or bodily injury.

Audits

This SEMS program shall audited at least once every 3 years by either the RSO, or another qualified person designated within the company. A knowledgeable and experienced auditor would audit the SEMS program to determine if VRC Protx is complying with the SEMS plan.

These audits would be conducted in an office environment and/or in the field, and cover both a broad range of activities or be focused on a particular area (e.g., records, gas compressors, blowout preventers, or documentation) as appropriate.

Asbestos Awareness

VRC Protx is subject to the OSHA asbestos regulations because we have employees. Regardless of whether or not we work in an asbestos-containing building, we also have specific responsibilities to protect our employees from asbestos hazards which may be present at any site where they work. Exposure to asbestos has been shown to cause lung cancer, asbestosis, mesothelioma, and cancer of the stomach and colon.

Some of our workers may clean-up dust and debris after work that involved disturbance or removal of VAT, asbestos-containing mastics, thermal system insulation, surfacing material, or other asbestos-containing materials. Our employees' clean-up work is classified as Class IV construction activity under the OSHA Asbestos Standards, if the work is the result of Class I, II, or III construction activity.

There are many possible locations where employees may be exposed to Asbestos during their job functions. Asbestos materials are used in the manufacture of heat-resistant clothing, automotive brake and clutch linings, and a variety of building materials including insulation, soundproofing, floor tiles, roofing felts, ceiling tiles, asbestos-cement pipe and sheet, and fire-resistant drywall. Asbestos is also present in pipe and boiler insulation materials, pipeline wrap and in sprayed-on materials located on beams, in crawlspaces, and between walls.

VRC Protx has responsibilities to take specific actions to protect the health and safety of these workers whenever they are engaged in such activity, even though the work which resulted in the dust and debris was performed by other workers. Our obligations include the following items in all cases. The Director of Safety will assign a competent person which must supervise all Class IV jobs involving contact with and clean-up of asbestos-containing materials. A competent person is an employee who has received specialized training to identify asbestos hazards, to select the best control strategy, and to take prompt action to correct or eliminate problems. The competent person who supervises Class IV work must receive training equivalent to EPA's 16 hours of operations and maintenance training and annual refresher training. Training must focus on the locations of suspect materials, work practices, job assessment, and methods of control. All asbestos awareness training shall be documented, and the records available to employees, employees representatives, and site owners where employees are working. Training records shall be kept by and obtained from the RSO, Director of Safety.

An exposure assessment must be conducted to determine whether or not airborne asbestos fibers in excess of the permissible exposure limits may be present. Air monitoring will be required unless a negative exposure assessment is obtained.

Asbestos may be friable or non-friable. Friable means that the material can be crumbled with hand pressure and is therefore likely to emit fibers. The fibrous or fluffy sprayed-on materials used for fireproofing, insulation, or sound proofing are considered to be friable, and they readily release airborne fibers if disturbed. Materials such as vinyl-asbestos floor tile or roofing felts are considered non-friable and generally do not emit airborne fibers unless subjected to sanding or sawing

Asbestos Awareness

operations. Asbestos-cement pipe or sheet can emit airborne fibers if the materials are cut, abraded or sawed, or if they are broken during demolition operations.

VRC Protx will provide employees whose work activities may contact Asbestos Containing Material (ACM) or Presumed Asbestos Containing Material (PACM) but do not disturb the ACM or PACM during their work activities with asbestos awareness training initially, and each year thereafter. The course must cover the health effects of asbestos exposure, the hazards of smoking and asbestos, use of respirators, locations of asbestos materials and signs of their damage, and who to tell and what to do if such materials are dislodged or become non-intact.

Workers who do asbestos construction clean-up work must receive annual asbestos hazard awareness training. Smoking is not allowed in the work area. Wet methods or wetting agents (unless not feasible) and appropriate work practices must be followed. HEPA vacuums must be used. Prompt clean-up and disposal of debris in leak-proof containers is required.

The following work practices are prohibited: use of high speed abrasive disk saws without HEPA filtered exhausts or point-of-cut ventilator, use of compressed air without capture device, dry sweeping/shoveling or other dry clean-up, and employee rotation to circumvent permissible exposure limits.

Signs and labels shall identify the material which is present, its location, and appropriate work practices which, if followed, will ensure that Asbestos Containing Material (ACM) and/or Presumed Asbestos Containing Material (PACM) will not be disturbed. The employer shall ensure that employees working in and adjacent to regulated areas comprehend the warning signs.

Medical surveillance is required for all workers doing Class IV work who are exposed to asbestos above the PEL's for 30 or more days per year. The 30-day requirement excludes days in which less than one hour is spent in Class III work when required work practices are followed.

In addition to these requirements (applicable to all Class IV work) VRC Protx may have additional requirements for Class IV work (listed in the next section of this report) depending on whether or not an exposure assessment indicates the likelihood that airborne asbestos fiber concentrations will be above or below the permissible exposure limits.

Additional Guidance for Class IV work where the PEL is likely to be exceeded

For workers who clean-up any job where the exposure assessment indicates the possibility that airborne asbestos fibers may exceed the permissible exposure limits of 0.1 fibers per cubic centimeter of air over an 8 hour period or 1 fiber per cubic centimeter of air averaged over a 30 minute period (as time-weighted averages):

Periodic exposure monitoring: Employee exposure monitoring (which represents full-shift exposures) must be conducted at the work area to determine accurately the airborne asbestos fiber concentrations. Monitoring may be discontinued if it shows asbestos fiber concentrations less than the permissible exposure limits (PELs).

Asbestos Awareness

Respirators: Negative-pressure air purifying respirators (quarter- or half-face types) or higher levels are required. Protective clothing: we must provide appropriate protective work clothing and equipment at no cost to the employee. Decontamination procedures: Work clothing must be HEPA vacuumed and equipment decontaminated on a plastic dropcloth; if Class IV clean-up takes place in a regulated area, the clean-up must comply with the hygiene required in a higher classification of asbestos work.

A regulated area must be established. It must be demarcated in any manner that minimizes the number of persons in the area and protects persons outside the area from exposure to airborne asbestos. Signs must be provided and displayed. Medical surveillance is required for all workers doing Class IV work who are exposed to asbestos above the PELs for 30 or more days per year. The 30-day requirement excludes days in which less than one hour is spent in Class III work when required work practices are followed. When working on multi-contractor worksites, employees shall be protected from exposure. Employees working immediately adjacent to a Class I asbestos jobs who may be exposed to asbestos due to the inadequate containment of such job, VRC Protx shall either remove the employees from the area until the enclosure breach is repaired; or perform an initial exposure assessment pursuant to 1926.1101(f).

Our employees may be exposed to asbestos hazards under circumstances covered by the OSHA General Industry Asbestos Standard. This involves work that is not related to construction activities defined by the four classes of asbestos construction work described in 29 CFR1926.1101. The General Industry Asbestos Standard is found in 29 CFR 1910.1001. Routine housekeeping activities during which employees contact or work in close proximity to accessible asbestos is an important example of work covered by the General Industry Standard. Accessible asbestos is any known or presumed asbestos containing material that is not sealed or enclosed or maintained in an intact condition that makes release of airborne asbestos fibers unlikely. The following summarizes the requirements of the General Industry Standard:

Lead Awareness

Lead Awareness/ Management Safety Program

Lead Awareness

Most lead over-exposures in the construction industry are found in the trades such as plumbing, welding and painting. In building construction, lead is frequently used for roofs, cornices, tank linings and electrical conduits. In plumbing, an alloy of lead/tin had been used extensively for soldering tin-plate and pipe joints. Use of lead solders in plumbing systems is now prohibited by law. Lead-based paint had also been used extensively for residential and commercial applications but has been banned for residential use by the Consumer Product Safety Commission. Lead-based paint may still be used on metal structures (bridges, railways, beams, etc.) to prevent corrosion, although substitute coatings are now available. In other industries, lead may be found in batteries, circuit boards, cathode ray tubes, and leaded glass.

Significant lead exposures can arise during stripping or demolition/ salvage of structures containing lead-based paint. The types of work with the greatest potential for lead exposure include iron work, demolition, painting, plumbing, electrical, lead-based paint abatement, heating/air conditioning and carpentry/renovation activities.

Unless working in a relatively new building (built since 1980), all paint should be treated as lead containing unless sampling shows otherwise.

Disturbance is defined as scraping, washing, limited wet sanding, grinding, welding, drilling, small surface cutting for installation of equipment, repainting activities, cleaning activities, and minor surface modifications.

On Multi-Employer worksites, if our employees who are working immediately adjacent to a lead abatement activity are exposed to lead due to the inadequate containment of such job, VRC Protx shall either remove the employees from the area until the enclosure breach is repaired or perform an initial exposure assessment.

Employees are prohibited from disturbing lead-containing, or presumed lead-containing materials. If an employee should accidentally contact such materials, the employees' hands and faces should be washed immediately.

Employees must abide by any signs/labels/assessment reports indicating the presence of lead containing materials. Appropriate work practices should be followed to ensure the lead containing materials are not disturbed.

• All employees with potential exposure to lead must receive training. VRC Protx's employees shall be informed of Appendices A & B of the regulation. All affected employees are required to attend initial and annual training programs. The employees should be informed of the specific nature of the operations which could result in exposure to lead above the action level, the purpose, proper selection, fitting, use, and limitation of respirators, engineering controls, purpose & a description of the medical surveillance program & the medical removal program.

Health Hazards

Health effects from lead exposure continue to be a concern both at the workplace and in the home. Since the ban on lead in gasoline, lead levels detected in areas near roadways have decreased dramatically; however, lead based paint used in buildings and housing prior to 1980 continue to

Lead Awareness

serve as significant sources of exposure.

Some common symptoms of acute lead poisoning are loss of appetite, nausea, vomiting, stomach cramps, constipation, difficulty in sleeping, fatigue, moodiness, headache, joint or muscle aches, and anemia. Long term (chronic) overexposure to lead may result in severe damage to the blood-forming, nervous, urinary, and reproductive systems.

Lead poisoning can result from a single high level (acute) exposure or through a number of smaller repetitive (chronic) exposures. Most adults are exposed to lead through occupational sources, while children and infants are exposed primarily through surface dust and soil. Floors, chewable surfaces and soil contaminated with lead serve as primary exposure sources for children.

Lead has no beneficial effect on humans. Once it has been ingested into the body, lead is distributed in the bloodstream to red blood cells, soft tissues and bone. Lead in the body is eliminated very slowly, mainly by the kidneys and digestive tract. Irreversible kidney damage may have already developed by the time high blood lead levels are identified and treated, making avoidance to exposure and medical surveillance extremely important.

Acute lead poisoning symptoms usually include abdominal pain as in a gall bladder attack or appendicitis. Other non-specific complaints include irritability, fatigue, weakness and muscle pain. In rare instances, damage to the brain and central nervous system also may occur. Chronic lead poisoning may result after lead has accumulated over time in the body and has been deposited mostly in the bone.

Stored lead in the bone may be released to the blood stream to produce health effects such as defective hemoglobin synthesis, nervous system abnormalities, hypertension, effects in the reproductive system (including impotency) and damage to a developing fetus.

The measurement of blood lead level is the most reliable method of evaluating lead exposure. It indicates the amount of lead in the bloodstream, which is often a measure of recent exposure to lead. The present "level of concern" in children is ten micrograms of lead per deciliter of blood (10 μg/dl). The level of concern for adult workers, as established by OSHA, is 40 μg/dl.

Health Hazard Data

A. Ways in which lead enters your body.

When absorbed into your body in certain doses lead is a toxic substance. The object of the lead standard is to prevent absorption of harmful quantities of lead. The standard is intended to protect you not only from the immediate toxic effects of lead, but also from the serious toxic effects that may not become apparent until years of exposure have passed.

Lead can be absorbed into your body by inhalation (breathing) and ingestion (eating). Lead (except for certain organic lead compounds not covered by the standard, such as tetraethyl lead) is not absorbed through your skin. When lead is scattered in the air as a dust, fume or mist it can be inhaled and absorbed through you lungs and upper respiratory tract. Inhalation of airborne lead is generally the most important source of occupational lead absorption. You can also absorb lead through your digestive system if lead gets into your mouth and is swallowed. If you handle food, cigarettes, chewing tobacco, or make-up which have lead on them or handle them with hands contaminated with lead, this will contribute to ingestion.

A significant portion of the lead that you inhale or ingest gets into your blood stream. Once in your blood stream, lead is circulated throughout your body and stored in various organs and body tissues. Some of this lead is quickly filtered out of your body and excreted, but some remains in the blood and other tissues. As exposure to lead continues, the amount stored in your body will increase

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if you are absorbing more lead than your body is excreting. Even though you may not be aware of any immediate symptoms of disease, this lead stored in your tissues can be slowly causing irreversible damage, first to individual cells, then to your organs and whole body systems.

B. Effects of overexposure to lead

(1) Short term (acute) overexposure.

Lead is a potent, systemic poison that serves no known useful function once absorbed by your body. Taken in large enough doses, lead can kill you in a matter of days. A condition affecting the brain called acute encephalopathy may arise which develops quickly to seizures, coma, and death from cardiorespiratory arrest. A short term dose of lead can lead to acute encephalopathy. Short term occupational exposures of this magnitude are highly unusual, but not impossible. Similar forms of encephalopathy may, however, arise from extended, chronic exposure to lower doses of lead. There is no sharp dividing line between rapidly developing acute effects of lead, and chronic effects which take longer to acquire. Lead adversely affects numerous body systems, and causes forms of health impairment and disease which arise after periods of exposure as short as days or as long as several years.

(2) Long-term (chronic) overexposure.

Chronic overexposure to lead may result in severe damage to your blood-forming, nervous, urinary and reproductive systems. Some common symptoms of chronic overexposure include loss of appetite, metallic taste in the mouth, anxiety, constipation, nausea, pallor, excessive tiredness, weakness, insomnia, headache, nervous irritability, muscle and joint pain or soreness, fine tremors, numbness, dizziness, hyperactivity and colic. In lead colic there may be severe abdominal pain.

Damage to the central nervous system in general and the brain (encephalopathy) in particular is one of the most severe forms of lead poisoning. The most severe, often fatal, form of encephalopathy may be preceded by vomiting, a feeling of dullness progressing to drowsiness and stupor, poor memory, restlessness, irritability, tremor, and convulsions. It may arise suddenly with the onset of seizures, followed by coma, and death. There is a tendency for muscular weakness to develop at the same time. This weakness may progress to paralysis often observed as a characteristic "wrist drop" or "foot drop" and is a manifestation of a disease to the nervous system called peripheral neuropathy.

Chronic overexposure to lead also results in kidney disease with few, if any, symptoms appearing until extensive and most likely permanent kidney damage has occurred. Routine laboratory tests reveal the presence of this kidney disease only after about two-thirds of kidney function is lost. When overt symptoms of urinary dysfunction arise, it is often too late to correct or prevent worsening conditions, and progression to kidney dialysis or death is possible.

Chronic overexposure to lead impairs the reproductive systems of both men and women. Overexposure to lead may result in decreased sex drive, impotence and sterility in men. Lead can alter the structure of sperm cells raising the risk of birth defects. There is evidence of miscarriage and stillbirth in women whose husbands were exposed to lead or who were exposed to lead themselves. Lead exposure also may result in decreased fertility, and abnormal menstrual cycles in women. The course of pregnancy may be adversely affected by exposure to lead since lead crosses the placental barrier and poses risks to developing fetuses. Children born of parents either one of whom were exposed to excess lead levels are more likely to have birth defects, mental retardation,

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behavioral disorders or die during the first year of childhood.

Overexposure to lead also disrupts the blood-forming system resulting in decreased hemoglobin (the substance in the blood that carries oxygen to the cells) and ultimately anemia. Anemia is characterized by weakness, pallor and fatigability as a result of decreased oxygen carrying capacity in the blood.

(3) Health protection goals of the standard.

Prevention of adverse health effects for most workers from exposure to lead throughout a working lifetime requires that worker blood lead (PbB) levels be maintained at or below forty micrograms per one hundred grams of whole blood (40 μg/100g). The blood lead levels of workers (both male and female workers) who intend to have children should be maintained below 30 μg/100g to minimize adverse reproductive health effects to the parents and to the developing fetus.

The measurement of your blood lead level is the most useful indicator of the amount of lead being absorbed by your body. Blood lead levels (PbB) are most often reported in units of milligrams (mg) or micrograms (ug) of lead (1 mg=1000 ug) per 100 grams (100g), 100 milliters (100 ml) or deciliter (dl) of blood. These three units are essentially the same. Sometime PbB's are expressed in the form of mg% or ug%. This is a shorthand notation for 100g, 100 ml, or dl. PbB measurements show the amount of lead circulating in your blood stream, but do not give any information about the amount of lead stored in your various tissues.

PbB measurements merely show current absorption of lead, not the effect that lead is having on your body or the effects that past lead exposure may have already caused. Past research into lead-related diseases, however, has focused heavily on associations between PbBs and various diseases. As a result, your PbB is an important indicator of the likelihood that you will gradually acquire a lead-related health impairment or disease.

Once your blood lead level climbs above 40 μg/100g, your risk of disease increases. There is a wide variability of individual response to lead, thus it is difficult to say that a particular PbB in a given person will cause a particular effect. Studies have associated fatal encephalopathy with PbBs as low as 150 μg/100g. Other studies have shown other forms of diseases in some workers with PbBs well below 80 μg/100g. Your PbB is a crucial indicator of the risks to your health, but one other factor is also extremely important. This factor is the length of time you have had elevated PbBs. The longer you have an elevated PbB, the greater the risk that large quantities of lead are being gradually stored in your organs and tissues (body burden). The greater your overall body burden, the greater the chances of substantial permanent damage.

The best way to prevent all forms of lead-related impairments and diseases-both short term and long term- is to maintain your PbB below 40 μg/100g. The provisions of the standard are designed with this end in mind. VRC Protx has prime responsibility to assure that the provisions of the standard are complied with both by the company and by individual workers. You as a worker, however, also have a responsibility to assist your employer in complying with the standard. You can play a key role in protecting your own health by learning about the lead hazards and their control, learning what the standard requires, following the standard where it governs your own actions, and seeing that your employer complies with provisions governing his actions.

(4) Reporting signs and symptoms of health problems.

You should immediately notify your supervisor or RSO, Director of Safety if you develop

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signs or symptoms associated with lead poisoning or if you desire medical advice concerning the effects of current or past exposure to lead on your ability to have a healthy child. You should also notify your supervisor or RSO if you have difficulty breathing during a respirator fit test or while wearing a respirator. In each of these cases VRC Protx must make available to you appropriate medical examinations or consultations. These must be provided at no cost to you and at a reasonable time and place.

Training

All VRC Protx employees involved in the disturbance of lead-containing materials or lead based paint as part of regular work activities must have at least a lead awareness training class. For employees whose work activities may contact lead containing materials but do not disturb the material during their work activities, VRC Protx will provide an introductory level lead awareness class for employees involved in non-abatement activities at time of hire, during orientation, or before assignment to areas containing lead. VRC Protx may also choose to cover lead hazards during their Worker Right to Know training. Typical job classifications needing awareness training would include painters, carpenters, welders, electricians, plumbers and general maintenance personnel. Documentation of training shall include at a minimum: dates of training, employee name, and trainer name. Employees involved in lead abatement activities must receive more extensive EPA approved lead abatement worker and/or supervisor level training. In all cases, refresher training shall be given annually.

Abrasive Blasting Operations

Pure hydrogen fluoride is a clear, colorless, corrosive liquid that has roughly the same weight as water (comparing equal volumes). It boils at 67 degrees Fahrenheit and, depending on the release conditions, can form a vapor cloud if released to the atmosphere. It has a sharp, penetrating odor that human beings can detect at very low concentrations (0.04-0.13 ppm(1), in the air. It is completely soluble in water, in which it forms HF, which, in concentrated solutions, vaporizes in air to form a noticeable cloud.

Hydrofluoric acid (HF) is a highly corrosive liquid and is a contact poison. It should be handled with extreme care (i.e., beyond what is generally required to handle other mineral acids). Owing to its low dissociation constant, HF as a neutral lipid-soluble molecule penetrates tissue more rapidly than typical mineral acids. Because of the ability of hydrofluoric acid to penetrate tissue, poisoning can occur readily through exposure of skin or eyes, or when inhaled or swallowed. Symptoms of exposure to hydrofluoric acid may not be immediately evident. HF interferes with nerve function, meaning that burns may not initially be painful. Accidental exposures can go unnoticed, delaying treatment and increasing the extent and seriousness of the injury.

HF is a calcium seeker. A person can't sense when it comes in contact with the skin, but it dissolves the calcium in the bone. HF burns are not evident until a day later. If not stored, handled and disposed of properly, HF can pose a serious threat to the health and safety of personnel, emergency responders and waste handlers. Hence, it is important to thoroughly understand the properties of HF and follow all safety protocols to properly store and handle HF.

HF is used for many purposes (etching glass, dilute hydrofluoric acid is a component of household rust stain remover and in car washes in "wheel cleaner" compounds). Because of its ability to dissolve iron oxides as well as silica-based contaminants, hydrofluoric acid is used in pre-commissioning boilers that produce high-pressure steam. In the petroleum industry, refineries use the acid in a manufacturing process called "alkylation," which is increasingly important in producing a high-quality gasoline. The HF alkylation unit should be distinctively marked at all points of entry. Such markings should warn people that HF is present, that access is strictly limited to authorized employees only, and that protective clothing is required. Hydrofluoric acid is hazardous and corrosive and, if accidently released, can form a vapor cloud. If the vapor cloud is concentrated enough it can be toxic until sufficiently dispersed.

Because of its extreme danger, all personnel should receive at a minimum an overview on the hazards of HF, including medical treatment of burns, where the chemical is located on site, and what to do in the unlikely event that a release has occurred. Note that once HF contacts the skin, enough damage can occur to cause death. It's vitally important to understand the extreme danger of contact with HF.

Personal Protective Equipment while useful, is still to be considered the last line of defense. Other controls, such as administrative controls, and engineering controls should be used, but if there's still a danger of contact with HF, then PPE must be used. Proper PPE must be available for all personnel who work in or enter an HF alkylation unit for any reason. Respirators should be used

Hydrofluoric Acid Program

only under any of the following circumstances: As a last line of defense (i.e., after engineering and administrative controls have been exhausted), when Permissible Exposure Limit (PEL) has exceeded or when there is a possibility that PEL will be exceeded, regulations require the use of a respirator, an employer requires the use of a respirator, there is potential for harmful exposure due to an atmospheric contaminant (in the absence of PEL), or as PPE in the event of a chemical spill clean-up process. Hand Protection will consist of natural rubber arm length or heavy duty nitrile arm length gloves. Note: These types of gloves must be put on over the inner Butyl Viton gloves/disposable nitrile gloves. Gloves must be inspected prior to each use. Use proper glove removal technique (without touching outer surface of the gloves) to avoid skin contact with HF on the contaminated gloves. Dispose of inner nitrile gloves after use as hazardous waste. *Inner Butyl Viton gloves can be reused carefully (i.e., without touching the outer surface of the gloves). Wash hands thoroughly with warm water and soap. NOTE: consult with your preferred glove manufacturer to ensure that the gloves you plan on using are compatible with Hydrofluoric acid. Eye Protection shall consist of tightly fitting safety goggles & face shield (ANSI approved). Skin and body protection may be a natural rubber apron, full-length pants, and closed-toe rubber or leather shoes. Designated areas and facilities should be provided for neutralization, cleaning, and storage of all protective clothing. Since protective clothing is acid resistant, not acid proof, it should be washed and neutralized immediately after any contact with HF.

All protective equipment, including new clothing, should be inspected per the manufacturer's suggested guidelines before use. Procedures should be developed for inspection, testing, and replacement of protective clothing and equipment. Testing of gloves and inspection of boots should be done before each use.

First Aid

Personnel trained in HF first aid and knowledgeable about the specific health effects of HF should be available on all shifts.

If inhaled, move to fresh air. If the person is not breathing, give artificial respiration. Avoid mouth to mouth contact. In case of skin contact immediately (within seconds) flush affected area for at least 15 minutes. Remove all contaminated clothing. Call 911 or site emergency number. Wearing compatible gloves, massage calcium gluconate gel into the affected area. Re-apply every 15 minutes until medical help arrives. Note: Hydrofluoric acid exposure is often treated with calcium gluconate, a source of Ca^{2+} that sequesters the fluoride ions. HF chemical burns can be treated with a water wash and 2.5% calcium gluconate gel, or special rinsing solutions. However, because it is absorbed, medical treatment is necessary; rinsing off is not enough. Intra-arterial infusions of calcium chloride have also shown great effectiveness in treating burns. In some cases, amputation may be required.

Suitably equipped first-aid kits should be readily available in HF alkylation units and other areas of the refinery where HF may be present. In case of eye contact use Calgonate Emergency Eyewash immediately. Do not open the Calgonate Emergency Eyewash Solution container seal, unless needs to be used. Use the entire 120 ml content during an emergency (eye exposure). Calgonate Emergency Eyewash Solution is for single use only. If swallowed DO NOT INDUCE VOMITING. Give large quantities of milk (preferable) or water. Never give anything by mouth to an unconscious person. Again, Call 911 or site emergency number.

Subcontractor Management Plan

Subcontractor Management Plan

Program Overview

The subcontractor shall have a comprehensive written safety and health program. All employees shall understand basic element of this program prior to assignment to the project.

The subcontractor's safety plan, depending on scope of their work should address the following elements:

- Safety Policy
- Control Measures
- Safety Inspections/Audits
- Disciplinary Program
- Training Policy
- Project Site Employee Orientation Program
- Recordkeeping Policy
- Accident/Exposure and investigations policy
- Emergency Action Plan
- Site-Specific medical Emergency plan
- Hazard Communication Program
- Written Trenching and Shoring Plan (if applicable)
- Written 100% Fall Protection Plan
- Personal Protective Equipment

Site Specific Safety Plan

Subcontractors are required to submit their site-specific safety plan (SSSP) prior to the pre-construction meeting. In addition, their safety and health plan is reviewed by our Director of Safety to assure that they meet the requirements of the site safety and risk control expectations. A subcontractor safety meeting will be held before initiating project work. This meeting is to review project requirements for safety and risk control. The subcontractor's safety officer and designated supervisor and any other necessary subcontractor's representatives shall attend the meeting. [3] In addition, subcontractors will be included in any tool box talk safety meetings, job safety analysis (JSA's), jobsite safety inspections, and any pre-job meetings or safety orientations with the site owner.

The subcontractor shall present project-specific safety requirements, including a review of various roles and responsibilities of personnel, an initial overview of project risks, and elements of hazard control/ countermeasures appropriate to potential exposures.

Subcontractor Training Requirements

Subcontractor training records may be maintained electronically and/or on site in the job site office. These records shall be available to VRC Protx, the site owner, and government agencies upon request.

The subcontractor shall conduct a project specific safety orientation for all subcontractor

Subcontractor Management Plan

personnel who work on the project before the personnel are allowed to perform any work.

Subcontractor Incident Reporting

The subcontractor's foreman or superintendent must ensure that all incidents are reported to VRC Protx as soon as possible, but in no case more than four hours of the occurrence. The subcontractor's foreman or superintendent will follow up any verbal report with a copy of the subcontractor's incident report. Included with this report shall be any monitoring or corrective action plans. Copies of all incidents reported, including near misses, must be maintained on site.

Upon completion of a job, VRC Protx shall conduct a post-job safety performance review of the subcontractor. This review shall be made available to the Director of Safety, and the site owner's representative.

Subcontractor Prequalification

Project procurement procedures require that all subcontractors submit prequalification documentation for evaluation. Subcontractors will be pre-qualified by reviewing their safety programs, safety training documents, and safety statistics. Acceptable safety metrics are an affirmative answer to those questions which are applicable to the subcontractor (see Subcontractor Qualification Scorecard) and average or better scores under OSHA Information (see OSHA Information Sheet) and will be used as criteria for selecting subcontractors. VRC Protx conducts the safety prequalification evaluation in accordance with the subcontractor prequalification process and scorecard form (included).

Subcontractor Management Plan

Subcontractor Qualification Scorecard

Subcontractor Name:_____

Please answer the following questions.

1. ___ Yes ___ No Do you have a written safety program? If yes, provide a copy of the table of contents and a copy of your firm's policy statement.
2. ___ Yes ___ No Do you require and use site-specific safety plans?
3. ___ Yes ___ No Do you have clearly defined safety responsibilities for managers, supervisors and workers?
4. ___ Yes ___ No Do managers/executives visit the worksite? How often? Provide details.

   _____
5. ___ Yes ___ No Does your company have a written drug/substance abuse policy?
6. ___ Yes ___ No Do you have an orientation program for new hires?
7. ___ Yes ___ No Do you conduct daily site safety inspections?
8. ___ Yes ___ No Do you have a disciplinary policy and procedure?
9. ___ Yes ___ No Do you hold site safety meetings for field workers & supervisors?

   How often? Weekly ___ Biweekly ___ Monthly ___ Daily _____
10. ___ Yes ___ No Do you have special work procedures in place for critical or potentially high hazard jobs?
11. ___ Yes ___ No Do you have Personal Protective Equipment standards in place?
12. ___ Yes ___ No Do you have Emergency Action Plans in place for your worksites?
13. ___ Yes ___ No Do you have Joint Health and Safety Committee meetings?
14. ___ Yes ___ No Do you have a pre-job planning process (JSA, JHA, on-job hazard assessment)?
15. ___ Yes ___ No Do you have an accident and incident reporting system in place?
16. ___ Yes ___ No Do you have a procedure in place to investigate and follow-up on accidents and incidents?
17. ___ Yes ___ No Have you received any OSHA citations in the past 3 years? If yes, provide an attachment describing the outcome of the inspection along with copies of citations received. Provide a description of the actions taken for any open citations.
18. ___ Yes ___ No Do you have a designated Competent Person on the project site?

Subcontractor Management Plan

OSHA INFORMATION:

*Please use your OSHA 300 Log to fill in the number of injuries and illnesses for the last 3 years

Year	1	2	3
Number of lost days/ restricted workday cases (Totals OSHA 300 Log, columns H and I).			
Days Away, Restricted, Transferred (DART) Rate Multiply total lost days/ restricted workday cases (Totals OSHA 300 Log, columns H and I) x 200,000 and divide by total employee hours for that year. (Col's. H+I) x 200,000 / Total Employee Hours			
Number of other recordable cases (Total OSHA 300 Log, column J).			
Number of fatalities (Totals OSHA 300 Log column G).			

Total employee hours worked in the last 3 years (do not include any non-work time, even though paid)

Year	Hours
1	_____
2	_____
3	_____

Total Recordable Injury Rate (TRIR)

Multiply total Recordable Cases (Col's H+I+J) x 200,000 and divide by total employee hours for that year.

$$\frac{\text{(Col's. H+I+J) x 200,000}}{\text{Total Employee Hours}}$$

Year	Rate
1	_____
2	_____
3	_____

Experience Modification Rate (EMR)

Policy Year	EMR
1	_____
2	_____
3	_____

Are the following accident records and accident summaries kept? How often are they recorded?

	No	Yes	Monthly	Annually
Accidents totaled for the entire company	_____	_____	_____	_____
Accidents totaled by project	_____	_____	_____	_____

The Applicant shall maintain records of such evaluations and make them available for review and approval of Contractor's and site owner's representatives at all reasonable times, should Applicant be awarded a contract based on this application.

By submitting this application, the Applicant agrees to use the above criteria and this form when selecting lower tier subcontractors.