

SAFETY STATEMENT BY THE PRESIDENT

TO: All Employees
FROM: The Management Team of Moran Iron Works, Inc.
RE: Work Safety Policy

The management team of **Moran Iron Works, Inc.** cares about the safety of its employee's, and has recognized a need to reinforce the awareness of job safety and performance. We want to stress that we believe that our most important assets leave and go home every night –YOU. You contribute to the overall success this company endures an accident, whether on-the-job or at home, affects the performance of this company. Therefore, we have made a commitment to promote and support safe working conditions by continuously improving, and updating our company policies and keeping current with nationally set standards.

Adequate training of personnel on the operation of equipment and maintenance will be instituted during regularly scheduled safety meetings.

It takes every one of us on a daily basis to ensure that we maintain a safe work environment. Please assist us in our goal by following the suggestions listed below.

- Make suggestions that will assist in safety performance.
- Notify your supervisor of any unsafe conditions.
- Report all injuries to your supervisor, document the events, and if necessary have them treated promptly.
- Always act and work safely on and off of the job.
- Watch fellow employees. Their safe work habits protect you also.
- **Think Safety**—“Accidents are caused, they don't just happen.”

Accident prevention is good business. We will promote job safety through education, communication, training, safety incentives, and if necessary disciplinary action. We all have a part in this, so let us work together.

Sincerely,



THOMAS MORAN

SAFETY & HEALTH POLICY

Safety is the Important means of preventing accidents and injuries.

A preventative program applied proactively, has some principle determining factors that when combined, creates an environment in which our employees feel self-assured and secure in the workplace. These factors are customized, periodic training sessions, routine and individual inspections, a clean, orderly work area, and knowing the importance and having the ability to personally prioritize your needs to be able to give your best everyday.

Regularly scheduled training sessions are necessary because it compels us to evaluate our surroundings, equipment, and techniques.

Customer or industry specific safety procedures and requirements will be adopted in order to comply with those instances as they arise. These requirements will be adopted as our own in our continuing effort to improve this policy.

When any work is done outside our immediate facility, regular “Tool Box” talks will be conducted to ensure that safety consciousness is on everyone’s mind.

Auditing ourselves to make sure, we comply with nationally set standards and routinely performing inspections on tools, equipment, and machinery by both our safety personnel and on an individual basis assists in the prevention of accidents.

Nothing else can say more about a company and its employees than a clean work area. Not only does cleanliness keep the work areas free from debris and other hazardous obstacles, but also it shows that the employees value their place of work.

Acknowledging the need to take care of yourself is essential.

Some aspects that can dramatically affect your ability to concentrate on the job are being well rested, maintaining a healthy diet, and managing both the good and bad stresses in your life. If one or all of these factors are out of balance, you are becoming more and more distracted, whether intentionally or unintentionally.

SAFETY & HEALTH POLICY

These decisions may potentially endanger your co-workers as well, and it's not worth it. Keep in mind, **Safety is everyone's responsibility.**

Providing and displaying safety in the workplace and out in the field demonstrates our commitment to safety; therefore strengthening our reputation as one we intend to be highly regarded for its dependability and consistency towards excellence.

ANTI-HARASSMENT POLICY

It is the intent of **Moran Iron Works, Inc.** to provide its employees with an environment, which encourages efficient, productive, and creative work; therefore, any sexual or other forms of illegal harassment are unacceptable and will not be tolerated. Verbal or physical conduct by any employee, which harasses, disrupts, or interferes with another's work performance or which creates an intimidating; offensive or hostile environment will result in an immediate investigation. If warranted, appropriate corrective action will be taken. All employees are responsible for complying with and enforcing this policy.

Sexual harassment refers to any unwelcome sexual advances, requests for sexual favors and other verbal or physical conduct or communication of a sexual nature when:

- Submission to such conduct or communication is made either or implicitly a condition of employment.
- Submission to or rejection of such conduct or communication is used as the basis for decisions affecting another's employment.
- Such conduct or communication has the purpose or effect of unreasonably interfering with another's work performance or has the purpose or effect of creating an intimidating, hostile, or offensive work environment.

Examples of sexual harassment include, but are not limited to, threatening adverse action if sexual favors are not granted, promising preferential treatment in return for sexual favors, unwelcome sexual advances, unnecessary physical contact, and offensive remarks, including unwelcome comments about appearance, obscene suggestive objects, or pictures.

Other forms of illegal harassment refers to any verbal or physical conduct or communication that shows hostility or aversion toward another because of his / her race, national origin, religion, age, etc. and any written material that is posted or displayed at work that shows hostility or aversion towards another.

Any individual who feels that he or she has been a victim of harassment should immediately notify your immediate supervisor.

ANTI-HARASSMENT POLICY

Moran Iron Works will investigate all reports of harassment promptly and take all necessary and appropriate corrective actions.

Upon investigation, any employee who is determined to have engaged in harassment in violation of this policy will be subject to appropriate disciplinary action, up to and including termination of employment.

Retaliation in any form against an individual who makes a report or who cooperates in an investigation of alleged harassment under this policy is also prohibited. Any employee who is determined to have retaliated against another will be subject to appropriate disciplinary action, up to and including termination of employment.

False accusations in regards to any complaint or reports concerning any form of illegal harassment will result in an immediate disciplinary action, up to and including termination of employment.

DRUG POLICY

The use of intoxicating beverages or illegal drugs on **JOBSITES**, or on the **PROPERTY** of Moran Iron Works, Inc, is ***ABSOLUTELY FORBIDDEN!***

SMOKING POLICY

Safety in the workplace cannot be carried or enforced by any one person. Everyone must make it a priority to participate in maintaining a safe, accident-free workplace. Therefore, when on the property of Moran Iron Works, Inc. the SMOKING POLICY shall be in effect for all employees.

SMOKING IS A HAZARD, and though there are many hazards in the workplace, this serves no purpose in the functionality of the workplace.

Smoking inside Moran Iron Works, Inc., may be done **PRIOR to the start of your shift and during LUNCH BREAKS** in the following designated areas:

- OUTSIDE ANY OF THE BUILDINGS
- MACHINE SHOP

During work hours, smoking will be in the designated areas and under the following circumstances:

- MACHINE ROOM
- OPERATING THE BURN TABLE
- OPERATING ANY SAW
- OPERATING THE SUB ARC WELDER
- ACTIVELY OPERATING THE CRANE **INSIDE** THE CAB

ANY, deviation from this policy may result in disciplinary action, which includes the following:

- VERBAL WARNING
- WRITTEN WARNING
- TIME OFF

ENVIRONMENTAL MANAGEMENT SYSTEM

Moran Iron Works, Inc. takes a pro-active approach to environmental management through company wide awareness and preservation of our existing surroundings by the following actions and programs.

- We have established a business contract with Crystal Clean Incorporated, which picks up and disposes of our waste barrel periodically throughout the year. Our waste barrel consists of any liquid contaminants that are not biodegradable and cannot be regarded as standard waste.
- We have an ongoing preventative maintenance program that encompasses all of our machinery, cranes, and shop vehicles. **Monthly** inspections on all motor vehicles and related equipment are done to ensure that spills and leaks are minimized.
- We have had several employees, including the owner, who have attended Asbestos and Lead awareness-training seminar that was conducted in accordance with the requirements of OSHA 29 CFR 1926.1101.
- Monthly safety meetings are held highlighting safe work practices, procedures, national standards, and key environmental matters that pertain to both shop and field work.

We are dedicated to continually improving our environmental management system and our employee awareness program, which assists in the conservation of our surrounding community.

FIRE EMERGENCY EVACUATION PLAN

Purpose:

To coordinate evacuation procedures for fires that may occur within our facilities.

Goals:

- A systematic and orderly evacuation.
- Accumulated list of numbers / persons to call near the phones.
- Testing of all announcement systems.
- Periodic reviews for fire prevention & extinguisher methods.

Upper Level Office & Engineering Department (Area M):

Once you have been notified of the fire, double check to make sure that the fire has been reported to the local fire departments (Onaway & Forrest Waverly). Remain clam and immediately close all filing cabinets, windows, and doors and turn off computers, copiers, etc.—time permitting. Exit the building and assemble in the front employee parking lot. Once assembled, your immediate supervisor will do a head count of all office personnel and then everyone will have to wait for further instructions.

Shops—Areas A, B, C, E, F, & K:

When anyone notices a fire and it cannot be controlled through the use of fire extinguishers in-house, immediately inform the owner, **Tom Moran**. He will proceed to announce on the loud speaker for everyone to evacuate the building. He will then call the appropriate emergency numbers. (I.e. 9-1-1, Onaway, and/or Forrest Waverly Fire Depts. Aurora Gas etc.) Notifying them of the situation.

REMAIN CALM and turn off all machinery, welders, computers, plasma tables and de-energize electrical panels—time permitting. Exit the building, having all shop personnel assemble in the employee parking lot outside the Shipping & Receiving Office and the Lunchroom.

Your immediate supervisors will proceed to take head counts of all shop personnel verifying everyone's whereabouts. Everyone will have to wait for further instructions once the fire department(s) arrive.

FIRE EMERGENCY EVACUATION PLAN

The Yard Attendant will be in charge of shutting down the propane tank located outside of the machine shop. Shut it down and return to the employee parking lot so an accurate head count can be taken.

Shipping & Receiving & Adjoining Back Offices (Area D):

REMAIN CALM and turn off all computers and fax machines, and close all windows and doors. Exit the offices and assemble in the employee parking lot outside the Shipping & Receiving office and Lunchroom. Wait for further instructions and stay in the designated area so an accurate head count can be done.

Tool Crib (Area G) & Paint Room (Area J):

REMAIN CALM shut doors and exit the building. Assemble in the employee parking lot outside the Shipping & Receiving office and Lunchroom. Wait for further instructions and for an accurate head count to be taken.

FIRE EXIT FLOOR PLAN

EMERGENCY RESPONSE PROGRAM

The President and Safety Director, have been designated as corporate safety officers for **Moran Iron Works, Inc.**

As part of its safety program, it is the policy of **Moran Iron Works, Inc.** to make certain that all employees have been instructed as to proper procedures in case of an injury or accident.

A list of emergency phone numbers will be posted at the jobsite when practical. If no suitable or convenient location exists, the list will be kept by the working supervisor.

All employees shall refer to the list of emergency numbers if medical attention or emergency rescue operations are required beyond, which can be performed by an employee of **Moran Iron Works, Inc.** Each employee posses a Standard First Aid Card and may administer first aid until medical professionals are on the scene.

All injuries and/or accidents shall be reported to the working supervisor or company officials promptly.

ACCIDENT SAFETY

It is the intent of **Moran Iron Works, Inc.** to furnish each employee employment that is free from recognized hazards that may cause or are likely to cause death or serious physical harm to such employee(s).

The President and Safety Director are responsible for the development and implementation of the company's safety program.

When practical, employees of **Moran Iron Works, Inc.** will participate in safety seminars.

The safety officers shall designate a competent employee on each crew or project who will have the following responsibilities:

- Instruct each employee regarding operating procedures, hazards, and safeguard of tools and equipment when necessary to perform the job or task at hand.
- Inspect the construction / job site, tools, and equipment to ensure that any unsafe conditions, which may create hazards, are eliminated.
- Instruct each employee on your crew / team in the recognition, avoidance, and proper procedures to follow when hazards are discovered.
- Advise each employee on your crew /team where known harmful substances are located, safe handling of these know substances, the proper use of them, how to avoid a potential injury, and applicable first aid procedures to be used in the event of an emergency.
- Demonstrate and/or discuss confined space procedures, personal protective equipment, necessary precautions, and communication and emergency evacuation procedures with crew/ team members.
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ACCIDENT PREVENTION RULES

- Post all emergency phone numbers and contact people in a central location, so that all crew / team members know what to do and who to contact in the event of an emergency.

Moran Iron Works, Inc. shall not knowingly permit an employee to work while under the influence of intoxicating beverages or substances which may affect the safety of the employees.

The job foreman or supervisor will inspect all machines, tools, and equipment on a regular basis to make certain that no defects are present which may affect the safety of the employees.

All employee complaint's or concerns regarding safety shall be immediately brought to the attention of the company's safety officials so prompt action may be taken.

Periodic meetings will be held to inform all employees of the continuing improvements of the safety program.

SAFETY RULES

It is expected that all employees of **Moran Iron Works, Inc.** will comply with all company safety rules and applicable governmental safety rules and regulations.

Violations of safety work rules and expectations may be cause for immediate dismissal.

Disciplinary action will be taken when an employee violates a safe work practice.

Remember that violating a company or governmental safety regulation may result in either you or a co-worker being seriously injured.

You must comply with the all rules and regulations. Take care of yourself and members of your crew/team. Lastly, keep alert and conscientious on the job at all times.

General Safety Rules:

- If you, as an employee, feel that your company safety operations require more than those rules listed in this manual, please bring it to the attention of your company's safety officials or a working supervisor. **Safety should be the #1 priority and is everyone's responsibility.**
- Proper training is a necessity; therefore, **do not** operate any tools or equipment in which you have not been trained or authorized to use.
- **Work and exit areas must be kept clean and orderly. Housekeeping both in-house and in the field is important, required and is everyone's responsibility.**
- supervisor or company safety officials. You never want to take any chances that could endanger the health or safety of another crew/team member or yourself.

SAFETY RULES

- All work-related accidents are to be reported to one of the company safety officials and documented immediately. If a doctor's visit is necessary, a turn-to-work slip is required before you are allowed to resume your duties at the shop or in the field.

SAFETY GUIDELINES

General Rules:

- Stay clear of suspended loads.
- Work at a consistent pace.
- Keep alert and focused.
- Always wear required **PPE.**
- No horseplay will be tolerated.

Housekeeping (Shops & Construction Jobsites):

- Keep doors and aisles clear.
- Keep work area as clean as possible.
- Clean spills immediately.
- Comply with no smoking or use of tobacco policies.

Lifting:

**** Approximately 20% of all construction related injuries result from lifting material incorrectly.***

- When you lift, lift correctly, use your legs and not your back.
- If the load is over 50 lbs...**ASK FOR HELP!**
- Avoid quick, jerky motions.
- Do not twist with a load to see where you are going.
- Stay fit.
- Stretch regularly.

Machines:

- Stay away unless you've been trained to operate them.
- Before starting, inspect guarding equipment.
- **Never** override guarding equipment.
- Always turn machinery off before servicing.
- Work smart, work safe.

Dress:

- Always wear PPE.
- Avoid loose clothing & jewelry.
- Tie up long hair

SUPERVISOR RESPONSIBILITIES

It is his/her responsibility to ensure that the entire safety program is followed at all times. A copy of this manual will be kept with them at any time they may need to reference it.

Primarily, it is the working supervisor's responsibility to evaluate the conditions at the site periodically throughout the day, and after every break.

They are expected to enforce and monitor the use of personal protective equipment.

It is imperative that they discuss and review necessary safety factors, potential hazards, proper communication, and any other pertinent information at the start of each shift. (*Tool Box Talks*)

The working supervisor must be familiar with the laws and regulations pertaining to MIOSHA and/or MSHA.

ANY, deviation from this policy may result in disciplinary action, which includes the following:

- VERBAL WARNING
- WRITTEN WARNING
- TIME OFF

LOCKOUT / TAG OUT (QUICK REFERENCE)

1. Notify any employees in the surrounding area and have them move away from that area.
2. Shut down the machine.
3. Turn the power off at the breaker box.
4. Properly lock out and apply warning tag to machine.
5. Double check to make sure that the machine is turned off.
6. Before beginning repairs, locate all additional energy sources.
7. Make sure all excess energy is released.
8. Repair and/or maintenance may be performed at this time.
9. When repair work has been completed, make sure that everything is back to the way you found it on the machine, all guards have been reinstalled and all tools that were used are removed.
10. Remove the tag.
11. Notify employees that the necessary work has been completed.
12. Turn electrical sources back on and restart machine.
13. All outside contractors need to know about our procedures and the times we plan to do them.
14. If (2) employees are working on the same machine both must use a lockout tag.

POWER LOCKOUT PROCEDURE

PURPOSE:

The purpose of this procedure is to assure that employees are protected from unintended machine motion or unintended release of energy, which would cause injury.

MANAGEMENT RESPONSIBILITIES:

- Each supervisor shall train new employees and periodically instruct all of their employees regarding provisions and requirements of this lockout procedure.
- Each supervisor shall effectively enforce compliance of this procedure including the use of corrective disciplinary action where necessary.
- Each supervisor shall assure that the locks and devices required for compliance with the lockout procedure are provided to their crew/team members.
- Prior to setting up, adjusting, repairing, servicing, installing, or performing maintenance work on equipment, machinery, tools, or processes, the supervisor shall determine and instruct the employees of the steps to be taken to assure they are not exposed to injury due to unintended machine motion or release of energy.

EMPLOYEES RESPONSIBILITIES:

- Employees shall comply with the lockout procedure.
- Employees shall consult with their supervisor or other appropriate knowledgeable management personnel whenever there are any questions regarding their protection.
- Employees shall obtain and care for the locks and other devices required to comply with the lockout procedure.

POWER LOCKOUT PROCEDURE

GENERAL:

- The power source of any equipment, machine, tool, or process to be set-up, adjusted, repaired, serviced, installed, or where maintenance work is to be performed and unintended motion or release of energy could cause personal injury such a power source shall be locked out by each employee doing the work. Sources of energy, such as springs, air, hydraulic and steam shall be evaluated in advance to determine whether to retain or relieve the pressure prior to starting the work.
- Safety locks are for the personal protection of the employees and are only to be used for locking out equipment.
- Safety lock, adapters, and “Danger Tags” can be obtained from a supervisor.
- Equipment locks and adapters can be obtained from a supervisor. The sole purpose of the “Equipment” lock and adapter is to protect the equipment during periods of time when work has been suspended or interrupted. The locks are not to be used as a substitute for the employee’s personal safety lock.
- Every person needs their own personnel lock.
- Personal locks shall contain a tag with the employee’s name on it.
- One key of every lock issued shall be retained by the employee to whom it was issued, and the only other key to the lock shall be retained by the supervisor.
- Employees shall request assistance from their supervisor if they are unsure of where or how to lockout the equipment.
- Any questions concerning the lockout procedure should be directed to the employee’s supervisor.

LOCKING OUT AND ISOLATING THE POWER SOURCE

Equipment, machines, or processing main disconnect switches shall be turned off and locked in the off position only after the electrical power is shut off at the point of operator control. Failure to follow this procedure may cause arcing and possibly an explosion.

Equipment / tools connected to a 110-volt+ source of power by a plug-in cord, will have a locking device applied to the plug, attached to the cord, and leading to the machine to be considered locked out.

Equipment / tools connected to a 110 volt source of power by a plug-in cord shall be considered locked out if the plug is disconnected and tagged with a "do not start tag."

After locking out the power source, the employees shall try the equipment, machine or process controls to ensure no unintended motion will occur; or test the equipment, machine, or process by use of appropriate test equipment to determine that the energy isolation has been effective.

When two or more employees work on the same equipment each is responsible for attaching his/her, lock. Safety locks and adapters are to be fixed on levers, switches, valves, etc. in the non-operative (off) position.

An employee who is assigned to a job and upon arrival finds and "equipment Lock," "adapter," and "danger tag" affixed to the equipment shall take the following action:

1. *Affix his / her personal lock to the "equipment adapter."*
2. *Determine who placed the equipment out of service and contact all parties who have locks on the equipment to determine if the assignment will proceed only if it is safe to do so with all parties involved.*

LOCKING OUT AND ISOLATING THE POWER SOURCE

- 3. Try the controls to ensure no unintended motion will occur before starting work or qualified personnel shall test equipment to determine that the energy isolation has been effective. Such testing equipment is only to be employed by trained, qualified personnel.*

PERFORMING TEST AND ADJUSTMENTS DURING LOCKOUT

- Power may be turned on when it is required to perform tests or adjustments. All of the rules pertaining to removing locks and restoring power shall be followed. The equipment or process shall again be locked out if it is necessary to continue work after completing the test or adjustments.
- If the employee leaves the job before its completion, such as a job reassignment the employee shall remove his / her personal lock and adapter and replace it with an “equipment” lock and adapter. In addition, the employee will prepare and attach a “danger tag” indicating the reason the equipment is locked out (should more than one employee be assigned to the job, the last employee removing his/her lock will be responsible for affixing the “equipment “ lock, adapter, and the “danger tag”).)
- Upon completion of the work, each employee will remove his / her lock, rendering the machine operable when the last lock is removed.
- The employee responsible for removing the last lock shall assure that all guards have been replaced, the equipment, machine, or process is cleared for operation, and appropriate personnel notified that power is being restored. This employee is also responsible for removing the “equipment” lock and returning it to the supervisor.

EMERGENCY SAFETY LOCK REMOVAL

The supervisor or the other designated management person will be authorized to remove an employee's lock under the following conditions.

Receipt of a written request signed by the appropriate supervisor, which shall state the reason the employee is not able to remove the lock.

The supervisor is responsible for making certain all the requirements for restoring power are followed.

DEFINING A CONFINED SPACE

NO EMPLOYEES SHALL ENTER A SPACE AS DEFINED BELOW WITHOUT AUTHORIZATION AND PROPER TRAINING:

- Not designed for continuous employee occupancy.
- Is large enough and so configured that a person can bodily enter and perform his assigned work.
- Has **LIMITED** or **RESTRICTED** means for **ENTRY** or **EXIT**.
- May have a **POSSIBLE HAZARDOUS ATMOSPHERE** that may expose employees to the risk of death, incapacitation and/or impairment of ability to self rescue caused by:
 - Flammable gas.
 - Airborne combustible dust or substances.
 - Atmospheric oxygen concentration below 19.5% or above 23.5%.
 - A toxic atmosphere or substance.
 - Danger of engulfment.

NO PERSON SHALL ENTER A SPACE AS DEFINED ABOVE UNTIL A COMPETENT PERSON EVALUATES THE AREA, AND ALL EMPLOYEES HAVE BEEN PROPERLY TRAINED ON CONFINED SPACE ENTRY PROCEDURES, COMMUNICATION SIGNALS, PPE & EMERGENCY RESPONSE & RESCUE PROCEDURES.

CONFINED SPACE ENTRY PROCEDURE

Confined Space Definition:

Confined space or enclosed space means any space having a limited means of entry and exit, which may be subject to the accumulation of toxic or flammable contaminants or may have an oxygen deficient atmosphere. Confined or enclosed spaces include, but are not limited to, storage tanks, process vessels, tunnels, pipelines, and open to spaces more than 4 ft. in depth such as pits, tubs, vaults and vessels.

Training Employees:

All employees required to enter into confined or enclosed spaces shall be instructed as to the nature of the hazards involved, the necessary precautions to be taken, and in the use of protective and emergency equipment required. The employer shall comply with any specific regulations that apply to work in dangerous or potentially dangerous areas.

Testing Air Quality:

The atmosphere of the confined or enclosed space to be entered will be tested for oxygen deficiency and gaseous conditions, which are possible in the space. The results of the testing will be recorded and must meet the guidelines set up by the Michigan Department of Health and the Division of Occupational Health. In testing the air quality in a confined space, the minimally acceptable respirator atmosphere will be as follows; oxygen=19.5%, combustible gas=5% of the lower explosive limit (L.E.L.) For each gas and chemicals, the airborne concentration of each chemical present must be compared with the Michigan Occupational Health limits-Maximum Allowable Concentration.

The testing of a confined space will be done by a positive-type reading instrument to give the levels at the time before entry and this will be recorded before entry and this will be recorded before entry into the space. The testing will be done by a competent person who has been trained on how to operate the instrument, calibrate the instrument, and the test procedures itself.

CONFINED SPACE ENTRY PROCEDURE

Ventilation:

To assure safe conditions, proper ventilation will be put into effect to allow entry into the confined space or enclosure. If natural ventilation is not adequate, ventilation equipment will be used to maintain an adequate atmosphere in the confined space during the time the employees are inside.

Safety Emergency Equipment:

Air monitoring devices will be on site and will be calibrated by trained personnel. These devices will be able to monitor oxygen deficient atmosphere, toxic, and / or combustible gases.

Safety and emergency equipment will be on site and ready to use at the confined space or enclosure, which is occupied by personnel and will be ready and easily accessible to personnel for rescue. Examples of rescue equipment are rescue rope or lifelines, safety harnesses, first aid kits, and any other equipment that would be that would be needed to provide for a safe and efficient rescue.

General Safety Concerns:

If ventilating a confined or enclosed space interferes with vehicular traffic, appropriate warning signs and protective barriers shall be promptly set up before the covers of manholes, hand holes, or volts are removed. The wording of a warning sign would depend upon the nature and the location of the hazards involved. Before an employee enters a street opening such as a manhole, it shall be protected with a barrier, temporary cover, and / or other suitable means.

Means shall be provided for quick removal of employees in cases of emergency. When a safety harness and lifeline are used, they should be properly attached to the employee so that his / her body cannot be jammed in the exit opening.

CONFINED SPACE ENTRY PROCEDURE

A standby employee with a pre-plan rescue procedure shall be stationed outside the entrance to the confined or enclosed space to observe or communicate with the employee(s) at all times. The standby employee shall be trained and equipped to initiate rescue operation.

It should be realized that a single person can seldom raise an unconscious body without such a device and additional personnel must be contained within easy summoning distance.

It is also interpreted to require an approved self-contained breathing apparatus or escape type airline respirators for the additional personnel who may have to enter the confined or enclosed space to perform a rescue.

The pre-plan rescue procedures will be filed with the local fire & rescue authority, which will be notified in cases they are needed.

The above written procedures are guidelines to be used by **Moran Iron Works, Inc.** in addition, its employees in a confined or enclosed space, and all other rules that are not covered in the above procedure shall be governed by the Michigan Department of Public Health, a Division of Occupational Health.

MINE SAFETY & HEALTH ADMINISTRATION

STATEMENT OF INTENT:

Under Section 115 of the Federal Mine Safety and Health Act of 1977, each operator is required to train miners so that job duties may be performed safely.

So that employees may benefit fully from the training experience, courses should be mine and /or job specific in nature. Course work that provides specific information is both beneficial and meaningful to employees and employers.

The training sessions will be conducted by certified MSHA instructors and/or persons designated by the production manager/president as competent {as per 46.2 (b)} to teach. This company may request assistance from: state and federal agencies; associations or production operators, independent contractors, miner's representative, consultants, manufacturer's representatives, private associations, educational institutions or any other training methods or sources that can qualify under 46.2 (b).

This mine reserves the right to substitute, as applicable, health and safety training required by the Occupational Safety & Health Administration (OSHA), or other federal or state agencies to meet requirements under this part. This training must be relevant to subjects required in Part 46 and must be documented in accordance with 46.9 of this part. {as per 46.4 ©}.

This training may consist of classroom instruction at the mine, interactive computer-based instruction or other innovative training methods, alternative training technologies, or any combination of training methods. {as per 46.4(d)}.

Employee health and safety meetings, including informal health and safety talks and instruction, may be credited under this part toward either new miner training, newly hired experienced miner training, or annual refresher training requirements. In such health and safety meetings, only the portion of the session actually spent in training will be recorded in accordance with 46.9 of this part. {as per 46.4(e)}.

IDENTIFICATION OF HAZARDS

Selection of PPE:

The following information provides guidance on identification of common hazards and determining whether PPE is appropriate.

This guide was developed to help employees comply with the General Industry Safety Standard, Part 33, Personal Protective Equipment. Please note that if you are engaged in Construction Operations or Occupational Health Standards you may need to comply with additional PPE requirements.

Head Protection R3370-3386

Hazards:

A survey by the U.S. Bureau of Labor Statistics (BLS) of accidents and injuries noted that most workers who suffered impact injuries to the head were not wearing head protection. The majority of workers were injured while performing their normal jobs at their regular work sites.

The results of this survey can help you in identifying whether there are potential hazards in your workplace. The survey noted that more than one-half of the workers were struck on the head while they were looking straight ahead. A third was injured when bumping into stationary objects. Head injuries are caused by falling flying objects, or by bumping the head against a fixed object.

In assessing your workplace for head hazards, look for the following potential sources of hazard:

- Bump contact.
- Overhead falling objects.
- Side flying projectiles.
- Electrical contact.
- Hair entanglement.

IDENTIFICATION OF HAZARDS

Selection:

When the potential of a head hazard is identified in your workplace, employees must be provided with head protection in the form of protective hats, which do two things—1) Resist penetration. 2) Absorb the shock of a blow. This is accomplished by making the shell of the hat of a material hard enough to resist the blow, and by utilizing a shock-absorbing lining composed of headband and crown straps to keep the shell away from the wearer's skull. Protective hats are also used to protect against electrical shock.

Protective helmets purchased after July 5, 1994, must comply with the requirements of the American National Standards Institute (ANSI) Standard Z89.1-1986, "Requirements for Protective Headwear for Industrial Workers." Protective helmets purchased prior to July 5, 1994, must comply with ANSI Z89.1-1969.

Types:

Type 1 Protective hat – Full brim, not less than 1, and ¼ inches wide.

Type 2 Protective hats – Brimless helmets with a peak extending forward for the crown.

Classes:

Class A General service, limited voltage protection.

Class B Utility service, high voltage helmets.

Class C Special service, no voltage protection.

Class D Limited voltage protection fire fighters service helmets with full brim.

HATS & CAPS UNDER:

Class A are intended for protection against impact hazards and are typically used in mining, construction, shipbuilding, tunneling, lumbering and manufacturing.

IDENTIFICATION OF HAZARDS

Class B, utility service hats and caps protect the wearer's head from impact and penetration by falling or flying objects and from high-voltage shock and burn. These hats and caps are used extensively by electrical workers.

Class C, safety hats or caps are designed specifically for lightweight comfort and impact protection. Class C helmets are used in certain construction and manufacturing occupations, oil fields, refineries, and chemical plants where there is no danger from electrical hazards or corrosion. The helmets are also used on occasions where there is a possibility of bumping the head against a fixed object. The "C" hat shall not be furnished by an employer or used by an employee except where it has been determined that the use of other types of hats is impractical.

Materials used to manufacture helmets are water-resistant and slow burning. Each helmet consists essentially of a shell and suspension. Ventilation is provided by a space between the headband and the shell. Each helmet should be accompanied by instructions explaining the proper method of adjusting and replacing the suspension and headband.

To protect against the potential of hair entanglement when working around or near rotating machinery such as drill presses, hair must be contained by a hat, cap or net, so that it cannot become caught. Hair containment can be through securing the hair or by using a hair enclosure such as a net.

Fit:

Headbands are adjustable in 1/8 size increments. When the headband is adjusted to the right size, it provides sufficient clearance between the shell and the headband.

The removable or replaceable type sweatband should cover at least the forehead portion of the headband. The shell should be of one-piece seamless construction and designed to resist the impact of a blow from falling material. The internal cradle of the headband and sweatband forms the suspension.

IDENTIFICATION OF HAZARDS

Any part that comes into contact with the wearer's head must not be irritating to normal skin.

Inspection and Maintenance:

Consult with the manufacturer regarding use of the hat or helmet when working with paint or cleaning materials because some paints and thinners may damage the shell and reduce protection by physically weakening or negating electrical resistance.

Hats and helmets must not be allowed to be decorated with paint or stickers.

A common method of cleaning shells is dipping them in hot water (approximately 140 degrees Fahrenheit) containing a good detergent for a least one minute. Shells should then be scrubbed and rinsed in clear hot water. After rinsing, the shell should be carefully inspected for any signs of damage.

All components, shells, suspensions, headbands, sweatbands and any accessories should be visually inspected daily for signs of dents, cracks, penetration, or any other damage that might reduce the degree of safety originally provided.

Helmets should not be stored or carried on the rear-window shelf of an automobile, since sunlight and extreme heat may adversely affect the degree of protection, and helmets could become flying projectiles.

Eye and Face Protection R3311-3313

Hazards:

A U.S. Bureau of Labor Statistics Study found that about 60 percent of workers who suffered eye injuries were not wearing protective equipment. When asked why, workers indicated that face protection was not normally used or practiced in their type of work, or it was not required for the type of work performed at the time of the accident.

IDENTIFICATION OF HAZARDS

Suitable eye protection must be provided where there is a potential for injury to the eye or face from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, potentially injurious light or heat radiation or a combination of these.

In assessing your workplace for possible eye hazards, look for potential of the following conditions:

- Frontal and side impact.
- Electrical arc.
- Molten metal.
- Chemical splash.
- Injurious light radiation.
- Suspended particles.
- Extreme hot/cold splash.

Selection:

Each eye, face or face-and-eye protector is designed for a particular hazard. In selecting the protector, consideration should be given to the kind and degree of hazard, and the protector should be selected on that basis.

Protectors must meet the following minimum requirements:

- Provide adequate protection against the specific hazards for which they are designed.
- Be reasonably comfortable when worn under the designated conditions.
- Fit snugly without interfering with the movements or vision of the wearer.
- Be durable.
- Be capable of being disinfected.
- Be easily cleanable.
- Be kept clean and in good repair.

Every face and eye protector must be distinctly marked to facilitate identification of the manufacturer.

IDENTIFICATION OF HAZARDS

Where choice of protectors is given and the degree of protection required is not an important issue, worker comfort may be a deciding factor. The BLS survey referenced above showed that few workers ever complained about poor vision or discomfort with personal eye protection equipment.

The survey did note that the typical injury was caused by flying or falling blunt metal objects. Lacerations, fractures, broken teeth, and contusions were common types of injuries reported.

Persons using corrective spectacles and those who are required by MIOSHA to wear eye protection must wear face shields, goggles, or spectacles of one of the following types:

- Spectacles with protective lenses optical correction.
- Goggles worn over corrective spectacles without disturbing the adjustment of the spectacles.
- Goggles that incorporate corrective lenses mounted behind the protective lenses.

Limitations or precautions indicated by the manufacturer must be shared with the user and strictly observed.

Eye protection is available in many types and styles in order to meet the wide range of demands for protection in the workplace.

Goggles come in a number of different styles: eyecups, flexible or cushioned goggles, plastic eye shield goggles, and foundry men's goggles. Goggles are manufactured in several styles for specific uses such as protecting against dusts and splashes, and in chipper's, welder and cutter's models.

Safety spectacles require special frames. Combinations of normal street wear frames with safety lenses are not acceptable.

Fit:

Fitting of goggles and safety spectacles should be done by someone skilled in the procedure. Prescription safety spectacles should be fitted only by a qualified optical person.

IDENTIFICATION OF HAZARDS

Inspection and Maintenance:

Eye protection must be kept clean. Continuous vision through dirty lenses causes eyestrain. Daily inspection and cleaning of eye protection with soap and hot water or with a cleaning solution and tissue is recommended.

Pitted lenses should be replaced. Deep scratches or excessively pitted lenses may break more readily.

Slack, worn-out, sweat-soaked, or twisted headbands do not hold the eye protector in proper position. Visual inspection can determine when the headband elasticity is reduced to a point beyond proper function.

Goggles should be kept in a case when not in use. Spectacles, in particular, should be given the same care as one's own glasses, since the frame, nose pads, and temples can be damaged by rough usage.

PPE that has been previously used should be disinfected before being issued to another employee.

Several methods for disinfecting eye-protective equipment are acceptable. The most effective method is to disassemble the goggles or spectacles and thoroughly clean all parts with soap and warm water. All traces of soap should be rinsed and defective parts replaced with new ones. Swab thoroughly or completely and immerse all parts for 10 minutes in a solution of germicidal deodorant fungicide. Remove parts from solution and suspend in a clean place for air-drying at room temperature or with heated air. Do not rinse after removing parts from the solution because this will remove the germicidal residue, which retains its effectiveness after drying.

The dry parts or items should be placed in a clean, dust-proof container, such as a box, bag or plastic envelope, to protect them until reissue.

Examples of common injuries to arms and hands are burns, cuts, electric shock, amputation, and absorption of chemicals.

IDENTIFICATION OF HAZARDS

Arm and Hand Protection R3392

Hazards:

A recent Bureau of Labor Statistics study found that seven of ten workers were not wearing hand protection at the time of the injury. About 60 percent were employed in manufacturing processes. More than two out of every five workers were injured while operating, maintaining, or repairing fixed machinery or equipment.

Injuries were divided almost equally between the left and right hand with cuts being the most common injury. The index finger was injured most frequently.

Most commonly injured were meat cutters and assemblers; highest among the craft and kindred workers were repair people, machinists, mechanics, and carpenters.

Table saws and presses were two of the most common pieces of fixed machinery involved.

When workers were asked what condition(s) led to the injury, the most frequent reasons were:

- Working too fast a pace.
- Unaware that hands were in a hazardous area.
- Misjudged time/distance needed to avoid injury.

Another common reason identified by workers who had been injured was a sudden or unintended movement of work materials, tools, equipment or the hand itself.

When assessing your workplace for arm and hand hazards, look for the following potential hazards:

- Skin absorption.
- Severe abrasions.
- Severe lacerations.
- Chemical burns.
- Thermal burns.

IDENTIFICATION OF HAZARDS

- Extreme cold.
- Puncture.

Selection:

There is a wide assortment of gloves, hand pads, and wristlets available for protection against various hazardous situations.

You must determine what hand protection is needed by your employees. The work activities of the employees should be studied to determine the degree of dexterity required, frequency, and degree of exposure to hazards and the physical stresses that will be applied.

It is important to know the performance characteristics of gloves relative to the specific hazard anticipated: @ exposure to chemicals, heat, or flames.

Before purchasing gloves, you should request information from the manufacturer to ensure the gloves meet the appropriate test standard(s) for the hazard(s) anticipated. For example, for protection against chemical hazards, the properties of the chemical(s) must be determined—particularly, the ability of the chemical(s) to pass through the skin and cause systemic effects. When selecting gloves for chemical use, consult the MSDS sheet prior to contacting glove manufacturers. Glove manufacturers generally provide charts for their products showing appropriate uses for different types of gloves. Keep in mind that not all glove compounds are the same and that the thickness of the material varies.

Gloves—like other PPE—need to be selected to fit the job. Select gloves based on performance requirements, conditions, duration and hazards.

Employees may need to use gloves—such as wire mesh, leather, and canvas—those have been tested and provide insulation from burns or cuts.

IDENTIFICATION OF HAZARDS

Inspection and Maintenance:

No single glove provides universal protection. Gloves must be used and maintained in accordance with the manufacturer's recommendation to address chemical resistance and permeation, reuse and decontamination issues.

Employers must be aware of the "degradation" and "permeation" of the gloves selected. Degradation means the material is physically breaking down. Permeation refers to the ability of the chemical to penetrate the material without necessarily affecting the materials.

Decontamination is required to reduce the effects of degradation and permeation. It must be prompt to halt the negative effects that chemicals may have on the material. When protective clothing cannot be decontaminated, it must be disposed.

FOOT AND LEG PROTECTION R3383-3386

Hazards:

Most of the workers in selected occupations who suffered foot injuries were not wearing protective footwear not was it required by the employer, according to the U.S. Bureau of Labor Statistics study. The study found that typical foot injuries were caused by objects falling fewer than 4 feet and the median weight was about 65 pounds.

Protection of feet and /or legs when there is a danger of falling or rolling objects, sharp objects, molten metal, hot surfaces, and wet slippery surfaces.

In assessing your workplace for foot hazards, look for the following potential hazards:

- Falling objects.
- Rolling objects.
- Electrical contact.
- Sole puncture.
- Wet slippery surfaces.

IDENTIFICATION OF HAZARDS

- Molten metal.
- Hot surfaces.

Selection:

Safety shoes should be sturdy and have an impact-resistant toe. In some shoes, metal insoles protect against puncture wounds. Additional protection, such as metatarsal guards, may be found in some types of footwear. Safety shoes come in a variety of styles and materials, such as leather and rubber boots and oxfords.

Leggings protect the lower leg and feet from molten metal or welding sparks. Safety snaps permit their rapid removal.

Aluminum alloy, fiberglass, or galvanized steel foot guards can be worn over work shoes, although the possibility of catching on something and causing workers to trip may occur. Heat-resistant soled shoes protect against hot surfaces like those found in the roofing, paving, and hot metal industries.

Safety footwear is classified according to its ability to meet minimum requirements for both compression and impact tests.

Inspection and Maintenance:

Inspect foot and leg protection in accordance with manufacturer's recommendations, based on the type and purpose of the protection, to ensure that continued protection is afforded.

Body Protection R3394

Hazards:

Many hazards can threaten the body and torso including heat, splashes from hot metals and liquids, impacts, cuts, acids and radiation. A variety of protective clothing is available including vests, jackets, aprons, coveralls, and full body suits. When assessing your workplace for torso hazards, look for these potential hazards:

- Chemical contact.
- Thermal burns.

IDENTIFICATION OF HAZARDS

- Extreme cold.
- Severe lacerations.

Selection:

Wool and specially treated cotton are two natural fibers that are fire-resistant and comfortable since they adapt well to changing workplace temperatures.

Duck, a closely woven cotton fabric, is good for light-duty protective clothing. It can protect against cuts and bruises on jobs where employees handle heavy, sharp, or rough material.

Heat-resistant material, such as leather, is often used in protective clothing to guard against heat and flame. Rubber and rubberized fabrics neoprene, and plastics give protection against some acids and chemicals.

It is important to refer to the manufacturer's selection guides for the effectiveness of specific materials against specific chemicals.

Disposable suits of plastic-like or other similar synthetic material are particularly important for protection from dusty materials or materials that can splash. If the substance is extremely toxic, a completely enclosed chemical suit may be necessary.

When selecting body protection to guard against chemical hazards, you should request information from the manufacturers to ensure protection is appropriate for the hazard(s) anticipated. For protection against chemical hazards, the properties of the chemical(s) must be determined. The MSDS sheet should be consulted as part of the selection process.

Inspection and Maintenance:

Clothing should be inspected regularly to ensure proper fit and function and for continued protection in accordance with manufacturer's recommendations.

IDENTIFICATION OF HAZARDS

Electrical Protective Equipment R3387

Hazards:

Personal protective equipment provided may need to be capable of protecting employees from electric shock. Looking for potential of electrical hazards must be a consideration throughout the hazard assessment and equipment selection process.

When assessing the workplace, consider both the type of work to be performed and the proximity of employees to potential electrical hazards. Some occupations will require special protection such as an electrician's need for protection from shocks and burns.

Selection:

MIOSHA's General Industry Safety Standards on Personal Protective Equipment, Part 33, contains specific requirements for the design, certification, inspection, use and storage of electrical protective equipment. Insulating blankets, matting, covers, line hose, gloves and sleeves made of rubber must be capable of withstanding imposed voltages.

Among other requirements, electrical protective equipment must be clearly marked as to the class of the equipment.

Employers must provide the appropriate equipment at no expense to the employee. Employees must use the electrical protective equipment that is capable of withstanding the voltages to which they may be subjected.

Rubber is considered the best material for insulating gloves and sleeves from electrical hazards. Rubber protective equipment for electrical workers must conform to the requirements established by ANSI standards as adopted in Part 33.

Maintenance and Inspection:

Insulating equipment must be inspected for damage, stored in a safe location and manner and subjected to periodic electrical tests at specified intervals.

IDENTIFICATION OF HAZARDS

Fall Protection R3390:

Part 33, Personal Protective Equipment includes general requirements for providing safety belts, safety harnesses, lifelines, and lanyards for employees who are required to work from heights of 25 feet or more above the ground, floor, water or other surface.

In addition to the rules included in the personal protective equipment standard, there are other rules that require protection when working at other heights. For example, the General Industry Safety Standard, Part 5, Scaffolding, requires that employees be provided a scaffold or wear a safety harness and lifeline when engaged in work that cannot be safely from the ground or from solid construction and when employees are not working from a ladder or self-propelled vehicle mounted elevating platform.

RESPIRATORY PROTECTION PROGRAM

PURPOSE:

The purpose of this program is to ensure that all employees of **Moran Iron, Inc.** works are protected from the exposure to respiratory hazards caused by breathing harmful dusts, fog, fumes, mists, gases, smokes, spray, or vapors by wearing the proper respirator when they are working in any of the above primarily the painting department & sandblasting areas.

Respirators are an effective method of protection against these designated hazards when properly selected and worn. Respirator use is encouraged, and provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker.

MANAGEMENT RESPONSIBILITIES:

- Identifying work areas, processes or tasks that require workers to wear respirators, and evaluating hazards.
- Selection of respiratory protection options.
- Arranging for and/or conducting training when necessary.
- Ensuring proper storage and maintenance of respiratory protection equipment. All filters, cartridges and canisters used in the workplace are to be labeled and color-coded with the NIOSH approval label.
- Ensuring that employees under their supervision (including new hires) have received appropriate training and fit testing. Where required. (Currently do not conduct fit testing for a variety of reasons.)
- Encasing the availability of appropriate respirators and accessories.
- Enforcing the proper use of respiratory protection when necessary.
- Continually monitoring work areas and operations to identify respiratory hazards.
- Maintaining records required by the program.

RESPIRATORY PROTECTION PROGRAM

SUPERVISOR RESPONSIBILITIES:

Supervisors are responsible for ensuring that the respiratory protection program is implemented in their particular area. In addition to being knowledgeable about the program requirements for their own protection, supervisors must also ensure that the program is understood and followed by employees.

EMPLOYEE RESPONSIBILITIES:

Each employee has the responsibility to wear his or her respirator when and where required and in the manner in which they were trained.

- Respirators shall be cleaned and disinfected after each use.
- Care and maintain their respirators as instructed, and store them in a clean sanitary location.
- Inform their supervisor or Manager of any respiratory hazards that they feel are not adequately addressed in the workplace and of any other concerns that they have regarding the program.
- Ensuring that respirators are properly cleaned, maintained, and stored.
- Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designated to protect you against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
- Keep track of YOUR respirator so that you do not mistakenly use someone else's respirator.
- Respirators will interfere with facial hair that comes between the sealing surface of the face piece and the face. For an optimum seal, no facial hair is best.

RESPIRATORY PROTECTION PROGRAM

PROCEDURE FOR CLEANING RESPIRATORS:

- Remove filters, cartridges, or canisters. Disassemble face piece by removing speaking diaphragms, valves, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.
- Wash components in warm water with mild detergent.
- Rinse components thoroughly in clean, warm water.
- Components should be hand-dried.
- Reassemble face piece, replacing filters, cartridges and canisters where necessary.
- Test respirator to ensure that all components work properly.

Maintenance and care of respirators:

The reusable kinds of respirators we have are the Air-purifying respirator with two cartridges that have filters that need to be changed on a regular basis. These are to be maintained by the employee during working hours. The APR's are to be kept at work with the employee's tools or at his next workstation.

Store respirators to prevent:

- Damage.
- Contamination.
- Dust.
- Sunlight.
- Extreme temperatures.
- Excessive moisture.
- Damaging chemicals.

Air Quality:

To make sure the air in the plant is well vented, we have 6 Air Quality Controller in place throughout the main areas of the plant. They will automatically turn on the fan if it detects any gases.

RESPIRATORY PROTECTION PROGRAM

DEFINITIONS:

Air-purifying respirator- A respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

Atmosphere-supplying respirator- A respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SAR's) and self-contained breathing apparatus.

Canister or cartridge- A container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

Demand respirator- An atmosphere-supplying respirator that admits breathing air to the face piece only when a negative pressure is created inside the face piece by inhalation.

Emergency situation- Any occurrence such as, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

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

Escape-only respirator- A respirator intended to be used only for emergency exit.

Filter or air purifying element- A component used in respirators to remove solid or liquid aerosols from the inspired air.

Filtering face piece (dust mask)- A negative pressure particulate respirator with a filter as an integral part of the face piece or with the entire face piece composed of the filtering medium.

RESPIRATORY PROTECTION PROGRAM

High efficiency particulate air (HEPA) filter- A filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and the P100 filters.

Negative pressure respirator- A respirator in which the air pressure inside the face piece is negative during inhalation with respect to the ambient air pressure outside the respirator.

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

Powered air-purifying respirator (PAPR)- An air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Pressure demand respirator- A positive pressure atmosphere-supplying respirator that admits breathing air to the face piece when the positive pressure is reduced inside the face piece by inhalation.

Respiratory inlet covering- A portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing source, or both. It may be a face piece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

Self-contained breathing apparatus- An atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

Tight-fitting face piece- A respiratory inlet covering that forms a complete seal with the face.

User seal check- An action conducted by the respirator user to determine if the respirator is properly seated to the face.

OVERHEAD CRANES and HOISTS

These instructions are for the purpose of increasing safety, efficiency, and proper operations of cranes.

- Cooperate with the other men on the floor.
- See that your cranes are kept clean and in good repair.
- Run them so as to prevent delays and accidents.
- ***Safety is all of our responsibility.***

Power-operated cranes:

- Only qualified employees designated by the supervisor shall be permitted to operate such equipment.
- Be conscious of all personnel within lift area.
- Familiarize yourself with the handles of control ropes so that you can tell without looking which is the hoisting and which is the lowering control. Each control rope shall be marked to indicate the direction it controls. Similarly, when using pendant controls, familiarize yourself with the location and function of each button. The function of each button should be indicated on the pendant control.
- Never raise a load before chains are securely hooked and the hooker's hands and feet are free and in the clear. Do not raise hooks before the unhooking is completed, and be especially alert for lugs or brackets on the members that may foul the hooks and cause the load to turn over.
- Remember when a bundled load is picked up that the material will tend to "nest" and create pinch points. Similarly, when a load is landed, it will tend to roll or spread out. Make certain you and others are alert and in the clear of such movements. Keep all parts of the body away from lifts being raised or lowered.
- When starting or stopping movements of bridge and trolley, move controls step by step, allowing motors to speed up or slow down gradually, except for magnetic type controllers which are timed and step less.

OVERHEAD CRANES and HOISTS

- When raising or lowering a load, proceed slowly and make sure the load is under control.
- Before starting to hoist, the trolley will be centered over the load.
- Side pulls (where load block is not hanging plumb) are not permitted except under specific direction of the supervisor.
- Do not use trolley or bridge motors to pull railroad cars or buggies unless the hoist falls are reaved to pull the load with only vertical motion of the falls and no side motion.
- Take slack out of chains or slings gradually.
- No load shall be carried over people.
- If anyone is in the path of travel, stop and clear the area.
- Do not allow anyone to ride a load, hook, lifting device or chains, except for inspecting wire rope under controlled conditions.
- When gloves may interfere with safe operation of the control buttons, they should not be worn.
- Stand in the clear so that if load swings, slips or spills, you will not be injured.
- Make sure hook block and attachment will clear adjacent equipment or material.
- When unhooking material, always clear hooks and chains; hold them away from material that can be tipped over if the empty hook should catch.
- Do not drag slings, chains, etc., along the floor.
- Do not carry extra chains in the crane hook.
- Wood blocks or short lengths of steel should not be carried loosely on tops of loads.

OVERHEAD CRANES and HOISTS

- Capacities will be marked on both sides of the equipment where the letters or numbers can be seen from the ground.
- Do not overload the crane, hoist, or sling. When in doubt as to the weight of a lift, consult your supervisor. (Also see Rule 3.78 for chart of alloy chain capacities.)
- Equipment will not be used to carry oxygen, acetylene, or other high-pressure cylinders unless carried in an approved carrier.
- Bumping into runway stops is prohibited.
- Never bump another crane.
- A path should be provided for travel of the person operating overhead traveling cranes with pendant controls.
- Report to the supervisor defective or missing safety equipment and mechanical or electrical defects without delay.
- When letting go of control pendant, do not allow it to swing freely. Avoid leaving operating ropes or control cables hanging in passageways.
- Unstable equipment located out of doors shall be secured against wind movements.
- Limit switches shall be checked at the beginning of each shift or turn that the equipment is used. Do not use limit switch to stop hoist. Limit switches are for emergency use only.
- Means for affecting an automotive return to the “off” position should be provided on controls of floor-operated cranes and monorail hoists.
- At all times use due care and sound judgment in the operation of such equipment to prevent injury to any person, damage to equipment or material.

INSPECTION POLICY FOR CHAIN, ROPE AND SLINGS

IN THE COURSE OF THE NORMAL WORKDAY, ALL PERSONNEL WHO WORK IN DIRECT CONTACT WITH (CHAINS, WIRE ROPES AND SYNTHETIC SLINGS) ARE REQUIRED TO INSPECT THEM FOR SAFE USE.

IF ANY OF THE ABOVE IS IDENTIFIED AS UNSAFE, THEY WILL BE TURNED INTO THE *CRIB ATTENDANT*.

REFERENCE: ASME B30.26 AND ASME B30.9

COPY OF RIGGING & LIFT PLAN

Rigging & Lift Plan

Purpose:

Moran Iron Works, Inc. is dedicated to the protection of its employees from on-the-job injuries as a result of being exposed to potential hazards associated to rigging and lifting activities in our shop, outside our shop or on a job site. The purpose of this plan is to:

- Supplement our existing safety program and policies by providing specific safety guidelines designed to further assist with rigging and lifting activities.
- Ensure that employees are made aware of and understand all safety provisions, potential hazards, and necessary communication and implementation of each rigging and lift pick.

Safety on any one project cannot be administered, implemented, monitored, and enforced by any one person. Everyone involved in rigging and lifting activities must make it a priority and participate in maintaining a safe, accident-free work place. In addition they must understand:

- Their value to this company.
- The costs of accidents (monetary, physical, and emotional)
- The objectives of our safety program, policies and procedures.
- Their individual role in providing and maintaining a safe work place through adequate preparation, planning, and judgment / risk assessment.

Site Layout & Inspection:

Moran Iron Works, Inc. will inspect and assure that:

- Adequate access roads into and through the site for all equipment and vehicles.
- Proper drainage and level grade for crane setup, accessible with adequate space for material storage will be inspected and arranged prior to each lift.

COPY OF RIGGING & LIFT PLAN

- Adequate placement and location of cranes in relation to material to be lifted.
- Safe means and methods for co-workers and/or subcontractors and vehicular traffic within the area or jobsite where rigging and lifting activities will take place.
- Visual inspection of all rigging equipment (latches, hooks, shackles, slings, chains, etc.) will be inspected prior to each lift.

Plan shall be implemented and documented for any pieces weighing 5,000 lbs. or more. All completed forms are to be returned to the Safety Director for further filing.

Based on the expectations, terms, and specifications outlined in this plan, I fully acknowledge and accept to follow and implement the conditions as stated above.

Lift Plan

Date: _____
Use: **In-House** **Yard** **Field**
Project / Job No. _____

Crane Info.

Make: _____
Model: _____
Size (Capacity in Tons): _____
Boom Length: _____
Type: **Hydraulic** **Lattice** **Truck - Rough**
Terrain **All Terrain** **Bridge Crane**

PRINT

Rigging & Lifting Team:

Responsible Job Supervisor / Foreman: _____
Rigger(s): _____
Crane Operator(s) _____
Signal Person(s): _____

Communication Procedure

Will the procedure include the use of hand signals?

YES **NO**

How many people will be involved in the use of hand signals? **1 2 3 4 5** _____

Have the hand signals been reviewed so all of us are in agreement in the way they are Conveyed?

YES **NO**

Will 2-way radios be used? **YES** **NO**

Lift Info.

What is the approximate size and weight of the load? _____

What equipment will be used to balance and control the load (i.e. spreader bars, tag lines, etc.) and have they been inspected? _____ **YES** **NO**

What **size / grade** are the chains, cables, hooks, shackles, being used?

CHAIN _____ / _____, **CABLE** _____ / _____,
HOOK _____ / _____, **SHACKLE** _____ / _____.

What are the min/max. allowed angle in degrees the load will be picked. **MIN** _____ **MAX** _____

Will this plan require a dual lift for material handling?
Please explain.

Will crane(s) need to “walk” with the loads? If so,
please explain.

Total number of lifts covered under this plan? 1 2
3 4 5 6 7 8 9 _____

Crane Location / Clearances.

Attach a diagram showing crane location, adjacent buildings, and other significant obstructions within load swing radius. Indicate direction and span of swing.

What is the horizontal distance from the crane center pin to the nearest structure? _____

What is the maximum distance from boom to load during a pick? _____

SIGNATURES REQUIRED

RESPONSIBLE JOB SUPERVISOR / FOREMAN

CRANE OPERATOR(S)

DATE

RIGGER

DATE

RIGGER

DATE

SIGNAL PERSON

DATE

SAFETY DIRECTOR

DATE

DISCIPLINARY PROCEDURES & REQUIREMENTS FOR A SAFE WORK ENVIRONMENT

It is the policy of Moran Iron Works, Inc. to provide each employee with proper instructions regarding the use of all equipment. **Moran Iron Works, Inc.** is concerned with your safety and would like you to take advantage of any and all protection, which is readily available to you. In order to ensure your compliance with the proper utilization of the safety rules, the following schedule of disciplinary action shall apply to any employee found to be in violation of these requirements.

- **First Offense:** Verbal Warning.
- **Second Offense:** Written Warning.
- **Third Offense:** Subject to Suspension.

Requirements are as follows:

1. Be conscious of what is going on around you and what you are doing.
2. Personal Protective Equipment is available to all employees and must be worn **AT ALL TIMES**.
 - Hard hats will be worn if there is a possibility of falling objects. Any time a crane is being used, hard hats will be worn.
 - Safety glasses – If you wear prescription glasses, the company will pay ½ the cost up to \$50. Otherwise, one pair is provided for you with replacements by turning your old pair in to the crib supervisor.
 - Steel-toe shoes/boots–Prevents spills or falling objects.
 - Gloves – Are required when attempting to handle or fabricate anything hot, sharp or with metal shavings.
 - Uniforms – Anyone not provided uniforms by the company will not be allowed to wear revealing or loose clothing as it is a safety hazard.
 - Harnesses and Lanyards–Are required when any employee must climb or be lifted to a height of 4 foot or more.

DISCIPLINARY PROCEDURES & REQUIREMENTS FOR A SAFE WORK ENVIRONMENT

3. No running.
4. Drugs and alcohol are forbidden, anyone having them on the premises, or under the influence of one or both can be terminated on the spot.
5. Do not distract fellow workers or engage in an act that could endanger another employee.
6. Keep work area clean and orderly.
7. The compressor is not to be used to blow anything off your clothing, hair or hands.
8. Do not move an injured person unless it is absolutely necessary.
9. Know the Fire Emergency Evacuation Plan.
10. Do not lift anything that is too heavy. Get help.
11. No horseplay, do not distract or interfere in any way with a person performing their job.
12. Do not double ride on any HI-LO'S that do not have two seats.
13. Do not use power tools and equipment until you have been properly instructed in the safe work methods and become authorized to use them.
14. Do not enter an area that has been barricaded. Barricades are required for cranes. Always make sure other workers can see you if moving motorized vehicles are being used on the job site.
15. Never oil, lubricate, fuel, service or repair equipment while it is running or in motion.
16. Use guardrails or perimeter cables when necessary.

DISCIPLINARY PROCEDURES & REQUIREMENTS FOR A SAFE WORK ENVIRONMENT

17. When using ladders keep these points in mind:
18. Use the “four and one” rule (one foot of the base for every four feet of height)
19. Ladders must extend three feet above landing surface.
20. Defective ladders must be tagged and removed from service.
21. Keep ladder bases free of debris and materials.
22. Portable ladders need to be equipped with safety feet unless ladder is tied, blocked or otherwise secured.
23. Scaffolds must be built to manufacturer’s recommendations and MIOSHA Construction Safety Standard Part 12.
24. Check the electrical grounding system. Use only extension cords of the three-prong type.
25. Use safety lines when working in high areas
26. Do not throw anything down below you when suspended or at an elevation higher than 6 feet.
27. Open fires are prohibited.
28. Be aware of emergency procedures established for your job site. Know location of phone and emergency phone numbers, first aid kit and stretcher.
29. Do not enter a manhole, well, shaft, tunnel or other confined space, which could have a lack of oxygen or presence of toxic or flammable gas or possibility of engulfment by solids or liquids. Use an appropriate detector before entering.
30. Posted Restricted Area Signs -No one is allowed in the shop unless they are employees or people being escorted through. These requirements are there for your safety and the safety of others.

ABRASIVE BLASTING

1. All personal protective equipment must be worn at all times.
2. PPE for abrasive blasting consists of:
 - Blasting coveralls with hood and gloves.
 - Air hose to operator.
3. A Bureau of Mines or NIOSH approved air-supplied sandblasting helmet or mask must be worn by all operators of abrasive blasting equipment, except where blasting operation is enclosed and separated from operator, as with Wheelabrator or Pangborn machines. Approved gauntlets and apron or coat should also be worn.
4. Use a special blower unit of a type not involving internal lubrication to provide the helmet air supply.
5. If air is supplied to the helmet from plant compressed air lines or oil lubricated compressor, an air-cleaning device, pressure-regulating valves, and other items are recommended as set forth in NIOSH specifications.
6. Air fed to the helmet should be at the pressure recommended by the respirator manufacturer
7. Gasoline engine units are not recommended for use with air-supplied respirators
8. Compressors supplying breathing air should not be operated near the exhausts of internal combustion engines, sewer manholes, abrasive blasting, painting, large electric arcs, or sources of smoke or other contaminants. Intakes should be provided with filters for removing contaminants in breathable range.
9. Anti-freeze, corrosion inhibitors, or such substances should not be added to compressed air systems from which air is taken for breathing purposes.

ABRASIVE BLASTING

10. If rust inhibitors are used on material after blasting, precautions should be taken to protect against hazards resulting from breathing spray or contacting the solution. This is especially important if the solution contains either chromates or dichromates. The concentration of dust or fume in the breathing zone of the operator shall be kept below the levels specified by the State or Federal Safety Standards.
11. Refer to rules on material handling. Be sure material is properly secured and spaced before starting blasting operations.
12. Small objects, loose blocking, etc., which might be driven through the air by the blast, should be removed prior to start of work.
13. Check all hose connections, nozzles, etc., before starting work. Be alert for weak spots in the hose.
14. Operator must maintain firm grip and be in complete control of nozzle at all times, particularly when pressure is turned on. Never aim nozzle in the direction of anyone within the immediate area. Also, keep hands away from the nozzle opening.
15. When practical, blasting should be done in a separate structure, an area isolated by partitions, or in a restricted outside area.
16. Steel to be blasted, if coated with red lead, epoxies, chromium, cadmium, or other toxic materials, may require special-type respirators. Check with your supervisor before starting work on such material.
17. Dust from alloys containing titanium, magnesium, and some other metals may create a fire and explosion hazard. Check with your supervisor when blasting such metals.

ABRASIVE BLASTING

18. Blasting equipment should be grounded to prevent static sparks when it is used on tanks, etc., which contain or have contained volatile substances. Such tanks, etc., should be purged before blasting.
19. Blasting nozzles should be equipped with automatic cutoff valves or dead man controls in the event the operator loses control.
20. Sandblast hose should be equipped with an anti-static inner tube (natural gum treated with carbon black) to prevent electrical shock.
21. When shutting down the equipment, the operator should be positive that the hose pressure is relieved before turning away from the blasting area.
22. If helpers or other personnel are exposed to dust from the operation, including cleaning up, they should wear approved protective equipment appropriate for the degree of exposure. This would include dust-type respiratory and tight fitting eye protection.
23. All food and drink should be kept out of the blasting area.

ARC WELDING

WELDERS:

- Safeguard eyesight.
- Contact lenses **shall** not be worn **while welding**.
- Welders are required to wear *approved safety glasses* in addition to a *welding helmet*. When welders are regularly working very close to one another, it may be desirable to use **safety glass lens** having a **shade value of 1.5 or 1.7**.
- **(Note: These shaded lenses have equal resistance to ultraviolet light transmittance, but they have a loss of 38% and 50% respectively in visible light. Thus, while some glare reduction will be achieved, the visible light reduction may present an unacceptable, unsafe condition.)**
- Any discomfort or injury to the eyes or other parts of the body caused by exposure to **ultraviolet rays from the arc** or by welds slag or scale should be reported to the supervisor, and **the welder should obtain medical treatment**.
- **Keep** gloves, shoes, clothing and other protective apparel as **dry** as possible, so as to avoid electric shocks.
- Welders should *not wear rings, metal wristbands, or other jewelry*.
- Avoid shock and heat hazards.
- **No welding shall be done** in or near areas where there may be **flammable materials, explosive gases or vapors**.
- When welding in **confined areas**, special means of **ventilation** may be required. Check with your supervisor before working in such areas.

ARC WELDING

- When **welding material** that may give off *dangerous toxic fumes* such as lead alloy and paint, Bureau of Mines or NIOSH approved respirators must be worn unless the fumes are adequately removed by artificial ventilation. Check with your supervisor before welding under such conditions.
- No welding or preheating is to be done on or in any tank, pipeline, compartment, or container which has contained flammable material until it has been thoroughly purged and cleaned, and approval given by your supervisor. Any openings that might allow **flammable gas** or **vapor to leak** into the **structure** shall be sealed securely before any welding is started. **Ventilation sufficient** to keep the space purged of **flammable gases** or **vapors** shall be supplied when any welder is required to work inside such a tank, pipeline, compartment, or container. If welding is to be done only on the outside of the structure, the interior shall be **purged continuously** with steam or inert gas to **prevent** any **fire** or **explosion**.
- Welders must **avoid starting fires**. Before starting to weld, **the vicinity** in which the welding is to be done must be **inspected carefully**. **Combustible material** shall be **moved away** or **shielded from all heat** with fireproof material. Where *welding* is being done on a *floor, deck, wall, bulkhead, or other partition*, the welder must be sure there is *no fire hazard* on the opposite side. **A fireguard shall be posted** if any hazard is present.
- The **power supply** to welding machines or welding transformers **shall be shut off** when work is completed, when the **equipment is to be left unattended**, or when the **equipment is to be moved**.
- Welders must use caution to **avoid electric shock** from welding equipment and from other sources. When handling the electrode holder or cable, the welder must **avoid electrical contact** between his body and objects connected to the work or "ground" of the welding circuit.

ARC WELDING

- Welders must **not stand in water** while **changing welding electrodes** in the electrode holder.
- Welders **must not handle the electrode holders** from **two different machines** at the same time.
- Electrode holders **must not be dipped in liquids** to cool them.
- When a welding machine is in operation, the cable should **not be looped** over the shoulders or around any part of the body.
- Welders shall **not change polarity** of the welding machine **while welding** is in progress.
- When welders carry **electrodes** on their person, they should be in a **proper container**.
- **Electrodes** shall be **removed** from the electrode holder **when welding is interrupted** for other activity or when the **equipment is left unattended**.
- Welding current return circuits or “*grounds*” must *carry their current without hot or sparking contacts, without heating of conductors* or their *joints*, and without passage of current through equipment or structures, which might be damaged or made unsafe, by the welding current or its voltage. In particular, welding current **must not be allowed to pass through;**
 1. *Acetylene, fuel gas, oxygen, or other compressed gas cylinders.*
 2. *Tanks or containers used for gasoline, oil, or other flammable material.*
 3. *Pipes carrying compressed air, steam, gases, or flammable liquids.*

ARC WELDING

4. *Conduits carrying electrical conductors.*
 5. *Chains or wire ropes.*
 6. *Metal hand railings or ladders.*
 7. *Machines, shafts, bearings, or weighing scales.*
- Welders should *inspect the area* in which they are to work to be sure that it is clear of objects which might fall or which otherwise might cause *injury when vision is obstructed* by the welding helmet.
 - When welding is done in areas not ordinarily used for such work, screens should be used to protect other workers and passersby from the radiation from the arc. Persons in the vicinity **should be warned** against watching or **looking directly at the welding arc**.
 - Welders should **place welding cable, ventilating hose, and other equipment** so that it is clear of **high voltage power cables, steam lines, moving shafting, ladders, and stairs**.
 - Welding equipment should be used only within its **rated capacity**.
 - **Welding** should be **stopped** if any *abnormal equipment condition* arises. Work should not be resumed until authorized by the supervisor.
 - Welding **electrode stubs must not be thrown on floors, decks, staging, or scaffolds**. They shall be **collected in a container for safe disposal**.
 - Only qualified and *authorized persons* shall *repair welding equipment*.

TOP TEN RULES FOR TORCH SAFETY

Reference: Oxyacetylene Safety Video

1. Blow out the cylinder valves before attaching the regulators to the cylinder / tank.
2. Release the adjusting screw on the regulators before opening up the cylinder valve.
3. Stand to one side of the regulator when opening the cylinder valve.
4. Open the cylinder valve slowly.
5. Do not use or compress acetylene in a free state to pressures above 15 psi.
6. Purge oxygen and acetylene lines.
7. Always light the acetylene line before opening the oxygen line.
8. Never use oil or grease around oxyacetylene equipment. (i.e. regulators, torches, fittings, etc.)
9. Never use oxygen as a substitute for compressed air.
10. Keep heat, flames and sparks away from combustibles.

HAZCOM PROGRAM

General :

The following hazard communication program has been established for **Moran Iron Works, Inc.** This program will be available for review by all employees

Hazard Determination:

Moran Iron Works, Inc. will be relying on Material Safety Data Sheets from suppliers to meet determination requirements.

Labeling:

The Shipping & Receiving Manager along with the Safety Director, will be responsible for the proper labeling of all Hazardous Materials coming into the plant.

All labels on Hazardous Materials will contain:

- Identity.
- Type of Hazard.

Supervisors will be responsible for insuring that all portable containers used in their work areas are labeled with identity and hazardous warning labels.

Material Safety Data Sheets (MSDS):

The shipping and receiving manager and/or the Safety Director will be responsible for compiling the master MSDS file. A copy of MSDS's for all hazardous chemicals to which employees may be exposed to, will be kept in a file at Moran Iron Works, in the tool crib.

MSDS's will be available for review to all employees at any time.

The Safety Director will be provided with the required MIOSHA "Right – To – Know" posters, and notifying employees of new or revised MSDS's within (5) days of receipt of new or revised MSDS's.

HAZCOM PROGRAM

Employee Information Training:

The safety director shall coordinate and maintain records of training conducted for **Moran Iron Works, Inc.**

Before starting work or as soon as possible thereafter, each new employee will attend a safety class covering various topics. These topics include but are not limited to:

- PPE.
- House keeping.
- Weld Safety.
- Machine Safety.
- Rigging.
- Chemical & Hazards in the workplace.
- First Aid & CPR procedures.

The employee will be informed that:

- The employer is prohibited from discharging, or discriminating against and employee who exercise the rights regarding information about hazardous chemicals in the work place.
- As an alternative to requesting an MSDS from the employer, the employee may obtain a copy from the Department of Public Health.

Informing Contractors:

It is the responsibility of **Moran Iron Works, Inc.** to provide any other Contractors with employees exposed to our chemicals with the following information:

- Hazardous chemicals with which they may come into contact.
- Measures the employees should take to lessen the risks.
- Informed of the location where the MSDS's are stored.

It is the responsibility of **Moran Iron Works, Inc.**, to obtain chemical Information from contractors when they will expose employees to hazardous chemicals in which they may bring into the workplace.

Common M.S.D.S. Terms

ACUTE EFFECT -	An adverse effect with severe symptoms occurring very quickly, because of a single excessive overexposure to a substance.
ACUTE TOXICITY -	The adverse effects resulting from a single excessive overexposure to a substance. Usually a figure denoting relative toxicity.
ASPHYXIAN -	A vapor or gas that can cause unconsciousness or death by suffocation. Most are associated with the temperature at sea level pressure when a flammable liquid gives off sufficient vapors to promote combustion.
BOILING POINT -	A temperature at which a liquid turns to a vapor state. This term is usually associated with the temperature at sea level pressure when a flammable liquid gives off sufficient vapors to promote combustion.
“C” or CEILING -	In terms of exposure concentrations, this is the number that should never be exceeded even for a short period, for a substance.
CARCINOGEN -	A substance or agent capable of producing cancer in mammals.
cc - Cubic Centimeter -	A volume measurement usually associated with small quantities of a liquid. One quart has 946 cubic centimeters.
CHRONIC EFFECT -	An adverse effect with symptoms that develop or recur very slowly, or over long periods of time.
CHRONIC TOXICITY -	The adverse effects resulting from prolonged or repeat exposures to a substance, usually used as an indicator or relative toxicity for exposures over great lengths of time.

Common M.S.D.S. Terms

COMBUSTIBLE -	A term used to classify liquids, gases or solids that burn readily. This term is often associated with 'flash point,' which is a temperature at which a given material will generate sufficient vapors to promote combustion.
CONCENTRATION -	A figure used to define relative quantity of a particular material. Such as a mixture in air of 5 ppm Acetone in Air.
CORROSIVE -	A material with the characteristic of causing irreversible harm to human skin, or steel by contact. Many acids are classified as corrosives.
DECOMPOSITION -	The breakdown of materials or substances into other substances or parts of compounds. Usually associated with heat or chemical reactions.
EVAPORATION RATE -	The rate at which a liquid material is known to evaporate, usually associated with flammable materials. The faster a material will evaporate, the sooner it will become concentrated in the air creating either an explosive / combustible mixture or toxic concentration, or both.
FLASH POINT -	The temperature at which a liquid will generate sufficient vapors to promote combustion. Generally, the lower the flash point, the greater the danger of combustion.
FLAMMABLE -	Any liquid that has a flash point of 100 degree F or below. Also, any solid, which can sustain fire and ignite readily.
GENERAL EXHAUST -	A term used to define a system for exhausting or ventilating air from a general work area. Not as site specific as localized exhaust.
HAZARDOUS CHEMICAL -	Any chemical which is either a physical or health hazard or both?

Common M.S.D.S. Terms

IGNITABLE -	A term used to define any liquid, gas or solid, which has the ability to be 'ignited' which means having a flash point of 140 degrees F., or less.
INCOMPATIBLE -	Materials that cause dangerous reactions from direct contact with one another.
INGESTION -	Taking in of a substance through the mouth.
INHALATION -	The breathing in of a substance in the form of a gas, liquid, vapor, dust, mist or fume.
INHIBITOR -	A chemical added to another substance to prevent an unwanted change from occurring.
IRRITANT -	A chemical which causes a reversible inflammatory effect on the site of contact, however is not considered a corrosive. Normally, irritants affect the eyes, nose, mouth, respiratory system.
LC–Lethal Concentration –	In lab animal tests, this is the concentration of a substance which is sufficient to kill the tested animal.
LC50-Lethal Concentration-50 -	In lab animal tests, this is the concentration of a substance required to kill 50% of the group of the lab animals tested.
LD – Lethal Dose -	The concentration of a substance required to kill the lab animal used for the test with a specific material.
LD50 – Lethal Dose50 -	The single dose concentration of a substance required to kill 50% of the lab animals tested.
L.E.L–Lower Explosive Limit –	The lowest concentration, or percentage in air, of a vapor or gas, that will produce a flash fire when an ignition source is introduced.

Common M.S.D.S. Terms

LOCAL EXHAUST -	The system for ventilating or exhausting air from a specific area such as in welding operations. More localized than general exhaust.
MELTING POINT -	The temperature at which a solid changes to a liquid.
Mg – MILLIGRAM -	A unit of measurement of weight. There are 1000 mg in one gram of a substance.
Mg/m³ – MILLIGRAMS PER CUBIC METER –	A unit of measurement usually associated with concentrations of dust, gases or mists in air.
Mppcf – MILLION PARTICLES PER CUBIC FOOT –	A unit of measurement used to describe airborne particles of a substance suspended in air.
MUTAGEN -	A substance or agent capable of altering the genetic material in a living cell. Normally associated with carcinogens.
NFPA – National Fire Protection Association –	An organization which promotes fire protection / prevention, and establishes safeguards against loss of property and / or life by fire. The NFPA has established a series of codes identifying hazardous materials by symbol and number for fire fighting purposes. These codes also classify materials in their order of flammability. With zero being not burnable up to 4 which means will burn spontaneously at room temperature.
OLFACTORY -	Relating to the sense of smell.
ORAL -	Taken through the mouth into the body.
ORAL TOXICITY -	A term used to denote the degree at which a substance will cause adverse health effects when taken through the mouth. Normally associated with lab animal tests.

Common M.S.D.S. Terms

OXIDIZING AGENT -	A chemical or substance which brings on oxidation reactions, by providing the oxygen to promote oxidation.
PEL—Permissible Exposure Limit-	An exposure concentration established by the Occupational Safety & Health Community which indicates the maximum concentration for which no adverse effects will follow.
PPM – Parts Per Million -	A unit of measurement for the concentration of a gas or vapor in air. Usually expressed as number of parts per million parts of air.
PPB – Parts Per Billion -	As above, only expressed as number of parts per billion parts of air.
REACTIVITY -	The term which describes the tendency of a substance to undergo a chemical change with the release of energy, often as heat
REDUCING AGENT -	In an oxidation reaction, this material combines with oxygen.
RESPIRATORY SYSTEM -	The breathing system, including the lungs, and air passages, plus their associated nervous and circulatory components.
SENSITIZER -	A substance, which on first exposure causes little or no reaction, however, with repeated exposure will induce a marked response not necessarily limited to the exposure site. Usually associated with skin sensitization.
SPECIFIC GRAVITY -	The weight of a material compared to the weight of an equal volume of water. Usually expresses materials heaviness. A material with a specific gravity of greater than 1.0 will sink to the bottom of water, whereas a material with a specific gravity of less than 1.0 will float on top of water.

Common M.S.D.S. Terms

STEL—Short Term Exposure Limit –The maximum allowable concentration of a substance that one can be exposed to for less than 15 minutes and not produce adverse health effects.

TERATOGEN – A substance or agent usually associated with cancer, that when exposed to a pregnant female would cause malformation of the fetus. Usually associated with lab animal tests.

TLV – Threshold Limit Value – A term used by the Occupational Safety & Health community to describe the airborne concentration of a material to which nearly all persons can be exposed over an 8-hour workday. (an average)

TOXICITY - The sum of adverse effects of exposure to materials, generally by mouth, skin, or respiratory tract.

TWA – Time Weighted Average – The airborne concentration of a material to which a person can be exposed over an 8 – hour work day

UEL – Upper Explosive Limit – The highest concentration of a gas or vapor in air that will sustain or support combustion, when an ignition source is present.

VAPOR DENSITY - A term used to define the weight of a vapor or gas as compared to the weight of an equal volume of air. Materials lighter than air have a vapor density of less than 1.0, whereas materials heavier than air have a vapor density greater than 1.0.

VAPOR PRESSURE - A number used to describe the pressure that a saturated vapor will exert on top of its own liquid in a closed container. Usually, the higher the vapor pressure, the lower the boiling point, and therefore the more dangerous the material can be, if flammable.