SAFETY, HEALTH AND ENVIRONMENTAL MANUAL

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SAFETY, HEALTH & ENVIRONMENTAL PROCEDURES & GUIDELINES MANUAL

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PREFERRED INDUSTRIAL CONTRACTORS, INC.

COMPANY STATEMENT

THIS MANUAL IS PROVIDED FOR THE USE OF THE MANAGEMENT AND EMPLOYEES OF
PREFERRED INDUSTRIAL CONTRACTORS, INC. AND ANY OF ITS OFFICES, DIVISIONS, SUB-
DIVISIONS, PROJECTS, AND SPONSORED JOIN VENTURES ONLY. IT IS NOT INTENDED FOR THE
USE OF ANYONE OR ANY ENTITY OUTSIDE OF PREFERRED INDUSTRIAL CONTRACTORS, INC.’S
OPERATIONS. PREFERRED INDUSTRIAL CONTRACTORS, INC. DOES NOT ASSUME NOR ACCEPT
ANY LIABILITY OR RESPONSIBILITY FOR ANY USE OF THIS MANUAL OR ITS MATERIAL BY
ANYONE OUTSIDE THIS SPHERE OF INFLUENCE.
PREFERRED INDUSTRIAL CONTRACTORS, INC.

POLICY STATEMENT

EMPLOYEES ARE OUR MOST IMPORTANT ASSET; THEIR SAFETY IS OUR GREATEST RESPONSIBILITY. IT IS THE RESPONSIBILITY OF THE COMPANY TO MAKE EVERY EFFORT TO PROVIDE A SAFE WORKING ENVIRONMENT, TO ELIMINATE SAFETY HAZARDS AND TO PROVIDE ADEQUATE PPE AND SAFETY DEVICES FOR ALL OF OUR EMPLOYEES. FURTHER, IT IS OUR GOAL TO CREATE A CULTURE OF SAFETY AWARENESS AMONG OUR MANAGEMENT AND EMPLOYEES SO THAT EACH INDIVIDUAL UNDERSTANDS THAT HE / SHE HAS THE ULTIMATE RESPONSIBILITY TO WORK SAFELY. UNSAFE WORK PRACTICES BY AN INDIVIDUAL CAN OFTEN LEAD TO ACCIDENTS EVEN IN A SAFE WORKING ENVIRONMENT. IT IS OUR GOAL TO ELIMINATE BOTH UNSAFE WORK CONDITIONS AND UNSAFE WORK PRACTICES.

IT IS OUR RESPONSIBILITY TO:

1. COMPLY WITH ALL FEDERAL, STATE, LOCAL REGULATIONS AND CLIENT RULES GOVERNING SAFETY ON OUR PROJECTS.
2. TAKE EXPEDITIOUS ACTION TO CORRECT UNSAFE CONDITIONS AND WORK PRACTICES.
3. PROMOTE SAFETY AWARENESS.
4. HOLD EACH MANAGEMENT PERSONNEL AND EMPLOYEE ACCOUNTABLE FOR HIS/HER INDIVIDUAL RESPONSIBILITY FOR SAFETY.
5. ENCOURAGE OUR EMPLOYEES TO INFORM THEIR SUPERVISOR IMMEDIATELY WHEN UNSAFE CONDITIONS ARE PRESENT WITHOUT FEAR OR REPRISAL.
6. PROVIDE THE TRAINING TO SUPPORT THE ACCIDENT REDUCING TECHNIQUES NECESSARY IN IMPLEMENTING OUR RESPONSIBILITIES.

EVERY REASONABLE EFFORT WILL BE TAKEN TO ASSURE THAT THE EMPLOYEES CAN ACCOMPLISH THE SAFE COMPLETION OF ASSIGNED TASKS. NO TASK IS SO IMPORTANT, OR SO URGENT, THAT WE CANNOT TAKE THE TIME TO DO IT SAFELY.

DIRECTOR AND OWNER
2.0 DRUG AND ALCOHOL ABUSE POLICY

The Company prohibits the use, possession, or distribution on its premises, facilities, or work places any of the following: alcoholic beverages, intoxicants and narcotics, illegal or unauthorized drugs (including marijuana), “look alike” (simulated) drugs, drug related paraphernalia, inhalants, firearms and unauthorized explosives. Company employees must not report for work under the influence of any drug, alcoholic beverage, intoxicant, or narcotic or other substance (including legally prescribed drugs or medicines) which will in any way adversely affect their working ability, alertness, coordination, response, or adversely affect the safety of others on the job.

All applicants for employment and employees of Preferred Industrial Contractors, Inc. may, as a condition of employment or continued employment, be required to submit to a drug and/or alcohol screening test at the discretion of the company, (allowing random, post-accident, and “for cause” testing).

Entry into, or presence on company premises, facility or work place by any person is conditioned by the company’s right to search the person, personal effects, vehicles, lockers and baggage of any employee or other entrant for any substance described in the above paragraph. By entering into or being present on Company premises, facility or workplace, any person is deemed to have consented to such searches which may include periodic and unannounced searches of anyone while on, entering or leaving Company premises, facility or workplace. The searches may include the use of electronic detection devices, scent trained dogs, or the taking of blood, urine or salvia samples for testing to determine the presence of substances named above.

The taking of blood, urine, or salvia samples for testing may also be required from any person on Company premises, facility, or workplace who is suspected of being under the influence of drugs or alcohol, or who is involved in an accident or is injured in the course of employment.

This program is designed to notify, identify, and provide penalties for those employees and applicants who by their possession, use, or sale of an illegal drug or alcohol, or who is involved in an accident or is injured in the course of employment.

Any person who refuses to submit to a search, screening or testing as described in this policy or who is found using, possessing or distributing any of the substances described above, or who is found under the influence of any such substances, is subject to disciplinary action up to and including immediate discharge of an employee, voluntary withdrawal of employment application, or removal from the premises, if not our employee.
3.0 SAFETY, HEALTH AND ENVIRONMENTAL OBJECTIVE

3.1 Purpose

A. To eliminate injuries in order to achieve zero injury status for all our employees. To promote maximum efficiency, in order to affect savings by the reduction of business interruptions due to accidents. To provide direction and coordination of a program which will be in compliance with established industry practices, OSHA, MSHA, state and owner safety and health standards.

3.2 Methods of Obtaining Objective

A. Plan all work, first at the project level, then, at the task level, to eliminate personal injury, property damage and loss of productive time.

B. Maintain a system for prompt detection and correction of faulty procedures, unsafe practices and conditions.

C. Make available and requiring the use of approved personal protective equipment and mechanical guards.

D. Establish an effective system of tool and equipment inspection and maintenance.

E. Establish an educational program to maintain interest and cooperation of all levels of employment through:

1. Safety orientation and training.
2. Investigation of all accidents and incidents to determine cause and to take necessary corrective action.
3. Safety meetings and craft training held at regular intervals.
4. Enforcement of safety requirements on all operations.
5. Use of bulletins, posters and other similar materials to stress safety and provide relevant information.
6. Solicit safety suggestions from employees.
7. Adherence to the Company’s Drug and Alcohol Abuse Policy.
8. Provide monetary incentive to all employees to achieve safety goals.
# 4.0 ORGANIZATION AND RESPONSIBILITIES

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4.0 ORGANIZATION AND RESPONSIBILITIES

4.1 General Provisions
The Board of Directors of the Company, recognizes the importance of, and the need to
implement a Safety, Health and Environmental (SH&E) Program to protect people,
property and the environment in which we work.

4.2 General
This manual outlines the requirements and responsibilities of the Board of Directors,
company management and field supervisors, staff and employees, regarding loss
control, accident prevention, promotion of safe and healthful work practices, pollution
prevention and control, hazardous waste management and prevention of occupational
injuries and illnesses.
A. Applicable client requirements, local, state, and federal and international codes,
   law and regulations will be complied with in the performance of all Company
   operations.
B. In the event that there is a conflict between the policies and procedures set forth in
   this SH&E Manual and other mandatory codes, laws and regulations, the more
   stringent standard will apply.
C. This SH&E Manual is intended to detail existing Company, safety protection and
   practices and to assist in applying good judgment in exercising care and prudence at
   all of the company locations.

4.3 Organization
All levels of management within the company must share equally in the responsibility
of creating a safe and healthful working environment for our employees. The
expectation is to operate in an incident free environment, where it is believed that the
employee’s opportunity to contribute to its success, will be fully realized.
A. Board of Directors
   Fulfillment of the above mentioned expectation rely quite heavily upon how well
   the Board of Directors accomplishes the following:
   1. Pursue work with clients that have the same commitment to safety that the
      Company has.
   2. Provide management with the tools to eliminate fatalities, disabling
      occupational injuries, and illnesses and the means to reduce the risks of
      having accidents in order to protect human resources and to maintain accident
      rates at or below the company goals.
   3. Implement programs to reduce accident costs in order that the company’s EMR
      (Experience Modifications Rate) is below 8.
   4. Implement programs to minimize equipment and property damage claims.
   5. Ensure that technical support in the disciplines of safety, industrial hygiene and
      environmental regulatory compliance is available to all projects.
   6. Implement programs that will reduce environmental pollution incidents and
      minimize the amount of damage from accidental releases of hazardous
      Substances.
   7. Promote safe and healthful work practices and effective training programs.
   8. Implement adequate protection programs that protect the public and others
      who may be inadvertently exposed to company activities.
9. Project an image of the company's commitment for safety on all projects.
10. Shall be responsible for monitoring and positively influencing the Safety and Health performance of all the company's projects.
11. Ensure that when performance is substandard and is not meeting the established goals of the company that steps will be taken immediately to bring the poor safety performance back into compliance. Part of this process is to conduct on-site safety inspection.

B. Project Manager
The Project Manager has the ultimate responsibility for executing and maintaining an effective program of employee protection, of safeguarding exposure to the public and of protecting the environment as required by the company, client and regulatory authorities.

The Project Manager may delegate authority to expedite and facilitate any application of the established SH&E Program. As with the Board of Directors, it must be recognized that strong support and active participation at the Project Manager level are essential to preserve human resources, to minimize lost production and costs due to accidents and environmental incidents and to achieve maximum satisfaction of the clients and regulatory authorities. Effective Jan 1, 2011, it will be mandatory the Project Manager and the Project Superintendent demonstrate their knowledge of general construction safety practices. This will be accomplished by successfully completing the OSHA 10 Hour Construction Safety Course, the Supervisory SH&E Training, the Incident/ Accident Investigation Training, and the SAFE Training Program.

The safety responsibilities of the Project Manager are as follows:
1. Since pre-job is the most important aspect in establishing a safe environment on the project it is the responsibility of the Project Manager to implement this program, he must evaluate job specifications and establishes controls for potential safety, health and environmental exposures and hazards.
2. Responsible for ensuring that he/she is fully informed regarding the project site, existing facilities and operations and any and all safety concerns prior to mobilization.
3. Ensure that all of the project management staff is orientated pertaining to safety concerns about the project prior to work being started.
4. Ensures the preparation and implementation of, an effective project SH&E Program to achieve compliance with applicable company, client and regulatory laws, regulations and standards.
5. Directs the development and implementation of accident prevention, hazard control and environmental protection procedures and practices including methods for employee training, objective enforcement of established rules and procedures and the safe handling, storage and disposal of hazardous materials.
6. Ensure that the company Hazard Communication Program is being effectively administered on the project.
7. Responsible for ensuring that safety meetings are being conducted both with the employees and subcontractors.
8. Direct and monitor all subcontractors ensuring that they are in compliance with the Project SH&E Program.
9. Ensure that the subcontractors report all accidents/ incidents to project management.
10. Responsible for ensuring that all safety and environmental issues are addressed when bidding for new work.
11. Personally promote and participate in the SH&E Program and audits of the work operation to ensure compliance of lower tier supervision with established policies and mandatory requirements.

C. Project Superintendent  
1. The Project Superintendent is directly responsible for providing site specific planning on every job prior to the start of work. Every effort must be made to identify and avoid hazards, which could affect employee safety and health. At a minimum, the following is a list of items to be addressed prior to the start of the project:

   - Medical Facilities
   - Substance Abuse Testing
   - First Aid
   - 100% Fall Protection
   - Safety and Other Required
   - Posters
   - Site Access/Egress
   - Project Site Orientation
   - Incentive Program
   - Safety Responsibilities
   - Personal Protective Equipment
   - Required Training
   - Supervisor Qualifications
   - Operator Qualifications
   - Equipment Inspections
   - Accident Investigation
   - Hazardous Materials
   - Employee Exposure
   - Emergency Procedures
   - Fire Prevention and Control
   - Excavations
   - Confined Space Entry
   - Lockout/Tagout Requirements
   - Assured Grounding/GFCI
   - Scaffolding/Ladders
   - Electrical Requirements
   - Crane Requirements
   - Special Rigging/Lifts
   - Welding/Cutting/Burning
   - Fuel Storage Requirements
   - Overtime and Night Work
   - Sanitation Requirements

2. Effective May 1, 2011, it will be mandatory for the Project Manager and the Project Superintendent demonstrate their knowledge of general construction safety practices. This will be accomplished by successfully completing the OSHA 10 Hour Construction Safety Course, the Supervisory SH&E Training, Incident/Accident Investigation Training and the SAFE Training Program.

3. Inform staff and employees of their safety responsibilities, authority, and accountability.

4. Enforce all applicable safety rules, regulations, procedures, and standards as set forth by OSHA, MSHA, the Company SHE&E Program and any specific rules and regulations established for certain projects.

5. Advise project manager regarding safety on the job as requested or when an accident or incident occurs.

6. Ensure that supervisors are conducting their pre-task planning meetings and completing the documentation as required.  

PIC  Rev 12/12/11
7. Make daily safety inspections of project site to monitor conditions and to implement an immediate corrective action for all observed or reported unsafe acts and unsafe conditions.
8. Ensure that the project safety policy is understood by each subcontractor before they start work and require their active participation in SH&E Program.
9. Conduct and document safety meetings and other required training.
10. Monitor and evaluate the use and effectiveness of personal safety equipment and recommend improvements where possible.
11. Ensure that subcontractors are in compliance with the Project SHE&E Program.
12. Require all subcontractors to submit in writing all accident/incidents that occur during the performance of their work.

D. General Foremen/Foremen
The General Foremen/Foremen are the deciding factor on an effective Project SH&E Program. The amount of effort they put into accident prevention determines whether or not a good safety record is established. A General Foreman/Foreman shall:
1. Set a good example by constantly promoting safety and ensuring that proper safety requirements are enforced.
2. Instruct employees in safe work practices and methods at the time of hire and when the employee is given new work assignments. Conduct pre-task meetings and complete the required documentation.
3. Conduct and/or attend Safety Toolbox Meetings.
4. Attend management Safety Meetings as required.
5. Respond to employee safety concerns in a timely manner.
6. Supervise non-routine operations to ensure that adequate safety precautions are taken.
7. Know the hazards and proper handling of all hazardous materials in the employee work area and ensure that each employee is properly trained and has a thorough understanding of how to safely use the materials.
8. Ensure that the employees have received the Hazard Communication Program training.
9. Ensure that employees are equipped with and use the proper protective equipment and tools to perform the job.
10. Ensure that equipment is well maintained and used properly.
11. Monitor the project site continuously to assure that no unsafe practices or conditions exist. If such conditions or practices are found, it is the foreman’s responsibility to eliminate, control or report them to the superintendent or project manager.
12. Ensure that first aid is administered to injured employees.
13. Make a complete and thorough investigation of accidents and incidents to determine the facts, take necessary corrective action and promptly report and record the results of the investigation.
14. Assist the superintendent in completing the required accident reports.
15. As foreman, you are ultimately responsible for the safety of your crew and work area. Workplace is company policy and the law, and must be part of your daily schedule.

E. Employees
All employees must lean and comply with the Project SH&E Program, mandatory safety and health rules and regulations to their work and to the general safety and health of other works on the project.
Specific Responsibilities include, but are not limited to:
1. Notifies his/her supervisor immediately when conditions, hazards or practices may or do cause personal injury or illness or property damage.
2. Makes the maximum use of all required personal protective equipment and follow the good health practices and procedures established to maintain his/her health and safety.
3. Reports safety and health hazards to his/her supervisor immediately.
4. Develops and practices good habits of personal hygiene and housekeeping.
5. Attend all required safety meetings.

F. Corporate Safety, Health and Environmental Director
The Safety, Health and Environmental Director(s) report to the CEO and the Board of Directors.
This individual manages the Corporate Safety, Health and Environmental Department. He directs the formulation and promulgation of policies, rules, procedures and administers the Corporate SH&E protection programs as they apply to employee protection, public safety, equipment and property protection, occupational health and hazardous waste / materials.
Primary Responsibilities include:
1. Supervises the SH&E Professionals assigned to the Department.
2. Serves as a technical advisor to the Board of Directors and project management.
3. Monitors operations and advises management relative to compliance with applicable client and regulatory rules, regulations and/ or laws.
4. Assists the Board of Directors in establishing annual Safety Performance goals in promoting activities to help projects meet or improve upon these goals.
5. Recruits, selects, hires, assigns, promotes, transfers and when and if necessary terminates personnel in the SH&E Department.
6. Provides technical support for and has administrative control over operating unit SH&E Professionals.
7. Conducts and supervises periodic safety, health and environmental evaluations of project operations and advises project management with regard to technical adequacy and compliance with mandatory rules and regulations.
8. Directs and assists in the investigation of serious accidents and environmental incidents. Analyzes investigative data and assists in the development of preventive measures to eliminate or control hazards and potential liability.
10. Collects, develops and disseminates material and information used in program
development to further safety, health and environmental protection training.
11. Complies and distributes statistical reports on safety performance.
12. Serves as the Company’s representative on technical committees and on
professional associations. Advises management on proposed standards and
laws relating to Safety, Health and Environmental issues.
13. Develops and implements industrial hygiene procedures that reflects both
technically sound and cost effective use of company resources.
14. Develops specific occupational health and environmental protection plans
which are both cost effective and responsive to the company’s demands for
technical work.
15. Monitors compliance with all legislative requirements relative to the federal,
state and local jurisdiction in which the company’s demands for technical work.
16. Provides technical input regarding applicable regulations, manpower needs and
associated costs potentially incurred as a result of project execution.

G. Safety, Health and Environmental Co-Director
Reports to the CEO and to the Board of Directors. The following responsibilities are
shared or divided between the Safety Director and the Safety Co-Director:
1. Applies appropriate policies, practices and standards to promote the company’s
SH&E Program and administers assigned functions to aid in this overall
responsibility.
2. Administers and coordinates medical and emergency first aid services.
3. Develop and implement SH&E training programs.
4. Conducts SH&E inspections to eliminate and control occupational injuries and
illnesses.
5. Investigates injuries, conditions and incidents that do or could involve actual or
potential liability and makes recommendations to eliminate future occurrences.
6. Directs the preparation of records and reports relating to Safety, Health and
Environmental protection and property losses required by law and the
company.
7. Maintain and distributes promotional materials to promote good safety and
health practices.
8. Acts as the primary liaison with governmental agencies concerning Safety,
Health or Environmental issues.
9. Represent the company at hearings or in court on matters involving accidents,
environmental incidents and / or regulatory inspections.
10. Supervise Project SH&E Supervisors.
11. Monitors all projects and advises project management relative to compliance
with applicable client and regulatory rules, regulations and/or laws.
12. Recruits, selects, hires, assigns, promotes, transfers and when necessary
terminates safety personnel on the projects.
13. Serves on technical committees and associated with various safety professional
associations.
14. Keeps abreast of proposed standards and laws relating to Safety, Health and
Environmental issues.
15. Provide technical assistance as needed for SH&E protection and practices including the safe handling, storage and disposal of hazardous waste.

16. Applies accepted Industrial Hygiene procedures, techniques and work practices in a manner, which reflects both technically sound and cost effective use of project resources.

17. Implement industrial hygiene programs for project specific occupational health and environmental protection, which will be cost effective and responsive to the demands of the project work.

18. Procurers and maintains all consumable health and environmental protection supplies at a level sufficient to ensure no interruption of project operations.

H. Project Safety, Health and Environmental Supervisor

SH&E Professionals on project reports in a direct line to the Corporate Safety, Health and Environmental Department and have a dotted line reporting responsibility to the Project Superintendent. The Project SH&E Supervisor’s responsibilities are:

1. Applies appropriate policies, practices and standards to promote the Company’s SH&E program

2. Administers and coordinates medical and emergency first aid services.

3. Conducts Safety, Health and Environmental inspections to detect, eliminate and control hazards, which could contribute to injuries, illnesses, and equipment/property damage.

4. Conducts inspections of equipment, structures and work in progress to assist project management in compliance with Safety, Health and Environmental standards of the company and regulatory agencies.

5. Participants in safety planning and scheduling meetings.

6. Investigates injuries, conditions and incidents that do or could involve actual or potential liability and makes recommendations to eliminate future occurrences.

7. Prepares and submits weekly reports to the Corporate SH&E Department on project safety activities.

8. Prepares or directs the preparation of records and reports relating to Safety, Health and Environmental protection and property losses required by law and by the company.

9. Administers and coordinates the project security and fire protection programs.

10. Maintains, distributes and posts promotional materials to promote good safety and health practices.

11. Assists in the planning and presentation of Safety, Health and Environmental training materials for employees and supervisors.

12. Monitor and assist subcontractors in the development and administration of their SH&E Program.

13. In order to instruct the OSHA 10 Hour Construction Safety course and MSHA 8 Hours Safety course, all Project SH&E Supervisors must successfully completed the OSHA 500 course or the MSHA Instructor course.

14. Maintains all consumable health and environmental protection supplies at a level sufficient to ensure no interruption of project activities.
I. **Project Safety, Health and Environmental Representative**

When projects do not warrant a full time Project SH&E Supervisor, the Project Superintendent, with the assistance and agreement of the Corporate Safety, Health and Environmental Director shall assign a member of the field management staff to serve as the Project SH&E Representative. This individual will report directly to the Corporate SH&E Department. Typically the Project SH&E Representative shall be responsible for completing and maintaining records of all accidents and with performing other Safety, Health and Environmental duties as assigned by the Corporate Safety, Health and Environmental Director. These responsibilities will include:

1. Project Safety, Health and Environmental inspections.
2. Equipment inspections prior to use of equipment and also periodic inspections.
3. Injury, illness and incident investigations.
4. Project liaison with insurance inspectors and regulatory agencies.

The Project SH&E Representative must have successfully completed the OSHA 10 Hour Course or MSHA 8 Hour Course and completed the requirements for a “competent person” in the construction disciplines the project is involved with.
4.4 Subcontractor Management Plan

1. Subcontractors will be advised of the provisions of the Project SH&E Program, client stipulations and of contractual obligations at a pre-job safety meeting. The obligation of all subcontractors is to comply with the Project SH&E Program, applicable statutory safety, health and environmental laws, regulations and rules. Subcontractors have the sole and complete obligation to provide a safe and healthful working environment for their employees and for other persons on the project site who may be exposed to their work.

2. All subcontractors shall be pre-qualified by reviewing their safety programs, safety training documents and safety statistics.

3. Project management will request and review the subcontractor’s safety performance such as recordable and lost workday incidence rates, experience modification rate and past history of OSHA/MSHA citations. TRIR, EMR, DART and Fatality Rate will be used as criteria for selecting subcontractors.

4. Minimum requirements for subcontractors will be:
   a. Provide a written SH&E program which includes procedures covering the work to be performed for review and approval by the Project Management.
   b. Provide a written Hazard Communication Program for review and approval by the Project Management.
   c. All subcontractors shall be included in pre-job meetings or kick-off meetings and safety orientations.
   d. Designate in writing a qualified SH&E Representative acceptable to Project Management and some cases by the client, tailgate safety meetings, JSA and site inspections.
   e. Provide pre-hire procedures to Project Management for review and approval. These procedures must include the orientation process and the following must be addressed during this process:
      1. Personal protective equipment requirements.
      2. Fire prevention/prevention.
      3. Emergency procedures.
      4. Hazard communication.
      5. Substance abuse prevention.
6. Security requirements
8. Equipment safety.
9. Specific project requirements.

f. Conduct and document Safety Toolbox meetings.
g. Attend all required Project Safety Meetings.
h. Complete and promptly report accident and injury reports. A copy of each insurance company first report of injury (E-1) shall be provided to the Project Superintendent who will forward to the Project Manager. A monthly summary of occupational injuries and illnesses including man-hours shall also be submitted to Project Manager.
i. The subcontractor is responsible for investigating injuries/incidents and filing a report, in writing to the Project Superintendent, identifying the cause(s) and what corrective actions have been taken to reduce the risk of a re-occurrence.
j. Inform all of their supervisory personnel of the Project SH&E Program and their responsibility for providing a safe and healthful place to work for their employees.
k. Report all OSHA/MSHA/EPA or other State or Local inspections and provide a copy of any inspection reports and citations to Project Management.
l. Maintain all equipment and tools in a safe condition.
m. Cooperate with Project Management, client and other contractors/subcontractors in maintaining a safe and healthful workplace.

5. The Preferred Industrial Contractor, Inc.’s Project Manager will monitor the SH&E performance of the subcontractors. Project Management will notify the subcontractor of noncompliance of any established SH&E rules or procedures. A “Safety Violation Notice” Form (See Section 7), has been developed to be used as a formal method for documenting and enforcing the Project’s SH&E Program.

6. If Project Management notifies any subcontractor of any noncompliance with the provisions of the Project’s SH&E Program or other client or statutory requirements the subcontractor shall take prompt action and make all reasonable efforts to correct the unsafe or hazardous condition(s) or act(s).
Satisfactory compliance shall be made within a reasonable, specified time. If a subcontractor refuses to correct unsafe or hazardous conditions or acts, the Project Management will initiate appropriate actions in accordance with the contract provisions and may take one or more of the following steps:

a. Cease the operation or a portion thereof (particularly in the case of an imminent danger).
b. Correct the situation and back-charge the subcontractor.
c. Stop and hold up payment for the work being performed.
d. Invoke contract penalties and/or terminate the contract.
e. Continued substandard safety performance will be considered a Breach of Contract and appropriate action will be taken up to and including cancellation of the contract.
f. Project Manager shall conduct post-job safety performance review.

4.5 Establishing the Project Safety, Health and Environmental Plan

A. Plan Requirements
Prior to the commencement of work at a new project site, the Project Manager shall take steps to implement an effective Project SH&E Plan. The Plan may be tailored to meet the needs of the project, but it must meet the basic requirements established in this SH&E Manual. The Plan must also in accordance with any client, local state, and federal laws, regulations and standards. The basic requirements of the Project SH&E Plan and appropriate reference sections of the Manual are listed below:

1. Project Specific Rules.
2. Organization Structure and Responsibilities of Key Personnel
3. Inspections
4. Training.
5. Hazard Communications.
6. Environmental Protection.
7. Administrative Procedures including Record keeping and Reporting.
8. Substance Abuse Prevention.
B. Organizing the Project Safety, Health and Environmental Plan

The Project Manager shall contact the Corporate Safety, Health and Environmental Director to determine if a full time SH&E Professional is required on the project. If it is determined that a SH&E Professional is needed then the Director will recruit for a SH&E Professional or transfer one to the project prior to the start of work. If the project is of the type or size that a full time SH&E Professional is not warranted, then the Project Manager or Project Superintendent will submit in writing the person they want to assume the position of Project SH&E Representative with qualifications for approval by the Corporate Safety, Health and Environmental Director. If the Project Manager decides not to designate a Project SH&E Representative then this responsibility will be assigned to the Project Superintendent who then must submit his/her safety qualifications to the Safety, Health and Environmental Director for approval.

NOTE: When a project operates on more than one shift, the responsibilities for carrying out the SH&E Plan shall be delegated to an individual or individuals on the second and third shifts.

C. Initial Priorities

1. Adequate safety, fire prevention, medical, security, occupational health and environment protection measures shall be established as required by the company, client and mandatory regulations. The Corporate SH&E Department will assist in the development and implementation of these measures.

2. Arrangements shall be made for hospital, doctor, ambulance, firefighting and police services. The telephone numbers and/or other instructions for obtaining these services **shall be posted** at the telephones in key locations on the project.
3. Liaison must be made by project management with representatives of
   the client, insurance carrier, regulatory authorities (if needed) and other
   appropriate personnel to determine and coordinate such items as:
   
   a. Measures to protect the public and/or other persons
      exposed to the work operations.
   
   b. Client, local, state and/or federal laws and regulations that
      are applicable to the project.
   
   c. Procedures for handling and reporting accidents,
      property damage and other emergencies.

4. Initial investigation of the project site and review of the proposed work
   must be made as soon as possible to determine, to the extent possible,
   existing or probable hazardous conditions.
   
   a. Planning shall outline steps needed to prevent or eliminate
      such hazards.
   
   b. Hazards, which cannot be eliminated, shall be controlled and
      properly marked as required with warning signs, barricades,
      etc. Such dangers shall be pointed out to visitors and new
      employees if they will be exposed to these dangers.

5. Utilize the Project Safety, Health and Environmental Check List
   (Exhibit 4-1) to plan for and establish an effective Project SH&E Plan.

D. Key Elements

1. Good advance planning and early establishment of the Project SH&E
   procedures and responsibilities are critical to a successful program.
   Planning should include these basic elements:
   
   a. Safety planning and job hazard analysis.
   
   b. SH&E indoctrination and training.
   
   
   d. Reporting and record keeping requirements.
   
   e. SH&E inspections, accident analysis and objective enforcement
      of established procedures and applicable standards.
   
   f. Procedures to ensure the active involvement of project
      supervision in the SH&E training, inspection and enforcement
      activities.

2. Safety meetings for supervisory personnel shall be conducted a minimum
   of once a week. The importance of project management’s support and
participation in these meetings is emphasized. The Project Superintendent shall reside at the supervisor’s safety meetings and shall be assisted by the Project SH&E Supervisor/Representative. Minutes of these meetings shall be maintained and copy of the minutes shall be distributed to the participants. These meetings will be presented in order to:

a. Promulgate and review the SH&E procedures and policies applicable to the project.
b. Identify responsibilities of each of the project management.
c. Review noted and anticipated SH&E hazards and plan methods to eliminate or control them.
d. Analyze accident experience and discuss accidents to determine causes and steps necessary to prevent reoccurrence.
e. Discuss suggestions and ideas for improving the Project’s SH&E Plan.

3. The Project Safety Supervisor/Representative shall attend and take an active part in scheduling and planning meetings to ensure for the proper planning on SH&E into the work sequence.

4. Once a week a formal SH&E inspection of all active work areas shall be conducted by the Project Superintendent and the SH&E Supervisor/Representative. To be effective, such inspections shall occur on all shifts, shall be unannounced and shall occur at varied intervals.
   a. Imminent danger situations shall be corrected immediately.
b. Inadequate or deficient protective measures and unsafe or unhealthy work practices shall be brought to the immediate attention of the craft supervision for correction.
c. The Project Superintendent shall be informed of all deficiencies not immediately correctable and/or which may result in damage to facilities, equipment or work in progress or which creates hazardous exposures to employees, other workers or the public.

5. Appropriate mechanical safety inspections are a part of the equipment preventive maintenance program and as such are the responsibility of the project supervisors.
   a. Accurate and complete maintenance and repair records are an important part of the preventive maintenance program. The
Project SH&E Supervisor or Representative shall have access to these records and shall make periodic reviews to determine if the equipment is being maintained in a safe condition.

b. Pre-Shift safety inspections shall be made by the operators of the equipment. These inspections shall be documented on “Operators Safety Check List” Form (see Section 7).

c. Project management shall adhere to federal, client and Company stipulations for testing and inspections of equipment and vehicles.

6. Signs and posters of appropriate size and design and bearing standard pertinent regulations shall be used to convey warnings, directions and instructions to personnel and the public as required by the client and other applicable regulations. The observance of such safety and accident prevention signs shall be strictly required of company employees and visitors while on the project.

7. Mandatory Safety, Health and Environmental Guidelines (Exhibit 4-4) and Rules of Conduct (Exhibit 4-3) will be posted on employee bulletin boards and in conspicuous locations in the project trailers, offices (if any) and other project facilities.

8. It is important to plan for and provide adequate resources to the Project SH&E Plan to ensure its effectiveness. The Project SH&E Supervisor/Representative must be provided with adequate transportation, telephone and/or radio units, suitable desk space and storage facilities, data entry or computer resources, training aids, testing equipment and administrative support.

9. Consideration must be given to make the Project Environmental Protection Plan effective. The type and extent of the measures needed for pollution control, hazardous materials handling, hazardous waste control and disposal and for relating occupational health issues will depend upon the contract stipulations, hazards involved, type of operation and mandatory requirements of regulatory authorities. Such measures shall include appropriate control methods necessary to prevent and reduce the safe levels exposure to hazardous substances.

E. Implementation of The Project Safety, Health and Environmental Plan

1. The active involvement of the project management at all levels in SH&E training, enforcement, inspection and incident investigation activities are necessary to maximize the effectiveness of the Plan.
2. Supervision SH&E Meetings.

In order to make the Project Plan most effective, the Project Superintendent shall conduct a meeting at least once a week for all supervisory personnel. It may be appropriate to combine this with other scheduling and/or planning meetings. The supervisory personnel of subcontractors need to be included in the safety meetings. These meetings will be presented in order to:

b. Review the work schedule for immediate and future operations. Pre-plan safe work methods and procedures and obtain necessary SH&E equipment and supplies.
c. Discuss accidents and environmental incidents occurring prior to the meeting, pointing out the causes and how they could have been prevented.
d. Review the Project’s SH&E performance looking at trends, costs and effectiveness of any recommendations or implemented changes.
e. Discuss SH&E hazards and potential pollutants on the project and the steps which have or will be taken to control or eliminate them. Supervisors shall be encouraged to report any discrepancies they may have noticed.
f. Discuss suggestions and ideas for improving the Project SH&E Plan.
g. A record of these meetings shall be maintained by the Project Safety Supervisor or the Project SH&E Representative.

3. Work Area Inspections.

Inspection of all work areas shall be made daily by the Project SH&E Supervisor or Representative. Inadequate and deficient protection measures and unsafe work practices that are noted shall be brought to the attention of the appropriate supervisor for immediate correction.

a. Periodic inspections by the Project Superintendent, on a weekly basis, is required to visibly demonstrate top management’s concern and support for the Project’s SH&E Plan.
b. The Project Superintendent shall be informed of all deficiencies that cannot be corrected immediately.
c. Inspection of all flammable storage areas shall be made at regular intervals.

4. General Methods of Controlling Health Factors or Stresses

As soon as dangerous hazards or stresses are discovered, steps shall be taken to eliminate or control these hazards or stresses. General methods of control to take into consideration, include the following:

a. Substitute a less harmful material for one, which is dangerous to health.

b. Change or alternate the process to minimize work contact.

c. Isolate or enclose the process or work operation to reduce the number of persons exposed.

d. Utilize wet methods to reduce dust on the project.

e. Safely remove or disperse the contaminants at their source before they reach the workers.

f. Ventilate with clean air to provide a safe atmosphere.

g. Utilize personal protective devices.

h. Maintain good housekeeping. This includes the cleanliness of the work area, waste disposal, adequate washing, toilet and eating facilities, sanitary drinking water and control of insects and rodents.

i. Whenever appropriate, utilize special control methods for specific hazards, such as reduction of exposure time, film badges, continuous or frequent sampling with monitoring device and medical programs to detect intake of toxic materials.

j. Medical controls should be used as necessary.

k. Maintain an adequate training and education program to supplement engineering controls.

5. Environmental Protection Factors.

a. Specific methods for controlling environmental factors will vary considerably depending upon each individual situation or problem.

b. To determine the most feasible solution to pollution and hazardous materials management problems, the
environmental factors and stresses must be first carefully measured and analyzed. This often requires sophisticated equipment and the assistance of expert consultants and laboratory facilities. For environmental problems requiring other than routine evaluation and control, contact the Corporate Safety, Health and Environmental Department.

6. Protection of Archeological Sites
   a. All items having any apparent historical, paleontological or archaeological interest, which are discovered in the course of construction activities, shall be left undisturbed and shall be immediately reported to the client.
   b. Any area or site that has been determined to be eligible for inclusion in the National Register of Historic Places in an environmentally restricted area. These areas will be left undisturbed and employees and subcontractors shall be directed not to disturb or otherwise cause damage to them.


Normally landscaping and restoration is the responsibility of the client/owner but, if this is not the case, the following needs to be considered:
   a. Wildlife habitat pond dikes where and when necessary will be constructed at specified locations before any material is placed in the drainage areas below these locations. When a slope area has been developed to the specified grade, immediate permanent seeding of that area will be undertaken. Immediate permanent seeding will also be done one each disposal area segment that has been developed to the specified grades and approved.
   b. If areas outside the limits of construction are disturbed by our operations, the area will also be restored. Restoration of any such areas will be accomplished by grading to provide a well-drained slope and shaped to blend into the adjacent undisturbed areas. An adequate growth media will be provided, if necessary, and suitable re-vegetation established.
following procedures comparable to those used for permanent seeding.
c. All temporary construction facilities such as haul roads, work areas, parking lots, structures, foundations of temporary structures shall be obliterated and the area appropriately landscaped to reflect the surrounding terrain and drainage requirements, covered with a growth medium as necessary and permanently seeded with appropriate grass.

4.6 Exhibit(s)

A. SAF 4-1 Project Safety, Health and Environmental Program Checklist Pg. 24
B. SAF 4-2 Safety, Health and Environmental Guidelines Pg. 29
C. SAF 4-3 Rules of Conduct. Pg. 33
EXHIBIT 4-1

PROJECT SAFETY, HEALTH AND ENVIRONMENTAL PROGRAM CHECKLIST

This checklist may vary for different project operations and may not include all items required for your project. However, it does contain the essential elements for establishing an effective Safety, Health and Environmental and Loss Prevention Program.

<p>| TASK                                                                 | ASSIGNEED TO | DATE COMPLETED |
|                                                                     |              |                |
| 1. Contact the Corporate Safety, Health and Environmental Dept. for planning of safety, medical and environmental programs. |              |                |
| 2. Contact the Corporate Human Resource Department for the Substance abuse prevention Program. |              |                |
| 3. Obtain the Safety, Health and Environmental Manuals and The Federal Regulations from The Corporate Safety, Health And Environmental Dept. |              |                |
| 4. Order safety forms from the Corporate Safety, Health and Environmental Director for a Project Safety Supervisor/Representative. |              |                |
| 5. Contact the Corporate Safety, Health and Environmental Director for a Project Safety Supervisor/Representative. |              |                |
| 6. Order first aid kits and supplies                                 |              |                |
| 7. Assign trailer/office space to Safety personnel including desk, File cabinet and clerical assistance. |              |                |
| 8. Obtain and assign radio and Telephone to safety personnel.         |              |                |</p>
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<th>TASK</th>
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<tr>
<td>9. Order prescribed personal Protective equipment, i.e.</td>
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<td>Hard hats, eye and hearing Protection, respirators, etc.</td>
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<td>12. Establish schedule for Monthly supervisor’s safety Meeting.</td>
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<td>13. Evaluate Project for hazards Or special requirements and Develop specific Safety, Health And Environmental rules and Procedures</td>
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<td>14. Plan and develop procedures For administering safety programs For subcontractors including Preconstruction safety meeting.</td>
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<td>15. Determine requirements and Conduct pre-work inspection For performance and load tests Of cranes, hoists, etc. and similar Equipment. Complete required Documentation.</td>
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<td>16. Plan project inspection Program, frequency of inspection, Documentation requirements and Type of inspection should be Included.</td>
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<td>17. Implement preventive Maintenance program.</td>
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<td>18. Determine record keeping</td>
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<td>Reporting requirements of</td>
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<td>Regulatory authorities (OSHA,</td>
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<td>MSHA, etc.), client, and company</td>
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<td>Safety.</td>
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<td>19. Evaluate the need for an EPA</td>
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<td>Storm Water Pollution Plan</td>
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<td>And NPDES Storm Water Permit</td>
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<td>For construction activities.</td>
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<td>20. Evaluate security requirements</td>
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<td>Such as guards, perimeter fencing,</td>
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<td>And lighting.</td>
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<td>21. Evaluate the need for occupational</td>
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<td>Monitoring, i.e. noise, water, air</td>
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<td>And dust surveys and gas monitoring.</td>
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<td>Contact the Corporate Safety Health</td>
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<td>And Environmental Dept for</td>
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<td>assistance.</td>
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<td>22. Determine and establish safety</td>
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<td>Enforcement and disciplinary</td>
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<td>Sanctions for Safety, Health and</td>
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<td>Environmental Violations. Ensure</td>
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<td>All employees have been advised.</td>
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<td>23. Plan and establish emergency</td>
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<td>Or toxic gases, etc.</td>
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<td>24. Determine requirements to Control</td>
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<td>and prevent unsafe Conditions, i.e.</td>
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<td>guards, Accessways, ladders, lock-</td>
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<td>out/ Tagout procedures, confined</td>
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<td>Entry, etc.</td>
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<td>TASK</td>
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<td>25. Develop fire prevention</td>
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<td>Plan and determine fire</td>
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<td>requirements</td>
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<td>Order and install equipment.</td>
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<td>26. Post safety instruction signs,</td>
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<td>Posters, and other promotional materials/</td>
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<td>27. Implement accident and</td>
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<td>Environmental incident</td>
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<td>28. Make contacts and establish</td>
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<td>Working relationship with local</td>
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<td>Medical personnel and facilities,</td>
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<td>Local ambulance service, fire</td>
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<td>Station and applicable client personnel.</td>
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<td>29. Establish methods to monitor and</td>
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<td>document progress of safety</td>
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<td>Performance and communicate to</td>
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<td>All project personnel.</td>
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<td>30. Implement company Hazard</td>
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<td>Communication Program to train employees</td>
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<td>and to monitor Health hazards.</td>
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<td>31. Order and prescribe appropriate</td>
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<td>Equipment and media for response</td>
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<td>To accidental spills or release of</td>
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<td>Hazardous materials.</td>
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It is the policy of Preferred Industrial Contractors, Inc. to perform work in the safest manner possible in conjunction with good work practices, which will protect the safety and health of our employees. This also includes making every effort to prevent accidental losses to equipment, client and public property.

To fulfill the requirements of this policy, an organized and effective SH&E Program shall be carried out at each project site. Such an effort will comply with all applicable federal, state, local and client occupational safety and health rules and regulations.

Our Company is vitally interested in the safety and welfare of every one of our employees. Safe tools, modern equipment and good working conditions are thus provided; but, the cooperation of each and every worker is necessary.

Most, if not all, accidents can be prevented, and as an employee, you will be required to follow all of the instructions and safe practices to your job. A copy of our SAFETY AND HEALTH EMPLOYEE HANDBOOK has been provided to you for each reference, which explains our safety program more fully. It is the duty and responsibility of all employees to know the Safety Rules, and conduct their work accordingly.

The following Safety and Health Rules are a partial list of general regulations that shall apply to all employees. Disregard of these rules or other applicable Safety and Health Regulations shall be grounds for disciplinary actions up to and including termination:

All occupational injuries and illnesses, no matter how slight, must be reported to your supervisor immediately. If you are injured on the job and do not report the occurrence to your supervisor, the Company will not be responsible for any medical expense incurred by you on your own.

Submitting false or fraudulent information when reporting an accident or injury is unlawful and will be cause for dismissal.

Personal protective equipment such as hard hats, eye, face, hearing and respiratory protection will be furnished and used as required. Approved hard hats must be worn at all times in designated areas or where overhead hazards exist.
Full body clothing will be required to avoid sunburn and exposure to sparks and hazardous materials. The minimum shall be short-sleeved shirts, long trousers and sturdy work shoes or boots required for foot protection. **Canvas, tennis or deck shoes are not acceptable footwear.** When a foot hazard is identified steel toe or safety toe protection may be required. On some projects the client may require this type of foot protection.

Only authorized and properly trained and supervised personnel are permitted to operate equipment, vehicles, valves, electrical switches and similar machinery.

Keep clear of all equipment. Avoid pinch points and blind areas. Be alert to avoid swinging or suspended loads and stay out from underneath suspended loads.

Ride only in vehicles designated and designed for transporting personnel; you must utilize the seat belts in moving equipment or vehicles that are equipped with such.

Misuse of tools and equipment or circumventing safety devices can result in injury to yourself or others. Do not use makeshift tools or equipment to perform your job.

Unless authorized, do not attempt to repair or tamper with equipment that is not functioning properly. Report malfunctions to your supervisor.

Riding loads, slings, the ball, crane hook or other material hoisting equipment or jumping on or off equipment or vehicles, either moving or stationary, is prohibited.

Keep all machinery guards, guardrails and other protective devices in place and in good operating order.

Whenever anyone is required to work on or in close proximity to electrical equipment or circuitry, appropriate tagging will be placed to identify all controls deactivating the circuits, and the circuit shall be locked out, when possible.

Be alert for and heed all information and warning signs at all times.

Do not use compressed air to “dust-off” yourself.

Store and use gas cylinders in a secure, upright position, with their valve caps secure and the cylinders shielded from sunlight.

Do not smoke or use open flames in areas marked “No Smoking” or near flammable or combustible materials or their storage areas.

Be alert to conditions and work processes in your area and surrounding areas and with the presence of other workers and equipment so that you can foresee and avoid potential dangers.

Work area guidelines and regulations for environmental protection must be strictly followed. All hazardous material must be handled, stored and disposed of properly.
Maintain good housekeeping at all times. Keep waste, debris and rubbish cleaned up. Place all lunch papers, cups, cans and other litter in trash receptacles. Discard and/or store all oily rags, waste and similar combustible materials in metal containers provided for that purpose.

Remember, it is extremely important that you understand how each task is to be done in a safe manner and if you do not know, **STOP & ASK** your supervisor before you being work. Your safety and well-being, as well as that of your co-workers, can be accomplished only through your constant, sincere effort. Merely talking about safety will not make safety a fact.

It is Company policy to perform work in the safest manner possible consistent with good construction work practices, which will protect the safety and health of our employees and of all persons exposed to our operations. This includes making every effort to prevent accidental losses to equipment and property and can be achieved with the cooperation of each and every worker engaged on this project.

________________________________________
SIGNATURE

________________________________________
PROJECT SUPERINTENDENT’S NAME
RULES OF CONDUCT

PROJECT NAME

ADDRESS OF PROJECT

We welcome your participation and cooperation as a member of the Preferred Industrial Contractors, Inc., construction project team. We have a continuing responsibility to our clients to provide our construction services in the safest, most efficient and economical manner possible. Good conduct on the job is thus essential to the common good of all employees and daily progress of the job. In order that we may enjoy a safe and efficient job, unsatisfactory conduct, including but not limited to the following violations, will be subject to appropriate disciplinary action up to and including termination:

- Employees must be at their appointed work station as designated by project management, ready to work, at their scheduled starting time and shall remain at their work station(s) and work until scheduled quitting time.
- Employees shall not gather on project property for personal business.
- An employee must report any injury or accident to his/her Supervisor as soon as practical on the day of occurrence.
- An employee shall be responsible and exercise reasonable care for all Company tools, equipment and property assigned to or requisitioned by him/her or in his/her custody. All tools, equipment and property must be returned to the proper or designated location after usage.
- An employee shall not enter the project property or remain on the premises unless he/she is on duty or scheduled for work, without permission from the Project Superintendent.
- If an employee is unable to report for or perform work due to illness or other justifiable cause, he/she must report his/her expected absence and give the reasons for his/her inability to work to the Project Superintendent to the extent practicable, at least 12 hours in advance.
- An employee shall use only project entrance designated.
- An employee shall not restrict production or interfere with others in the performance of their jobs or engage or participate in any interruption of work or production.
• An employee shall not neglect his/her job, duties or responsibilities, nor fail or refuse to perform work assigned to him/her.

• An employee must be available and report for work as scheduled or for overtimes work as may be required or assigned to him/her.

• An employee shall not engage in soliciting funds on project property at any time.

• An employee shall not use telephones for personal calls except in case of an emergency or unless he/she has permission from the Project Superintendent.

• An employee must report for and remain at work at all times in a fit physical condition.

• No employee shall post, remove or change any non-Company notice, poster or sign on the project property without prior written approval from the Project Superintendent.

• In order to facilitate better communication among employees and thus assure a safer working environment, employees shall communicate only in the English language during periods of actual work. Employees may communicate in any other language during breaks or meal periods.

THE FOLLOWING ACTS OR CONDUCT IS PROHIBITED:

• Driving a vehicle over an unprotected electrical cable.

• Bringing any firearms or weapons of any kind onto project property.

• Bringing drugs, alcoholic beverages or other intoxicants onto project property.

• Violating any Company Safety Rules or practices or engaging in any conduct, which tends to create a safety hazard.

• Misusing or removing from the project premises without proper written authorization, company property, records or other materials.

• Fighting.

• Horseplay.

• Abuse or destruction of Company or Client property, tools or equipment.

• Interfering with fellow employees or Supervisors.

• Insubordinate conduct or refusal to follow Supervisor’s direction of the working force.

• Gambling.

• Smoking in no smoking areas.

• Falsely stating or making claims of injury or accident.

• Unauthorized or un-excused absence or lateness.
• Falsifying any reports, data or records, including but not limited to personnel, absence, sickness, production, equipment, time or health and safety reports.
• Littering of the project and client property.

The foregoing rules are not intended to be all inclusive of the required discipline, proper standards of conduct or obligation which employees must observe at all times.

The Company shall, when it deems it appropriate, establish additional rules and the Project Superintendent may set up particular rules to govern employees conduct deemed necessary to operational requirements.

__________________________
SIGNATURE

__________________________
PROJECT SUPERINTENDENT

__________________________
DATE
# 05.0 - Process Safety Management

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5.0 PROCESS SAFETY MANAGEMENT

1.0 PURPOSE

A. The purpose of the Process Safety Management program is to develop and coordinate, with plant and facility owners, all construction and maintenance work, which could result in the catastrophic release of toxic, reactive, flammable or explosive chemicals. These releases may result in toxic, fire or explosion hazards. While all plants and processes are not the same and present unique hazards, Preferred Industrial Contractors, Inc. must ensure that our employees are properly trained and that appropriate safety precautions are taken during all phases of construction or maintenance activities.

2.0 GENERAL REQUIREMENTS

A. The plant/facility owner is responsible for supplying Preferred Industrial Contractors, Inc. with the following:
   1. Provide detailed safety requirements in bid documents.
   2. Information concerning any potential fire, explosion and toxic release hazards in addition to any Hazard Analysis and Hazard Communication information relevant to work areas or processes effected by construction activities.
   4. Information concerning Safe work Procedures, including but not limited to: Site specific rules and regulations, material safety data sheets, lockout/tagout, confined space entry, hot work permits, opening of process equipment or piping, and access/entry controls for employees in process areas.
   5. Conduct periodic Safety Performance Audits to ensure compliance and to notify Preferred Industrial Contractors, Inc. of any deficiencies.

B. It shall be the responsibility of Preferred Industrial Contractors, Inc. to assure that each employee has been properly trained in safe work practices for each task to be performed and that all employees obey company and plant/facility safety requirements by use of the following:
   1. Employees receive project orientation and training.
   2. Employees are instructed that they are responsible to report all injuries and accidents to their supervisors immediately. The supervisor will implement the Accident Investigation
Procedure the day of the accident and inform the employees of the investigations findings and correction actions to be implemented.

3. Project specific safety requirements such as:
   a. Lockout/Tagout
   b. Hot Work Permits
   c. Confined Space Permits
   d. MSDS Information
   e. Client Processes
   f. Access/Entry Controls to Process Areas

4. Instructs each employee in the known potential of fire, explosion and toxic release hazards associated with their work areas and assignments.

5. Review the client’s Process Hazard Analysis and Hazard Communication information including Material Safety Data Sheets with each employee.

6. Ensure that each employee has been instructed in the safe work practices for the control of hazards associated with their work areas and activities.

7. Provide documentation that each employee has received and understood the required training and insisting upon strict compliance with company and plant/facility safety requirements.

8. Advise the plant/facility owner of any unique hazards presented by construction activities or found during the construction work.

9. If required by the client, all employees will sign a client’s trade secret information form.
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6.0 EDUCATION AND TRAINING

6.1 Orientation of New Hires

The purpose of this section is to define the requirements for welcoming new employees to the Company and project, and evaluating the new employee’s physical ability to perform their work tasks. Should the project not have a medical or first aid staff, the Project Superintendent will designate the responsibilities to a qualified member of his/her staff.

This section is applicable to all projects unless otherwise modified by contractual agreement.

A. Employee Sign-Up
   It is important to make a distinction between sign-up and orientation. All new hire paperwork and reviews should be completed prior to starting the orientation; specifically:
   1. Drug Testing
   2. Health Survey
   3. Citizenship, W-2’s etc.
   4. New employee given the Safety and Health Knowledge Questionnaire to be completed prior to Orientation.
   5. The employee is to be issued a copy of the Safety, Health and Environmental Handbook.

B. Screening For Pre-Existing Medical Conditions Which May Pose a Hazard
   1. The Company is responsible to provide a work environment free of recognized hazards. Some pre-existing medical conditions, when combined with the expected work assignments and job condition, may pose a significant safety and health hazard to the affected employee and/or to other workers. Furthermore, many states have a second injury fund program that minimizes the employer’s Worker’s Compensation costs should the employee have qualifying pre-existing physical disability. It is imperative under the American Disabilities act guidelines that the Health Survey is completed only after the employee is signed up and may not be used in a manner that would discriminate against physical limitations.
   2. The Project Superintendent is assigned the responsibility of reviewing the Health Survey form to check for completeness, pre-existing physical conditions, which are qualified under the second injury fund, and/or pre-existing physical conditions which may pose a safety and health hazard.
3. The Project Superintendent must interview all employees who do not fully complete the Health Survey form and/or who indicate the existence of a pre-existing condition to determine the nature of the condition.

4. The Project Superintendent is to request the employee to contact their personal physician and provide a written report of any pre-existing physical condition and release to perform the work. As appropriate, a formal written request, signed by the employee, is to be provided to the physician. The Project Superintendent is to ensure that a job description is completed and attached to the written request when it is sent to the physician.

5. Should the employee’s private physician be unable to provide the request report in a timely manner or should the provided report be inconclusive, then the Project Superintendent will refer the employee to the company physician for examination and recommendation.

6. Employees having pre-existing physical conditions which may pose a safety or health hazard are to be assigned low risk work, when such is available, until the physician’s report is received and verified.

7. The Project Superintendent will verify that all qualified employees with pre-existing disabilities are registered with the second injury fund (when such a program exists in the state). The Project Superintendent is to initiate the registration of those employees who are qualified but are not registered.

8. Employees having pre-existing physical conditions, which pose a safety or health hazard, are to be considered for work consistent with their physical capabilities. Should alternative jobs not be available, the employee is to be discharged as physically unable to safely perform the work referred for.

9. The following procedure is applicable should an employee does not report a pre-existing physical condition which may pose a safety or health hazard at time of hire and such condition becomes known later:
   a. The employee should be immediately removed from the work environment that is incompatible with the condition. He/she will call or contact their personal physician and request a current report on the condition and the employee’s ability to safely perform their work. The Company doctor will evaluate the employee should the employee’s doctor’s report does not arrive in a timely manner or is inconclusive.
   b. The Project Manager, after consultation with the Corporate Safety, Health and Environmental Director, Manager of Human Resources and the Division Manager, will approve the termination of employment, should the requested medical report not be provided in a timely manner.

C. New Employee Safety, Health and Environmental Orientation
   1. New employees are to be provided orientation concerning the safety requirements, job rules and conditions prior to assignment to a crew or
job. These orientations are to be provided only after the sign-up and screening elements have been completed. The purpose of the orientation is to welcome the new employees to the project, explain our Safety, Health and Environmental Program and expectation, and encourage the employee to be an active supporter of the program:

2. The orientation is to be conducted by the Project SH&E Supervisor or the SH&E Representative and if neither are available this responsibility is assigned to the Project Superintendent. The individual conducting the orientation must be aware that this is the first contact the new employee has with management. First impression usually dictates a person’s perception and, we do not get a second chance to make the impression that is needed for the new employee to do his/her work safely. Arrangements should be made prior to orientation process to accommodate non-English speaking employees.

3. The New Safety and Health Knowledge Questionnaire will be given to the new employees to answer prior to the start of the orientation.

4. The Safety, Health and Environmental Handbook will be reviewed with the new employees. Upon the completion of the orientation the employee, Project SH&E Supervisor/Representative or Project Superintendent will sign and date the acknowledgement page. This signed acknowledgment is to be sent to the Corporate SH&E Department with a copy placed in the project safety files.

5. A verbal orientation will be conducted covering the safety requirements applicable to the project. The orientation must be documented and including the following:
   b. Evacuation Alarms and Procedures
   c. Personal Protective Equipment
   d. Hazardous Communication Program
   e. Lockout/Tagout Procedure
   f. Procedures for Confined Space, Excavation/Trenching, Heights, etc.
   g. Client Requirements (if applicable).
   h. Project Specifics
      1. First aid/Safety Department Location
      2. Emergency Evacuation Area
      3. Smoking Areas
4. Off Limit Areas
5. Tool Trailer/Room
6. Bathroom Location(s)
7. Project Trailer/Office
8. Employee Parking
9. Danger Areas
10. Break Areas

6. Hazards Unique to the Project Site
   a. Client Operations
   b. Overhead Power Lines
   c. Railroad Tracks and Roads
   d. Possible Fire/Explosive Conditions
   e. Chemicals
   f. Other Contractors Operations
   g. Craft Specific Hazards

7. Advise the new employees what he/she will be working on initially and the precautions that need to be taken on the work assignment. Employees should be briefed on the process involving the SAFE Program which describes the process of identifying hazards and establishing a plan for a control/prevention of those hazards prior to commencing each major phase or activity on the project.

8. Advise the new employee of the time and place that the Safety Toolbox Meetings are held.

9. Clarify all generic information in the Safety, Health and Environmental Employee Handbook and make it specific to the job such as:
   a. Drug Testing
   b. Hours of work
   c. Payday and distribution
   d. Rehire policy
   e. Medical facility
   f. Project Superintendent and Supervisor names
   g. SH&E Supervisor/Representative name

10. Explain the Company’s Safety Goals and Incentives
11. Advise current the new employee of the Project Safety Performance.
a. All injuries  
b. Near misses  
c. Unsafe conditions  
d. Unsafe acts  

14. During the orientation ask enough questions to ensure that the orientation messages have been conveyed and be sure to welcome the new employee to the project.  

15. When appropriate, use of videotapes may be incorporated into the orientation; however, such use must be with care and always followed up with questioning to ensure conveyance of the safety message.  

16. Additional consideration for the orientation process include:  
a. Do not attempt to give an orientation without a script or outline.  
b. Use the word “We” instead of “You” whenever possible.  
c. Conduct orientations in separate rooms away from distractions if at all possible.  
d. Give the New Hire Safety and Health Knowledge Questionnaire again and review the incorrect answers with the new employees. Send originals to the Corporate SH&E Department and keep a copy for the project safety files.  

17. Upon completion of the orientation give the new employees the New Hire Safety and Health Knowledge Questionnaire and address all incorrect answers. Once this has been completed issue protective equipment to the employees, such as:  
a. Hard Hat  
b. Safety Glasses  
c. Side Shields  
d. Gloves  
e. Safety Harnesses and Lanyards  
f. Etc.  

6.2 Safety – Education and Training  

As a means of instituting, reinforcing and ensuring all personnel are aware of and implement all phases of the Company SH&E Program, a planned program of education, training, and information must be used. A means for implementing our program shall include the following:  

A. Foreman/ Supervisor Orientation
The project manager or superintendent will thoroughly review the project, taking special care to point out any and all identified hazards or concerns and informing the foreman of his responsibilities. To ensure our foreman and our subcontractor’s foremen are familiarized with their safety responsibilities, a one-time safety orientation shall be conducted by the project manager or superintendent prior to project start up and upon hire or promotion, to review foreman/supervisor responsibilities. This meeting shall cover the Company’s Safety, Health and Environmental Program and the Foreman/Supervisor’s responsibilities and specific duties.

B. Foreman/Supervisor Safety Toolbox Meetings

1. Safety meetings are to be held weekly. The day of the week is to be at the supervisor or foreman’s discretion. Once established, the day and date should not be changed. It is recommended that these meetings be held on Monday because it sends the message to the employees that it is important that they work safely all week. Employees are to be informed that attendance is mandatory.

2. Topics of discussion shall be pertinent to the work currently being performed. Any unsafe conditions or act reported or observed shall be discussed along with corrective action taken.

3. Results of project site safety inspections are to be discussed along with any corrective or suggest actions taken.

4. The meeting should last approximately 15 minutes. The supervisor is to give the employees the opportunity to ask questions regarding safety.

5. The Safety Meeting Report (Exhibit 6-2) shall be completed to include:
   a. Time and date of meeting
   b. Project name and/or job number
   c. Location where meeting was held
   d. Each attending employee’s signature and company
   e. Topics discussed
   f. Suggestions or recommendations made
   g. Signature of foreman or superintendent holding meeting

6. All suggestions or recommendations must be acknowledged and a response given. If an employee makes a suggestion, he is entitled to a response and it should be documented, either on the Safety Meeting Report or as an additional report.

C. Daily Pre-Task Planning Meetings with Crews

In addition to weekly project safety meetings, each Foreman/Supervisor is to conduct daily safety Pre-Task Planning meetings, the SAFE Program
Worksheet, to review planned work for the shift with the emphasis on safety. It is at this time that specific training such as task training may be performed. At a minimum these daily pre-task planning meetings are to cover the following:

1. Review of hazards involved in particular sequence of events.
2. Review the safe use and operation of tools and equipment
3. Communication review
4. Emergency procedure review

**D. Project Safety Bulletin Board**

1. Company bulletin boards shall be set up and maintained on every job. Scaled down versions may be used. See Exhibit 6-3 for proper layout of posters.
2. The required posters are supplied by the home office when a job is started. For replacements, contact your project manager.
3. During the month of February, the summary portion of the OSHA Log 300 must be posted. This summary will be completed by the corporate office and mailed to the project sites prior to February 1st for posting.
4. Safety posters will be sent routinely from the home office. For special requests, contact the safety department.

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<th><strong>OSHA JOBSITE</strong></th>
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<td>Minimum Wage Poster</td>
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<td>OSHA Safety &amp; Health*</td>
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<td>Report All Accidents</td>
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<td>Report All Accidents</td>
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<td>Drug and Alcohol Abuse Policy</td>
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</table>
Family Leave Act* 

Authorized Drivers

*NOTE: FEDERAL OR STATE REQUIREMENT

E. Additional Site Specific Training

The Corporate SH&E Department will provide and conduct the following training courses as needed:

1. SAFE Program (Required for Project Supervisory Staff).
2. OSHA 10 hr Course and MSHA Training as applicable (required for Project Supervisory Staff).
3. Accident Investigation (Required from Project Supervisory Staff).
5. Project Equipment.
6. 1st Aid/CPR
7. Lead Hazard Awareness
8. Confined Space
9. Excavation and Trenching
10. Scaffolds
11. Fall Protection
12. HazWop

6.3 Exhibit(s)

A. SAF 6-1 New Hire Safety and Health Knowledge Questionnaire
   • Answers to New Hire Safety and Health Knowledge Questionnaire
B. SAF 6-2 Weekly Safety Training Meetings
C. SAF 6-3 Standard And Company Notices
NEW HIRE SAFETY AND HEALTH

KNOWLEDGE QUESTIONNAIRE

Before / After Orientation
(Circle One)

Name: ________________________________ SS# ___ ___ / ___ / ___ ___ ___
(Print)

Date: ___ ___ / ___ / ___ ___ ___

Please answer the following questions:

1. What is OSHA?
   O________ S__________ & H ___________ A ______________

2. What is MSHA?
   M________ S__________ &H ___________ A ______________

3. Notify your ___________________________ of any unsafe act or conditions that you find on the project site.

4. Housekeeping is to be done
   a. Only at the end of the shift.
   b. Continuously during the task.
   c. Before starting work.
   d. By a maid.

5. Fall protection is required if you are working _______ feet or higher.
   a. 10 feet
   b. 15 feet
   c. 5 feet
   d. 6 feet

6. The use of electrical tools and cords that have not been inspected is permitted.
   a. True
   b. False

7. Straight and extension ladders are to be set up at a _______to _______ ratio with _______ feet of the ladder extending above the landing.
8. All injuries, no matter how minor, must be reported
   a. Immediately
   b. The next morning
   c. To your supervisor
   d. a & b
   e. a & c
9. PPE stands for: P ____________ P ____________ E ____________
10. Chemicals are only used by workers in Factories.
    a. True
    b. False
11. MSDS stands for: M ____________ S ____________ D ____________ S ____________
12. One of the most useful parts of your Right-To-Know training is a special
document that contains just about all the information you need to know about a
particular chemical. It is called the ______________
13. Another replace to find immediate information about a chemical is __________
14. Three words that you might see on a label that can alert you to possible hazards
    are:
    a. Caution
    b. Warning
    c. Danger
    d. All the above
15. Chemicals can enter your body a number of ways. Name one way a chemical can
    enter your body: ______________
16. Corrosives are strong and biting chemicals that can destroy your eyes, skin or
    mucous membranes.
    a. True
    b. False
17. If you are exposed to a chemical, you will always know it right away.
    a. True
    b. False
18. You should never mix chemicals together unless you are sure that they will not
    cause a bad reaction.
    a. True
    b. False
19. The only people allowed to have access to Material Safety Data Sheets are Supervisors and technical staff.
   a. True
   b. False

20. When lifting material you must do the following:
   a. Plan the lift
   b. Move close to the load
   c. Bend your knees and lift with your legs
   d. Do not lift and twist in the same location
   e. All the above

21. To reduce the risk of muscle strains it is good idea to take a few minutes to do some stretching before starting work.
   a. True
   b. False

22. A Confined Space is:
   a. An enclosure having limited means of access and exit
   b. Poor ventilation
   c. An enclosure that may contain dangerous contaminants
   d. All of the above

23. To work in a Confined Space you have to have training and authorization prior to entry.
   a. True
   b. False

24. A Confined Space does not have to be air tested prior to anyone entering to start work.
   a. True
   b. False

25. Anyone can enter a Confined Space to rescue an injured person
   a. True
   b. False
26. A Confined Space Competent Person need not be present prior to entering a Confined Space.
   a. True
   b. False

27. Anyone on the project is allowed to operate equipment, vehicles, valves, electrical switches and other similar machinery to ensure that the job gets done on schedule.
   a. True
   b. False

28. A Competent Person must inspect and approve an excavation prior to workers entering the excavation.
   a. True
   b. False

29. A ladder must be provided for access and exit in an excavation.
   a. True
   b. False

30. A ladder or other safe access must be provided for scaffolds.
   a. True
   b. False

31. Guards on power tools and other equipment serve no real purpose and can be removed if needed.
   a. True
   b. False

32. Scaffolds must be placed on a firm surface, be fully decked, equipped with top rails, mid rails and toe boards, and be inspected by a competent person.
   a. True
   b. False

_________________________________________________________________________  Project Number: ____________________________

Signature
NEW HIRE SAFETY AND HEALTH KNOWLEDGE

QUESTIONNAIRE ANSWERS

1. Occupational Safety & Health Administration
2. Mine Safety & Health Administration
3. Supervisor/ Foreman
4. b
5. d
6. b
7. 4 to 1 – 3 feet
8. e
9. Personal Protective Equipment
10. b
11. Material Safety Data Sheets
12. MSDA or Material Safety Data Sheets
13. On the container label
14. d
15. Inhalation or Absorption
16. a
17. b
18. a
19. b
20. e
21. a
22. d
23. a
24. b
25. b
26. b
27. b
28. a
29. a
30. a
31. b
32. a
### WEEKLY SAFETY TRAINING MEETING

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<tr>
<td>Crew:</td>
<td>Craft(s)</td>
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</table>

### Briefly Describe Specific Training Topics Covered

1. ____________________________________________
2. ____________________________________________
3. ____________________________________________

### REMARKS


### Total Employees on Crew(s): [ ] Total in Attendance: [ ]

### Signature of Employees Attending

__________________________________________
__________________________________________
__________________________________________

Complete all sections fully and submit to the Project Supervisor or Safety Representative

Supervisor: [ ] Position: [ ]
### Standard Notices

1. Occupational Safety & Health (OSHA) poster
2. Equal Employment Opportunity Commission poster
3. Minimum Wage poster
4. Polygraph Protection Act poster
5. Workers Compensation Commission posters
6. State Unemployment Information / Payday Laws
7. Immigration poster (Federal Projects)
8. Family Leave Act

### Company Notices

9. Space left blank for use such as a Job Safety Record, Days without Lost Time Accident, Special Notices, etc.
11. Report Unsafe Conditions
12. Company Hazard Communication Program poster
13. Company Drug Policy
14. Company Authorized Drivers
15. Rental Equipment Policy
16. Discrimination Policy
# 7.0 RECORDS AND REPORTS

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7.0 RECORDS AND REPORTS

7.1 Purpose

Well-maintained and accurate documentation of safety and incident activities is essential. It can be the company’s best defense in legal matter, as well as a useful reference for employee qualification and site incident records.

Reasons for good record keeping include:

A. Recording of Safety Orientation:

Displays that each employee has been properly trained in the basic essentials of safety when they began work on the project.

B. Documenting Safety Training/ Site Qualification:

Maintains knowledge of employee qualifications.

C. Daily Safety/ Equipment Inspections:

Ensures that various onsite activities proceed in a safe manner by preventing accidents through documented, daily inspections.

D. Weekly Toolbox Meetings:

Documenting Toolbox Meeting topics and discussions provides a complete record of the site safety issues.

E. Incident Reports:

In accordance with the procedures in Section 9 Incident Investigation, accurate recording of incidents is instrumental in the timely improvement of safety conditions and are in an essential element in insurance and legal investigations.

F. Project Inspection:

Provides a date snapshot of the project, which lends itself to making timely workplace improvements.

G. Subcontractor Incident Reports:

Forms links between the Preferred Industrial Contractors, Inc. and its subcontractors, by providing detailed information on their incident investigations.
H. Medical Recording:
   Recording of employee exposure to various harmful or toxic substances as well as
documenting onsite safety conditions and medical treatments can be an
important referent to future issues.

7.2 OSHA Requirements

Various OSHA standards, primarily 29 CFR 1904, require the establishment and
maintenance of employee injury and illness records when work-related conditions
arise that result in either an occupational injury or illness. An injury is defined as
“Any injury such as a cut, fracture, sprain, amputation, etc. which results from a work
accident or from a single instantaneous exposure in the work environment”. An
occupational illness differs, in that it is “any abnormal condition or disorder, other
than one resulting from an occupational injury, caused by exposure to environmental
factors associated with employment that include acute and chronic illness or diseases,
which may be caused by inhalation, adsorption, ingestion or direct contact”. The
records of these incidents are required to be maintained for up to 30 years after
employment ends.

In the event that these substances or materials are discovered or present on the
worksites, contact the Safety Department for their assistance in determining if
documentation is required. If so, there are specific guidelines to the recording, the
maintenance and who has access to the records.

Under certain circumstances, it is required to allow access of those records to the
employees or their designated agents. OSHA standard 1926.33 provides details and
describes the access process and procedure.

Records will be maintained in the Baytown home office and the Safety Department
should be contacted whenever record requests are made.

7.3 References

B. OSHA 29 CFR 1904
C. OSHA Recordkeeping Guidelines for Occupational Injuries and Illnesses, Appendix
   Selected Illnesses Which may Result From Exposure in the Work Environment.
7.4 Forms

The following forms have been set up in section order and attached to this section for copying and use by supervisors, *unless otherwise stated on the form*. Answers to tests and/or quizzes can be found in the sections pertaining to the test/quiz subject.
INSTRUCTIONS:

PREFERRED INDUSTRIAL CONTRACTORS, INC.

JOBSITE INSPECTION REPORT

1. Record the description and location of all unsafe DATE: _________________________________
   conditions, unsafe work practices, safety violations; LOCATION: ______________________________
   or other program deficiencies in the appropriate space. JOB#: ______________________________
2. Responsibility for corrective action is to be LOCATION: ______________________________
   Assigned by the site safety supervisor in a review INSPECTED BY: ______________________________
   With the project superintendent following each JOBSITE ACTIVITIES: ______________________________
   Inspection.
3. The site safety supervisor is to place The date corrective action was completed
   The date corrective action was completed
   Form as follows: ______________________________
   • 1 Copy Job File/ Project Superintendent ______________________________
   • 1 Copy Safety Director Baytown Office ______________________________

<table>
<thead>
<tr>
<th>Subject Area</th>
<th>Description &amp; Location of Deficiency</th>
<th>Responsibility for Corrective Action</th>
<th>Date Completed</th>
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<tbody>
<tr>
<td>1. Bulletin Board Required Posters &amp; Emergency Numbers</td>
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<td>2. Medical Service &amp; First Aid Supplies</td>
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<td>3. Fire Protection</td>
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<td>4. Haz-com Program MSDS</td>
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<td>5. Safety Meetings &amp; Training</td>
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<td>Subject Area</td>
<td>Description &amp; Location of Deficiency</td>
<td>Responsibility for Corrective Action</td>
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<td>6. Inspections &amp; Examinations</td>
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<td>7. Cranes, Machinery &amp; Mobile Equipment</td>
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<td>8. Rigging Equipment Slings, Chokers, etc.</td>
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<tr>
<td>9. Hand &amp; Power Tools</td>
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<td>11. Housekeeping</td>
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<td>13. Ventilation / Fumes Vapors / Gases</td>
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<td>14. Illumination</td>
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<td>15. Disposal of Waste Material</td>
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<td>Subject Area</td>
<td>Description &amp; Location of Deficiency</td>
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<td>16. Electrical</td>
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<td>17. Ladders &amp; Scaffolds</td>
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<td>18. Floor &amp; Wall Openings / Stairways</td>
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<td>19. Steel Erection</td>
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<td>20. Noise / Hearing Protection</td>
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<td>25. Concrete Forms &amp; Shoring</td>
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<td>ITEM NO.</td>
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<td>EQUIPMENT / OPERATIONS</td>
<td>SUPERINTENDENT / FOREMAN CONTACTED</td>
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INSPECTION CONDUCTED BY:

Safety Supervisor: ____________________________

Please Print ____________________________ Signature
**PREFERRED INDUSTRIAL CONTRACTORS, INC**  
**SUBCONTRACTOR’S SAFETY VIOLATION NOTICE**

Subcontractor: ______________________________ Date Given: ________________
Responsible Individual Name: ______________________________ ______________________________
From: ____________________________________________________________________________
Title: ____________________________________________________________________________
Violation Number: __________ Job Name & Number: ______________________________

A Safety and Health Survey of your operation has revealed non-compliance of certain contract specifications, Preferred Industrial Contractors, Inc.’s Safety and Health Policies and/or Client, Local, State or Federal Regulations. As a condition of the contract, and applicable regulations, you are required to maintain a safe work environment and to prevent unsafe actions of your employees.

The Violation(s) noted and the required Corrective Action(s) is/are indicated above:

<table>
<thead>
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<th>Reference</th>
<th>Description of Violation</th>
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Corrective Action Required:

- [ ] Cease Operation until corrective action is complete.
- [ ] Initiate and complete corrective action by ________________
- [ ] Warn employees and instruct them on proper procedures.
- [ ] Provide proper equipment.
- [ ] Change procedure / work methods.

Complete the following and return to the Project Superintendent and/or Project Safety Manager.

Action(s) Taken

<table>
<thead>
<tr>
<th>Action Taken</th>
<th>Date: ________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>______________________</td>
</tr>
<tr>
<td>2.</td>
<td>______________________</td>
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<td>3.</td>
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<tr>
<td>4.</td>
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</tbody>
</table>

Date Received: ______________________ Signature / Title

PIC  Rev 12/12/11
VIOLATION OF SAFE PRACTICE

Project: 

Employee: 

Job Assignment: 

Date & Time: 

Immediate Supervisor: 

Nature of Violation: 

Action taken to prevent reoccurrence: 

Issued by: ___________________________ Signature
# Certificate of Training

**U.S. Department of Labor**

**Mine Safety And Health Administration**

Approved OMB Number 1219-0070, Expires April 25, 2011

This certificate is required under Public Law 91-173 as amended by Public Law 95-164. Failure to comply may result in penalties and other sanctions as provided by sections 108 and 110, Public Law 91-173 as amended by Public Law 95-164.

<table>
<thead>
<tr>
<th>Issue Certificate Immediately</th>
<th>Serial Number (for operator’s use)</th>
</tr>
</thead>
</table>

1. Print Full Name of Person Trained (First, middle, last)

2. Check Type of Approved Training Received:
   - [ ] Annual Refresher
   - [ ] Newly Employed, Experienced Miner
   - [ ] Hazard Training
   - [ ] New Task (Specify Below)
   - [ ] New Employed, Inexperienced Miner
   - [ ] Other (specify)

<table>
<thead>
<tr>
<th>Date</th>
<th>Task</th>
<th>Initial</th>
<th>Date</th>
<th>Task</th>
<th>Initial</th>
</tr>
</thead>
<tbody>
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</table>

3. Check Type of Operation and Related Industry
   - A. [ ] Surface
   - [ ] Construction
   - [ ] Underground
   - [ ] Shaft & Slope
   - B. [ ] Coal
   - [ ] Metal
   - [ ] Non metal

4. Date Training Requirements Completed
   - [ ] Check if not completed and go to item 5, below.
   - If completed, go to item 6, below.

5. Check Subjects Completed (use only for partially completed training):
   - [ ] Introduction to Work Environment
   - [ ] Roof/ Ground Control & Ventilation
   - [ ] Health
   - [ ] Hazard Recognition
   - [ ] Mine Map; Escapeways; Emergency
   - [ ] Electrical Hazards
   - [ ] H&S Aspects of Tasks Assigned
   - [ ] Evacuation; Barricading
   - [ ] First Aid
   - [ ] Statutory Rights of Miners
   - [ ] Cleanup; Rock Dusting
   - [ ] Mine Gases
   - [ ] Self-Rescue & Respiratory Devices
   - [ ] Mandatory Health & Safety
   - [ ] Explosives
   - [ ] Transport & Communication Standards
   - [ ] Prevention of Accidents
   - [ ] Authority & Responsibility of Supervisor’s & Miner’s Representatives
   - [ ] Other (Specify)

6. False certification is punishable under section 110(a) and (f) of the Federal Mine Safety & Health Act (P.L. 91-173 as amended by P.L. 95-164)

   I certify that the above training has been completed (signature of person responsible for training)

7. Mine Name, ID, & Location of Training (if institution, give name & address)

8. Date

   I verify that I have completed the above training (signature of person trained)

---

MSHA Form 5000-23, April 11 (revised)  Copy 1 – Employer’s Personnel Record

SAMPLE COPY ONLY  CONTACT THE BAYTOWN OFFICE FOR REPLACEMENT FORMS

PIC  Rev 12/12/11
# WEEKLY SAFETY TRAINING MEETING

<table>
<thead>
<tr>
<th>Date of Training:</th>
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<tbody>
<tr>
<td>Crew:</td>
</tr>
<tr>
<td>Craft(s)</td>
</tr>
</tbody>
</table>

## Briefly Describe Specific Training Topics Covered

1. 

2. 

3. 

## REMARKS

____________________________
____________________________
____________________________
____________________________
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<table>
<thead>
<tr>
<th>Total Employees on Crew(s):</th>
<th>Total in Attendance:</th>
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</table>

**Signature of Employees Attending**

____________________________
____________________________
____________________________
____________________________
____________________________
____________________________

Complete all sections fully and submit to the Project Supervisor or Safety Representative

**Supervisor:**

**Position:**
COMPANY: ____________________________________________________________

CONTRACT NUMBER AND EWT: ___________ DATE OF MEETING: ____________

PROJECT:  ____________________________________________________________

TOPICS PREFERRED INDUSTRIAL CONTRACTORS DISCUSSED:

____________________________________________________________________

____________________________________________________________________

CRAFTS PRESENT:

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

EMPLOYEES SIGNATURES WHO ATTENDED MEETING:

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

SPECIAL PROBLEMS:

____________________________________________________________________

____________________________________________________________________

PERSON CONDUCTING MEETING & TITLE: _________________________________

SIGNATURE OF PERSON CONDUCTING MEETING: _________________________

PIC  Rev 12/12/11
## JOB SAFETY ANALYSIS

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>UNSAFE CONDITION/ ACTION or OTHER HAZARD</th>
<th>PREVENTIVE/CORRECTIVE ACTION TAKEN</th>
<th>DATE OF CORRECTION</th>
</tr>
</thead>
<tbody>
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</table>

CONTRACTOR/ SUBCONTRACTOR ________________________________

APPROVAL ____________________________________________________________________________

SUPERINTENDENT ________________________ SAFETY SUPERVISOR ________________________ DATE ____________

(Contractor/Subcontractor) (Preferred Industrial Contractors, Inc. /Subcontractor)
Preferred Industrial Contractors, Inc.

Job Safety Assessment (JSA)

This job will be completed before each shift for each task. Post this JSA in an obvious place during the length of the task. Each crewmember involved with the task will sign this JSA. If a deviation from safe work practice/procedure occurs, WORK WILL BE STOPPED AND RE-EVALUATED.

Task Description: ____________________________

Contractor: ____________________________

Permit/Work Order No: ____________________________

Date: ! ! ! Emergency No: ____________________________

Personal Protective Equipment: ____________________________

--- Hearing Protection
--- Respirator-Type
--- Gloves/Glove Mat
--- Safety Glasses, Goggles, Shields
--- Chemical Resistant Clothing
--- Rubber Boots
--- Fall Protection
--- Other

1. List job steps associated with task.
(1) JOB STEPS

Hazard Communication
--- Discuss Health Hazards
--- Discuss Physical Hazards
--- MSDS Available

2. List hazards associated with job steps.

(2) IDENTIFIED HAZARDS

--- Noise
--- Heat Stress
--- Airborne Particulate
--- Restricted Access/Egress
--- Restricted Lighting
--- Heavy Objects
--- Sharp Objects
--- Hot/Cold Surfaces
--- Other

Specialized Operations
--- Confined Space Entry
--- Excavation and Shoring
--- Lock Out/Tag Out
--- Line breaking
--- Crane Lift Study
--- Crane Suspended Work Platform
--- Scaffolding
--- Asbestos Abatement
--- Working on Energized Electrical Circuit
--- Roof Access
--- Scaffolds/Ladders
--- Welding/Burning/Cutting
--- Other

3. List safe work procedures to eliminate the hazards

(3) SAFE WORK PRACTICES

PIC Rev 12/12/11
Additional Job Instructions
List All Equipment Needed for Job Task.
(Cranes, Fork Lift, Grinder, Come-Along, etc.)

EMPLOYEE COMMENTS
I acknowledge receiving these instructions, understand the instructions and will fully comply with the assigned job task.

Employee(s) Assigned  BadgeliD

ATTENTION: Verify that all workers understand their duties and job requirements.
Employees Safety Concerns: Answer the following questions with Yes, No or N/A.

a. Could weather conditions affect the safety performance of this task?
   Yes  No  N/A
b. Have all tools, ladders, electrical cords, rigging and safety equipment been inspected?
   Yes  No  N/A
c. Has a material storage area been identified and approved?
   Yes  No  N/A
d. Have scaffolds and ladders been inspected?
   Yes  No  N/A
   Have scaffold tags been signed?
   Yes  No  N/A
e. Is a fire watch or confined space attendant required?
   Yes  No  N/A
f. Do you know how to summon help?
   Yes  No  N/A
g. Will proper housekeeping methods be implemented?
   Yes  No  N/A
h. Have areas been identified as requiring full protection systems and have they been installed?
   Yes  No  N/A
i. Are flammable/combustible materials stored, separated and secured?
   Yes  No  N/A

Safety Principles:
1. Plan every job
2. Anticipate Unexpected Events
3. Use the Right Tools For the Job
4. Use Procedures As Tools
5. Isolate the Equipment
6. Identify the Hazards
7. Minimize the Hazards
8. Protect the Person
9. Assess People’s Abilities
10. Audit These Principles

Notes/Comments
EVERY TASK

EVERY DAY

PREFERRED INDUSTRIAL CONTRACTORS, INC.
SAFETY AWARENESS FOR EMPLOYEES INSTRUCTIONS

Task Description: ___________________________ Date: ___________________________

Area or Unit: ___________________________ Permit/Work Order No.: ___________________________

Assembly Area / Nearest Safe Shelter Identified: ___________________________

<table>
<thead>
<tr>
<th>Personal Protective Equipment</th>
<th>General Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>_____ Hearing Protection</td>
<td>_____ Barricades</td>
</tr>
<tr>
<td>_____ Respirator – Type: ___________</td>
<td>_____ Post Warning Signs</td>
</tr>
<tr>
<td>_____ Gloves / Glove Material: ___________</td>
<td>_____ Use Ventilation / Exhaust</td>
</tr>
<tr>
<td>_____ Safety Glasses, Goggles, Shields</td>
<td>_____ Relocate Flammable Materials</td>
</tr>
<tr>
<td>_____ Chemical Resistant Clothing</td>
<td>From Work Area</td>
</tr>
<tr>
<td>_____ Rubber Boots</td>
<td></td>
</tr>
<tr>
<td>_____ Fall Protection: _______________________________</td>
<td></td>
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<tr>
<td>_____ Other: ___________</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hazards (Environmental)</th>
<th>Housekeeping</th>
</tr>
</thead>
<tbody>
<tr>
<td>_____ Noise</td>
<td>_____ Walkway Clean / Work Area Clean</td>
</tr>
<tr>
<td>_____ Heat Stress</td>
<td>_____ Trash &amp; Scrap Metal Placed in Proper Containers</td>
</tr>
<tr>
<td>_____ Airborne Particulate</td>
<td>_____ Tools, Materials &amp; Equipment</td>
</tr>
<tr>
<td>_____ Electrical Shock</td>
<td>Stored Properly</td>
</tr>
<tr>
<td>_____ Restricted Access/Egress</td>
<td>Other: ___________</td>
</tr>
<tr>
<td>_____ Heat Stress</td>
<td></td>
</tr>
<tr>
<td>_____ Sharp Objects</td>
<td></td>
</tr>
<tr>
<td>_____ Hot / Cold Surfaces</td>
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<tr>
<td>_____ Other: ___________</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Hazard (Body)</th>
<th>Unit Specific Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>_____ Fall Potential</td>
<td>_____ Known Potential Hazards Related to Job Task / Unit – Area</td>
</tr>
<tr>
<td>_____ Pinch Points</td>
<td>Specialized Operations</td>
</tr>
<tr>
<td>_____ Slip / Trip Potential</td>
<td>_____ Confined Space Entry</td>
</tr>
<tr>
<td>_____ Other: ___________</td>
<td>_____ Excavations &amp; Shoring</td>
</tr>
<tr>
<td></td>
<td>_____ Lock Out / Tag Out</td>
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<tr>
<td></td>
<td>_____ Line Breaking</td>
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<td>_____ Crane Lift Study</td>
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<td>_____ Crane Suspended Work Platform</td>
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<td></td>
<td>_____ Scaffolding</td>
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<td></td>
<td>_____ Asbestos Abatement</td>
</tr>
<tr>
<td></td>
<td>_____ Working on energized Electrical Circuit</td>
</tr>
<tr>
<td></td>
<td>_____ Other – Notify Management for Procedures and Review</td>
</tr>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Hazards Communication</th>
<th>Employee Comments:</th>
</tr>
</thead>
<tbody>
<tr>
<td>_____ Discuss Health Hazards</td>
<td></td>
</tr>
<tr>
<td>_____ Discuss Physical Hazards</td>
<td></td>
</tr>
<tr>
<td>_____ MSDS Available</td>
<td></td>
</tr>
<tr>
<td>_____ Employee Involvement</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional Job Instructions</th>
<th></th>
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<tbody>
<tr>
<td>List all Equipment Needed for Job Task.</td>
<td></td>
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<tr>
<td>(Cranes, Fork Lift, Grinder, Come-Along, etc.)</td>
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PIC Rev 12/12/11
INCIDENT INVESTIGATIONS WORKSHEET

Incident Location: ___________ Date of Incident: ___________ Time of Incident: ___________

A. The incident (did) (did not) result in injury.
B. The incident (did) (did not) result in property damage, environmental concern, or fire.
C. If either A or B occurred, the potential for serious A or B was (high), (medium) or (low).

Description of Incident: ____________________________

Root Cause(s): ____________________________

Action to be taken to prevent recurrence: ____________________________

Person Injured: ____________________________

Injured’s on-site experience time: _____________

Injured’s service time on the project: _____________

Witness(es):

__________________________

Witness(es) Statement:

__________________________

Use additional paper and attach for witness(es) statement

Superintendent’s Name: ____________________________

Prepared By: ____________________________ Date: _____________

Signature of Preparer: ____________________________

Title: ____________________________

PIC  Rev 12/12/11
Probe each of the considerations listed below with open-ended questions (questions that begin with who, what, when, how, why, etc.) Question openly enough to get to essential information, determine root cause(s), as “why was the hazard not recognized?”, “why did the change occur?”. 

<table>
<thead>
<tr>
<th>Considerations</th>
<th>Yes</th>
<th>No</th>
</tr>
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<tbody>
<tr>
<td>Was the hazard(s) that produced the incident recognized?</td>
<td></td>
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</tr>
<tr>
<td>Oral? ___________ Written: ___________</td>
<td></td>
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</tr>
<tr>
<td>Was there a plan to control the hazard? (SAFE Program Implement)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Was the plan adequately communicated (given, received, understood by those involved in the incident?)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Did the plan include back-up or secondary consideration to prevent injury even if the even began to occur?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>If tools or equipment were involved, were they right tools or equipment for the job?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Did written safety procedures exist for the task(s) involved?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>If written procedures existed and were known, were they followed?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Had those involved in the incident received training and/or appropriate instructions concerning the hazard(s) involved?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Did the person(s) involved have some personal condition that contributed to the incident? (i.e. color blindness, physical handicap, language barrier, inability to read, vision or hearing problems, etc.)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Did a change occur prior to the incident that may have contributed to the incident? (i.e. change in tools, equipment, people, plans, scope of work, etc.)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Were facility design deficiencies a factor in the incident?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Did the layout of the work area / environment contribute to the incident?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>If an injury occurred, was the injured directly involved in causing the incident?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Was an unsafe work practice a contributing factor to the incident?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Prepared by: ___________________________________________ Date: ___________________________

Print Name

Signature of Preparer: ___________________________________________
MANDATORY SAFETY, HEALTH AND ENVIRONMENTAL RULES

1. The following Safety, Health and Environmental Rules are a partial list of general regulations that shall apply to all work. Any employee who carelessly or callously disregards these rules or other applicable safety, health and environmental regulations shall be subject to disciplinary action up to and including termination.

2. All occupational injuries and illnesses, no matter how slight, must be reported to your Supervisor immediately. If you are injured on the job and do not report the occurrence to your Supervisor, the Company will not be responsible for any medical expense incurred by you on your own.

3. Submitting false or fraudulent information when reporting an accident or injury is unlawful and will be cause for dismissal.

4. Fighting, gambling, horseplay and other misconduct, are not permitted, nor shall threatening or attacks upon another employee be tolerated.

5. The use, or possession of intoxicants or drugs on the project is prohibited. Any employee reporting to work intoxicated or under the influence of intoxicating liquor or drugs will not be allowed to work and will be administered disciplinary action which could result in immediate termination.

6. Only authorized and properly trained and supervised personnel are permitted to operate equipment, vehicles, valves, electrical switches and similar machinery.

7. Keep clear of all equipment. Avoid pinch points and blind areas. Be alert to avoid swinging and suspended loads.

8. Unless authorized, do not attempt to repair or tamper with equipment that is not functioning properly. Report malfunctions to your Supervisor.

9. Misuse of tools and equipment or circumventing safety devices can result in injury to yourself or others. Do not use makeshift tools or equipment to perform your job.

10. Riding loads, slings, the ball, crane hook or other material hoisting equipment is prohibited.

11. Ride only in vehicles designated and designed for transporting personnel.

12. Jumping on or off equipment or vehicles, either moving or stationary is prohibited.

13. Whenever anyone is required to work on or in close proximity to electrical equipment or circuitry, appropriate tagging will be placed to identify all controls deactivating the circuit and the circuit shall be locked out, when possible.

14. Keep all machinery guards, guardrails and other protective devices in place and in good operating order.
15. Personal protective equipment such as hard hats, eye, face, hearing and respiratory protection will be furnished and used as required. As a minimum, sturdy work shoes or boots will be required for foot protection.

16. Be alert for and heed all information and warning signs at all times.

17. Store and use gas cylinders in a secure, upright position, with their valve caps secure and the cylinders shielded from the sunlight.

18. Do not smoke in areas marked “No Smoking” or near flammable or combustible materials or their storage areas.

19. Be alert at all times to conditions and work processes in your area, surrounding areas and with the presence of other workers and equipment so that you can foresee and avoid potential dangers.

20. Full body clothing will be required to avoid sunburn and exposure to sparks and hazardous chemicals. T-shirts with short sleeves will be required as a minimum during hot weather.

21. Unless specifically authorized, explosives are prohibited on the project.

22. All fire protection and emergency equipment must be plainly marked and kept free of obstruction for emergency use.

23. Maintain good housekeeping. Keep waste, debris and rubbish cleaned up. Place all lunch papers, cups, cans and other litter in trash receptacles. Discard and/or store all oily rags, waste and similar combustible materials in metal containers provided for that purpose.

24. Do not use compressed air to “dust-off” yourself.

25. Report all unsafe and unhealthy practices and conditions to your Supervisor at once.

26. Each employee must cooperate in promoting and maintaining an effective safety program.

27. If you are in doubt about the safe or proper way to perform a specific job or duty, get instructions from your Supervisor before proceeding.

28. When you are relieved from a job that has unusual or concealed hazards, immediately inform the person relieving you that such hazards exist. BE SPECIFIC.

29. Work area guidelines and regulations for environmental protection must be strictly followed. All hazardous material must be properly handled, stored and disposed of.
PREFERRED INDUSTRIAL CONTRACTORS, INC.

MATERIAL GATE PASS

Contracting Company: ____________________________

Contractor Representative: ________________________

Date: ___________________________________________

I AUTHORIZE THE FOLLOWING MATERIALS TO BE REMOVED FROM THE PROJECT SITE VIA:

TRUCK NUMBER: __________________ DRIVER: __________________

MATERIALS:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

________________________________________________________________________
________________________________________________________________________

CONTRACTOR REPRESENTATIVE __________________________ DATE ________________

PIC REPRESENTATIVE __________________________ DATE ________________
PREFERRED INDUSTRIAL CONTRACTORS, INC.

FALL PREVENTION AUDIT FORM

Equipment being audited: ___________________________ Date: ___________ Shift: ______

Crafts involved: □ CIVIL □ MECH □ I/W □ OTHER: ________________________________

Working crew size: _______ Audit Members: _______________ ________________

_________________________ __________________________
II. PERSONAL PROTECTIVE EQUIPMENT

Is the proper PPE being used? ................................................................. □ □ □

- Full body harness (elevated 6’ or more) .................................................. □ □ □
- Does the Full Body Harness have a current Inspection Tag? ................. □ □ □
- Are body belts being used? (unacceptable) ................................................ □ □ □
- Shock absorbing lanyard with double locking lanyard hooks................ □ □ □
- Is the shock-absorbing end connected to the D-Ring on harness? ....... □ □ □
- Are lanyards being looped (unacceptable) ............................................. □ □ □
- Are proper anchorages provided? .......................................................... □ □ □
- List anchorages points being used ______________________________________

III. MOBILE EQUIPMENT

Is mobile equipment being utilized to perform the work? ....................... □ □ □

- Equipment being used:
  - Aerial Manlift ...................................................................................... □ □ □
  - Tied off with full body harness and lanyard to AM? .......................... □ □ □
- Scissor Lift (Tie off not required).................................................. □ □ □
- Approved For Truck Man-lift Basket............................................. □ □ □
- Tied off with full body harness and lanyard to basket?.................. □ □ □
- Production Tub (unacceptable)...................................................... □ □ □
- Does the Equipment have a place to tie-off?.................................. □ □ □

IV. ACCESSIBILITY

- Is the access to the work area adequate and safe?.......................... □ □ □
- Do ladders in excess of 30’ have a rest platform?........................... □ □ □
- Do ladders in excess of 20’ have a cage guard?............................... □ □ □
- Are step and extension ladders inspected and in good condition?... □ □ □
- Are extension ladders inspected and in good condition?............... □ □ □
- Is person at bottom holding extension ladders?............................ □ □ □

V. COMMENTS

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
PREFERRED INDUSTRIAL CONTRACTORS, INC.

HOUSEKEEPING INSPECTION

Contractor: __________________________ By: ______________________ Date: ______________

- Good housekeeping practices are absolutely necessary to achieve a safe and healthy workplace and are consistent with Preferred Industrial Contractor, Inc.’s goals for a “ZERO ACCIDENT WORK ENVIRONMENT”
- Good housekeeping practices increase productivity and increase the quality of the work being performed.
- Housekeeping is the responsibility of each contractor, superintendent, foreman and craft worker.

YES   NO   IMMEDIATE WORK AREAS

☐ ☐ All supplies and materials shall be neatly stacked in appropriate containers, pallets, bins, or racks. All excess containers, pallets, dunnage, banding and scrap materials shall be disposed of immediately in the proper receptacles and/or areas.

☐ ☐ All tools and equipment shall be in good working order, free of excess oil, grease, dirt, mud, tailings, or filings. Absorbent material containers shall be used under all pipe or conduit threading machines.

☐ ☐ All tool boxes, hand tools, gang boxes and cabinets shall be placed in a safe and orderly fashion, free of access hazards. Gangbox or cabinet doors and lids shall be operable and closed when not being accessed.

☐ ☐ Upon completion of each shift, all tools, and/or equipment shall be returned to its proper storage area. All abandoned, used, spent or surplus materials shall be stored or disposed of in appropriate areas, receptacles, or luggers. Examples include welding rod butts, metal drop offs, pipe and fittings, dunnage, banding and empty boxes, plastic wrap, pallets or crates. All work areas shall be left clean and hazard free by use of the next or returning shift.

YES   NO   TEMPORARY STORAGE, STAGING OR LAYDOWN AREAS

☐ ☐ All Materials should be stored according to project, type, or function, in appropriate containers or pallets and off the ground on adequate dunnage.

☐ ☐ All materials shall be stored only in designated locations, out of traffic access areas and away from emergency equipment, doors, ladders and walkways.

☐ ☐ Materials shall be stored so as to allow reasonable access to all items.
Materials shall not be stored or stacked in such a manner to become unstable and present a hazard.

All surplus materials shall be removed from the jobsite as soon as possible.

Equipment and/or tools shall be removed from work areas when not in use.

YES   NO   DESIGNATED EQUIPMENT AND MATERIAL STORAGE AREAS

All mobile equipment shall be free of excess oil and grease in good working order. All leaks shall be fixed and any spillage shall be cleaned up and disposed of properly. Contractor vehicles shall be free of excess trash, surplus, spent or damaged materials.

Damaged or non-functional tools and equipment such as welders, pumps, compressors, tires, cables, chokers, etc. shall not be stored on site and are to be repaired or removed from the jobsite.

All areas in and around contractor buildings and structures are to be maintained in a neat and orderly fashion. All equipment and tools shall be stored in an orderly fashion. Holding bins, shelves, or racks shall be used for placement or storage of materials within structures. As an example; chokers and shackles on the ground or in corners is not considered proper storage. Electrical conduit on the ground or stacked on pallets is not considered proper storage.

Fabrication and assembly areas shall be maintained in an orderly fashion.

All electrical tools, appliances and/or connections shall be of adequate size and or proper specifications and maintained in a responsible manner at all times.

Contractor office areas shall be free of excess hazards. These areas not to be used for storage of materials.

COMMENTS / REMARKS
PREFERRED INDUSTRIAL CONTRACTORS, INC.

DAILY EXCAVATION PERMIT

PERMIT NO. __________

Responsible Supervisor: ______________________ Time Issued: ______________________

Date Issued: ______________________ Time Expires: ______________________

1. Specific location of work: ______________________

2. Size of Trench: Pit or Wall Opening __________ ft. long x __________ ft. deep.
   Sloping or benching for excavations greater than 20 ft. deep shall be designed by a registered
   professional engineer.

3. Means of Egress (if 4 ft. or more deep): Stairway(s) __________, Ramp(s) __________,
   Ladder(s) __________, Other (specify) __________.
   Employee shall not have to travel more than 25 ft. to exit from the excavation.

4. Soil Type (check one) A. __________ B. __________ C. __________

5. Is shoring or sloping Necessary? □ Yes □ No

6. Daily inspection will be performed by: ______________________

7. Type of barricade required: ______________________

8. Lines in vicinity of work:
   a. Electrical __________
   b. Telephone __________
   c. Water __________
   d. Sewer __________
   e. Steam __________
   f. Alarm __________
   g. Drain __________
   h. Process __________
   i. Other (specify) __________

9. Precautions to be taken:
   a. De-energize line __________
   b. Ground tools __________
   c. Hand excavate __________
   d. Other (specify) __________

   The above date has been checked with blueprints on file. When close clearances are
   indicated, hand excavation must be used to determine the exact location. Existing lines and
   interferences in the vicinity of work must be marked by stakes indicating location and depth
   prior to excavation.

10. Other known obstructions:
   a. Footings __________
   b. Pilings __________
   c. Concrete Encasements __________
   d. Other (specify) __________

   CAUTION: Determine if the excavation / trenching meets criteria for
   confined spaces and, if so, conduct appropriate air quality tests prior to
   entry. Refer to the Confined Space Entry Procedures.

   Signature of Competent Person: ______________________
   Date: ______________________
### SECTION 1 GENERAL

<table>
<thead>
<tr>
<th>Digging and Drilling Location Description:</th>
<th>Requested By:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Date:</td>
<td></td>
</tr>
<tr>
<td>Visual Inspection Completed by Person</td>
<td>Reference Drawings or Sketches Attached</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Requesting Permit: □ Yes □ No</th>
<th>□ Yes □ No □ N/A</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Anticipated Depth of Excavation:</th>
<th>Digging Performed By:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
<td></td>
</tr>
</tbody>
</table>

### SECTION 2 CIVIL

**Approximate Depth**

<table>
<thead>
<tr>
<th>□ Yes □ No Design Calculation / Drawing Reference:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Yes □ No Authorized Depth of Excavation:</td>
<td></td>
</tr>
<tr>
<td>□ Yes □ No Shoring / Shielding Requirements:</td>
<td></td>
</tr>
<tr>
<td>□ Yes □ No Slope Requirements:</td>
<td></td>
</tr>
<tr>
<td>□ Yes □ No Any Other Requirements:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Civil Check and Authorization By:</th>
<th>Date:</th>
</tr>
</thead>
</table>

### SECTION 3 MECHANICAL

**Approximate Depth**

<table>
<thead>
<tr>
<th>□ Yes □ No Water lines within 5 ft. of excavation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Yes □ No Gas lines within 5 ft. of excavation</td>
<td></td>
</tr>
<tr>
<td>□ Yes □ No Sewer lines within 5 ft. of excavation</td>
<td></td>
</tr>
<tr>
<td>□ Yes □ No Electrical lines within 5 ft. of excavation</td>
<td></td>
</tr>
<tr>
<td>□ Yes □ No Hydraulic lines within 10 ft. of excavation</td>
<td></td>
</tr>
<tr>
<td>□ Yes □ No Drainage system within 5 ft. of excavation</td>
<td></td>
</tr>
<tr>
<td>□ Yes □ No Chemical piping within 5 ft. of excavation</td>
<td></td>
</tr>
<tr>
<td>□ Yes □ No Other mechanical hazards within 5 ft. of excavation</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mechanical Check and Authorization By:</th>
<th>Date:</th>
</tr>
</thead>
</table>

### SECTION 4 ELECTRICAL

**Approximate Depth**

<table>
<thead>
<tr>
<th>□ Yes □ No 120 Volt Service</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Yes □ No 220 Volt Service</td>
<td></td>
</tr>
<tr>
<td>□ Yes □ No 480 Volt Service</td>
<td></td>
</tr>
<tr>
<td>□ Yes □ No Low Voltage Wiring</td>
<td></td>
</tr>
<tr>
<td>□ Yes □ No High Voltage Wiring</td>
<td></td>
</tr>
<tr>
<td>□ Yes □ No Ground Cables</td>
<td></td>
</tr>
<tr>
<td>□ Yes □ No Telephone / Computer Cables</td>
<td></td>
</tr>
<tr>
<td>□ Yes □ No Other (Specify)</td>
<td></td>
</tr>
<tr>
<td>□ Yes □ No Cable Locator / Metal Detector Required</td>
<td></td>
</tr>
<tr>
<td>□ Yes □ No Cautious Digging Required (Probe and Scratch)</td>
<td></td>
</tr>
<tr>
<td>□ Yes □ No Other Special Instructions</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical Check and Authorization By:</th>
<th>Date:</th>
</tr>
</thead>
</table>

**NOTICE:** Do not dig without Civil, Mechanical and Electrical Authorizations. This Permit must be posted during the actual digging / drilling operation. An Excavation Safety Checklist must be completed prior to excavation.
EXCAVATION AND TRENCH SAFETY CHECK LIST

Date: ___________________ Job No.: _______________

Excavation <5 feet deep are to be evaluated for potential hazards.

Excavation >5 feet deep must be evaluated and inspected using the following tests.

Excavation > 20 feet deep must be designed by a registered professional engineer.

**VISUAL TESTS**

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th></th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohesive</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
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<tr>
<td>Non-cohesive</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fine grained</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coarse grained</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breaks up easily</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stays in clumps</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cracks inside excavation</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cracks on top excavation</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raveling</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previously disturbed</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Layered soil</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fissured</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjacent structure</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjacent excavation</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crossing utilities</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supported utilities</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spoil Pile</td>
<td>□</td>
<td>□</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MANUAL TEST**

*Thumb penetration:*

- Can only indent soil 1/8” with great pressure □ Type A Soil
- Can only indent soil ½” with some pressure □ Type B Soil
- Can easily indent soil 2” to 3” □ Type C Soil

*Plasticity:*

- Crumbles YES □ NO □
- Rolls into ball YES □ NO □
- Rolls into 1/8” thread YES □ NO □

*Penetrometer reading*

- Tons/ft² YES □ NO □

- Does excavation meet the definition of a confined workspace? YES □ NO □
- Could excavation be expected to contain a hazardous atmosphere? YES □ NO □
- Does excavation have natural drainage? YES □ NO □

**Based on the above information – the following protective system has been selected:**

<table>
<thead>
<tr>
<th>Sloping</th>
<th>Slope</th>
<th>Bench</th>
<th>Step</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoring</td>
<td>Manufacturer</td>
<td>Spacing</td>
<td>Sheeting</td>
</tr>
<tr>
<td>Shield</td>
<td>Manufacturer</td>
<td>Certified</td>
<td>Height</td>
</tr>
</tbody>
</table>

Rescue equipment

Ventilation

Method of drainage

PIC Rev 12/12/11
| DATE/TIME: | | | |
| DEPTH | | | |
| SOIL TYPE | | | |
| SLOPE RATIO | | | |
| SHORING OK | | | |
| SHELDING OK | | | |
| BARRICADES | | | |
| WATER REMOVAL | | | |
| TRAFFIC REMOVAL | | | |
| TRAFFIC CONTROL | | | |
| ATMOSPHERE | | | |
| SPOIL PILE | | | |
| COMMENTS | | | |

![Diagram](image)

**COMPETENT PERSON:** _________________________________

PIC Rev 12/12/11
SCAFFOLD SAFETY CHECK LIST

<table>
<thead>
<tr>
<th>Project:</th>
<th>Location:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scaffold:</td>
<td>Type:</td>
</tr>
<tr>
<td>Date of Inspection:</td>
<td>Inspector:</td>
</tr>
</tbody>
</table>

| All scaffold materials and components in safe condition for use and all planking is graded for scaffold use. | YES | NO | ACTION / COMMENTS |
| Maximum intended load Scaffold frames, planking and sills capable of supporting intended load. |  |  |  |
| Competent person in charge of scaffold. |  |  |  |
| Sills properly placed and are adequate size. |  |  |  |
| Screw jacks used to level and plumb scaffold instead of unstable objects such as blocks, bricks, etc. |  |  |  |
| Base plates and /or screw jacks in firm contact with sills and frame. |  |  |  |
| Scaffold level and plumb |  |  |  |
| All scaffold legs braced and braces properly attached. |  |  |  |
| Guard rails, midrails and toe boards in place on all open sides and ends above 10’. (4’ in height if <45”) |  |  |  |
| Proper access provided. |  |  |  |
| Overhead protection or wire mesh screening. |  |  |  |
| Scaffold tied to structure at least every 30’ horizontally and 26’ vertically. |  |  |  |
| Freestanding towers guyed or tied every 26’ in height. |  |  |  |
| All brackets and accessories have been properly placed: |  |  |  |
| Brackets |  |  |  |
| Putlogs |  |  |  |
| Tube and clamp |  |  |  |
| All nuts & bolts tight. |  |  |  |
| Scaffold free of makeshift devices or ladders to increase height. |  |  |  |
| Working level platforms fully planked between beyond supports. |  |  |  |
| Planking has minimum 12” overlap and extends 6” beyond supports. |  |  |  |
| The following additional hazardous conditions have been provided for: |  |  |  |
| Power lines |  |  |  |
| Wind loading |  |  |  |
| Possible footing washout |  |  |  |
This is to verify that______received and understands the procedures of operating, handing, lubrication, safety features and safe operations of COMPACTORS.

**Understands the Proper Use of:**

- Seat Belts
- Pinch Points
- Control/Warning Device
- Transmission / Shift
- Emergency Stopping
- Working Near Pipelines
- Body Supports
- Air Conditioner
- Brake System
- Hydraulic System
- Parking Brake
- Ignition
- Warming up Period
- Fire Extinguisher
- Gauges
- Proper Tire Inflation

**Important Instructions. PLEASE READ AND INITIAL EACH ONE.**

1. Tires should be inspected daily.
2. When parking, the machine must be stopped and brake applied.
3. Never work under the loader bucket.
4. Do not smoke while refueling.
5. Daily inspection before each shift.
7. Always watch for other employees.
8. A careful operator follows the rules of the road.
9. Always look before backing.
10. Keep cab clear of mud and debris.
11. Seatbelts are to be worn at all times.
12. Although the basic controls may be the same, the exact controls and instruments vary from one compactor to another.

_________________________  __________________________
Print Name Signature

SUPERINTENDENT: ________________________________
OPERATOR: ________________________________
This is to verify that _______ received and understands the procedures of operating, handing, lubrication, safety features and safe operations of DUMP TRUCKS.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Seat Belts</td>
<td>Brake System</td>
<td>Fire Extinguisher</td>
<td></td>
</tr>
<tr>
<td>Working Near Electricity</td>
<td>Stabilizers</td>
<td>Hydraulic System</td>
<td></td>
</tr>
<tr>
<td>Control/Warning Device</td>
<td>Parking Brake</td>
<td>Gauges</td>
<td></td>
</tr>
<tr>
<td>Transmission / Shift</td>
<td>Ignition</td>
<td>Downhill Travel</td>
<td></td>
</tr>
<tr>
<td>Emergency Stopping</td>
<td>Warming up Period</td>
<td>Permit Procedures</td>
<td></td>
</tr>
<tr>
<td>Working Near Pipelines</td>
<td>Dump Instructions</td>
<td>Gear Shift Lever</td>
<td></td>
</tr>
<tr>
<td>Body Supports</td>
<td>Grounding Bucket</td>
<td>Watch Swing Radius</td>
<td></td>
</tr>
<tr>
<td>Air Conditioner</td>
<td>Proper Tire Inflation</td>
<td>Bed Blocking</td>
<td></td>
</tr>
</tbody>
</table>

Important Instructions. PLEASE READ AND INITIAL EACH ONE.

1. Tires should be inspected daily.
2. Machine must not coast with gear lever in neutral position.
3. Engine revolutions must be reduced and the truck must have to come to a complete stop before selecting between reverse and forward gears.
4. Do not smoke while refueling.
5. Start in low gear with every load.
6. Never let unauthorized personnel operate a backhoe.
7. Never let bystanders stand or walk under the loader bucket.
8. A careful operator follows the rules of the road.
9. Always use stabilizers while digging.
10. Keep cab of dump truck clear of mud and trash.
11. Seatbelts are to be worn at all times.
12. There is no braking effect with engine stopped and in gear.
13. Do not load material in bed while bed is raised.
14. Bed must be completely lowered after load is complete.
15. Do not drive truck with bed raised.
16. When doing inspections under the raised bed, use the bed support arms. The bed must be empty, and the tip lever in neutral.
17. In the event that the truck is unevenly loaded or when on uneven terrain, caution must be exercised at all times. Severe shift of material in bed could cause truck to tip over.

Print Name ______________________  Signature _______________________
SUPERINTENDENT: ______________________  OPERATOR: _______________________
Example of Equipment Operator’s Proficiency Qualifications

PREFERRED INDUSTRIAL CONTRACTORS, INC.

EQUIPMENT OPERATOR’S PROFICIENCY QUALIFICATION

THIS IS TO CERTIFY THAT:

HAS REVIEWED THE OPERATOR’S MANUAL, THE COMPANY INSPECTION AND OPERATIONAL MANUAL AND HAS SUCCESSFULLY COMPLETED THE PROFICIENCY PROCEDURES. THIS OPERATOR IS QUALIFIED TO OPERATE THE FOLLOWING EQUIPMENT:

CORY ROPER
CEO/PRESIDENT

AUTHORIZED SIGNATURE

COMPANY TITLE

(INFORMATION MUST BE TYPED OR PRINTED)

CERTIFICATE VALID FOR 1 YEAR FROM THE DATE TRAINED

<table>
<thead>
<tr>
<th>DATE TRAINED</th>
<th>EQUIPMENT TYPE</th>
<th>SUPV. INITIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>All 3-30-2011</td>
<td>Forklift</td>
<td>CR</td>
</tr>
<tr>
<td></td>
<td>Skidsteer</td>
<td>CR</td>
</tr>
<tr>
<td></td>
<td>Excavators</td>
<td>CR</td>
</tr>
<tr>
<td></td>
<td>Backhoe</td>
<td>CR</td>
</tr>
<tr>
<td></td>
<td>Up to 25 ton Crane</td>
<td>CR</td>
</tr>
<tr>
<td></td>
<td>Scissor Lift</td>
<td>CR</td>
</tr>
<tr>
<td></td>
<td>Manlift</td>
<td>CR</td>
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</tbody>
</table>
This is to verify that ___________________________ received and understands the procedures of operating, handing, lubrication, safety features and safe operations of EXCAVATORS.

Understands the Proper Use of:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Seat Belts</td>
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<td>Fire Extinguisher</td>
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<tr>
<td>Working Near Electricity</td>
<td>Stabilizers</td>
<td>Hydraulic System</td>
</tr>
<tr>
<td>Control/Warning Device</td>
<td>Parking Brake</td>
<td>Gauges</td>
</tr>
<tr>
<td>Transmission / Shift</td>
<td>Ignition</td>
<td>Downhill Travel</td>
</tr>
<tr>
<td>Emergency Stopping</td>
<td>Warming up Period</td>
<td>Permit Procedures</td>
</tr>
<tr>
<td>Working Near Pipelines</td>
<td>Dump Instructions</td>
<td>Gear Shift Lever</td>
</tr>
<tr>
<td>Body Supports</td>
<td>Grounding Bucket</td>
<td>Watch Swing Radius</td>
</tr>
<tr>
<td>Air Conditioner</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Important Instructions. PLEASE READ AND INITIAL EACH ONE.

1. Tires should be inspected daily.
2. When parking the backhoe the bucket should always be grounded.
3. Never work under the loader bucket.
4. Do not smoke while refueling.
5. Start in low gear with every load.
6. Never let unauthorized personnel operate a backhoe.
7. Never let bystanders stand or walk under the loader bucket.
8. A careful operator follows the rules of the road.
9. Always use stabilizers while digging.
10. Keep cab of backhoe clear of mud and trash.
11. Seatbelts are to be worn at all times.
12. Although the basic controls may be the same, the exact controls and instruments vary from one compactor to another.
13. Before digging operations begin an excavation permit must be in the cab and all known lines identified.

Print Name: ____________________________ Signature: ____________________________
SUPERINTENDENT: ____________________________ OPERATOR: ____________________________

PIC Rev 12/12/11
PREFERRED INDUSTRIAL CONTRACTORS, INC.

_____________________________ PROJECT

FUEL TRUCK – OPERATING, INSTRUCTIONS, REPORT

DATE: _________________________  MODEL: _________________________

This is to verify that __________________________ received and understands the procedures of operating, handing, lubrication, safety features and safe operations of FUEL TRUCK.

Understands the Proper Use of:

| □ | Seat Belts | □ | Brake System | □ | Fire Extinguisher |
| □ | Working | □ | Proper Grounding | □ | Hydraulic System |
| □ | Control/Warning Device | □ | Parking Brake | □ | Gauges |
| □ | Transmission / Shift | □ | Ignition | □ | Downhill Travel |
| □ | Emergency Stopping | □ | Warming up Period | □ | Daily Inspections |
| □ | Power Take Off | □ | Sloshing Liquids | □ | Gear Shift Lever |
| □ | Working Near Flammable | □ | Fire Extinguisher | □ | |
| □ | No Smoking | □ | Proper Tire Inflation | |

Important Instructions. PLEASE READ AND INITIAL EACH ONE.

_____ 1. Tires should be inspected daily.

_____ 2. When parking the backhoe the bucket should always be grounded.

_____ 3. Never work under the loader bucket.

_____ 4. Do not smoke while refueling.

_____ 5. Start in low gear with every load.

_____ 6. Never let unauthorized personnel operate a backhoe.

_____ 7. Never let bystanders stand or walk under the loader bucket.

_____ 8. A careful operator follows the rules of the road.

_____ 9. Always use stabilizers while digging.


_____ 11. Seatbelts are to be worn at all times.

_____ 12. Although the basic controls may be the same, the exact controls and instruments vary from one compactor to another.

_____ 13. Before digging operations begin an excavation permit must be in the cab and all known lines identified.

_________________________________________  ____________________________
Print Name  Signature

SUPERINTENDENT: __________________________
OPERATOR: __________________________

PIC  Rev 12/12/11
# OPERATORS SAFETY CHECK LIST

REQUIRED FOR ALL MOBILE EQUIPMENT BEFORE EACH SHIFT

<table>
<thead>
<tr>
<th>Equipment</th>
<th>O.K.</th>
<th>B.O.</th>
<th>Vehicle Description</th>
<th>O.K.</th>
<th>B.O.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerg. Brakes</td>
<td></td>
<td>MIRRORS</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Reg. Brakes</td>
<td></td>
<td>HORN</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Steering</td>
<td></td>
<td>SEAT BELTS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FRT. Lights</td>
<td></td>
<td>DOOR LATCH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rear Lights</td>
<td></td>
<td>TIRES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Windshield</td>
<td></td>
<td>EXHAUST</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W/S Wipers</td>
<td></td>
<td>CABLES</td>
<td></td>
<td></td>
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<tr>
<td>Back-Up Alarm</td>
<td></td>
<td>SHEAVES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire Extinguisher</td>
<td></td>
<td>HOOKS</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Hydraulics</td>
<td></td>
<td>GAUGES</td>
<td></td>
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<tr>
<td>Fluid Levels</td>
<td></td>
<td>FUEL LEVEL</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**REPAIRS NEEDED:**

<table>
<thead>
<tr>
<th>Maintenance Request No.</th>
<th>Name of Supervisor</th>
</tr>
</thead>
</table>

**SAMPLE COPY ONLY**

CONTACT THE BAYTOWN OFFICE FOR REPLACEMENT FORMS

PIC Rev 12/12/11
PREFERRED INDUSTRIAL CONTRACTORS, INC.

OVERHEAD CRANE DAILY INSPECTION REPORT

DATE ____________  INSPECTED BY ____________

CRANE #/ LOCATION  CRANE CAPACITY

1. Secure the area. Make a visual of the work area served by the crane and note any obstructions or work being performed in the area.

2. Visually inspect the crane for the following:

□ Deterioration or leakage in lines, tanks, valves, pumps or gear boxes.

□ Load block and hook for deformation or cracks.

□ Hoist chains, including end connections for excessive wear, distortion, or other physical damage.

□ Proper spooling on drums and wire rope properly seated in all sheaves.

□ From the ground level, visually inspect runway rails, wheels, couplings, bumpers, stops, structural and electrical systems for indication of damage of deterioration.

□ Check all operating controls for proper operation and adjustment.

□ Check hoist holding brakes.

□ Move crane to clear area and check out upper and lower limits switches if equipped.

REPAIRS NEEDED: ________________________________________________________________

(FRONT PAGE)

SAMPLE COPY ONLY CONTACT

THE BAYTOWN OFFICE FOR

REPLACEMENT FORMS
OVERHEAD CRANE SAFETY RULES

- Assure the total load to be lifted (including rigging) does not exceed the rated capacity of the hoist/crane. Each overhead crane is to be visibly marked with the capacity rating.
- Operate all controls to insure their proper operation. Do not operate a damaged or malfunctioning hoist.
- Test the limit switch by raising the hook block slowly until it makes contact with the switch. If it does not stop the hoisting motion, stop upward movement, lock out the crane and report the failure to your supervisor.
- Inspect the hook, chain and wire rope for excessive wear or damage. Assure that no slack is present on the drum or load block, and that the wire rope is properly spooled on the drum.
- Do not operate the hoist with twisted, kinked, or damaged chain rope.
- Position the hoist in a direct vertical line above the load, do not make the side pulls which misalign the rope with the hoist.
- Do not operate the hoist with other than its own power.
- Attach the load to the load block hook by the use of slings or other approved devices.
- Insure that the slings or other approved lifting devices are properly seated in the saddle of the hook.
- Tag line should be used to control the load.
- Assure that the load and rigging will clear all obstacles.
- Assure that there is no loose gear or material on the load.
- Clear all non-essential personnel from the operating area.
- The operator shall respond to signals only from the person assigned to direct the lift, or from an appointed signalman. However, the operator shall obey a stop signal at all times, no matter who gives it.
- Raise the load a few inches to verify balance and to test the effectiveness of the braking system.
- Do not lift or transport loads over personnel.
- Keep the load or block high enough to clear all obstacles below the hoist.
- Lower the load carefully. Keep the load under control at all times until it is secured.
- Do not leave the controls while a load is on the hook.
- Do not use the hoist to pull things free from the load.
- Return the hoisting device to its designated park position, turn off all controls and open the main circuit breaker.

SAMPLE COPY ONLY

CONTACT THE BAYTOWN OFFICE FOR REPLACEMENT FORMS
PREFERRED INDUSTRIAL CONTRACTORS, INC.

RANDOM SAFETY INSPECTION

DATE: ____________________________

INSPECTED BY: ________________________________

<table>
<thead>
<tr>
<th>SAFETY ITEM CHECKLIST</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Are MSDS on site and available to employees?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Are weekly safety meetings being held and documented?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Are JSA’s being completed and signed daily?</td>
<td></td>
<td></td>
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<tr>
<td>4. Is first aid kit available and properly stocked?</td>
<td></td>
<td></td>
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<tr>
<td>5. Is loss control manual on the jobsite?</td>
<td></td>
<td></td>
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<tr>
<td>6. Is bulletin board properly posted?</td>
<td></td>
<td></td>
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<tr>
<td>7. Are emergency numbers posted by telephones?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Has daily inspection of work area been completed?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Is fuel storage area clean from debris?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Is fuel stored in proper containers and clearly labeled?</td>
<td></td>
<td></td>
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<tr>
<td>11. Are berms in place and maintained around fuel tanks?</td>
<td></td>
<td></td>
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<tr>
<td>12. Is a fire extinguisher maintained in storage area?</td>
<td></td>
<td></td>
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<tr>
<td>13. Are daily inspections being done on mobile equipment?</td>
<td></td>
<td></td>
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<tr>
<td>14. Have all operators been trained on the equipment?</td>
<td></td>
<td></td>
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<tr>
<td>15. Does all equipment have a charged fire extinguisher?</td>
<td></td>
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<tr>
<td>16. Are road signs in place and visible to traffic?</td>
<td></td>
<td></td>
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<tr>
<td>17. Are speed limit signs in place?</td>
<td></td>
<td></td>
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<tr>
<td>18. Is dump area in stable and level condition?</td>
<td></td>
<td></td>
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<tr>
<td>19. Are speed limits being enforced?</td>
<td></td>
<td></td>
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<tr>
<td>20. Is dust being kept to a minimum?</td>
<td></td>
<td></td>
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<tr>
<td>21. Are dump procedures being adhered to?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. Are berms being maintained in good order?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. Are employees wearing gloves while working with pipe?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

REMARKS: 
This is to verify that received and understands the procedures of operating, handing, lubrication, safety features and safe operations of WATER TRUCK.

Understands the Proper Use of:

<table>
<thead>
<tr>
<th>□</th>
<th>Seat Belts</th>
<th>□</th>
<th>Brake System</th>
<th>□</th>
<th>Fire Extinguisher</th>
</tr>
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<tbody>
<tr>
<td>□</td>
<td>Working Near Electricity</td>
<td>□</td>
<td>Filling Operations</td>
<td>□</td>
<td>Downhill Travel</td>
</tr>
<tr>
<td>□</td>
<td>Control/Warning Device</td>
<td>□</td>
<td>Parking Brake</td>
<td>□</td>
<td>Ignition</td>
</tr>
<tr>
<td>□</td>
<td>Transmission / Shift</td>
<td>□</td>
<td>Emergency Stopping</td>
<td>□</td>
<td>Warming up Period</td>
</tr>
<tr>
<td>□</td>
<td>Emergency Stopping</td>
<td>□</td>
<td>Power Take Off</td>
<td>□</td>
<td>Spraying Instructions</td>
</tr>
<tr>
<td>□</td>
<td>Gear Shift Levers</td>
<td>□</td>
<td>Gauges</td>
<td>□</td>
<td>Warming up Period</td>
</tr>
<tr>
<td>□</td>
<td>Air Conditioner</td>
<td>□</td>
<td>Proper Tire Inflation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Important Instructions. PLEASE READ AND INITIAL EACH ONE.

1. Tires should be inspected daily.
2. Machine must not coast with gearlever in neutral position.
3. Engine revolutions must be reduced and the truck must have to come to a complete stop before selecting between reverse and forward gears.
4. Do not smoke while refueling.
5. Start in low gear with every load.
6. Never let unauthorized personnel operate equipment.
7. Speed should be controlled at all times.
8. A careful operator follows the rules of the road.
9. Equipment Inspections.
10. Proper use of power take off.
11. Seatbelts are to be worn at all times.
12. There is no braking effect with engine stopped and in gear.
13. In the event of uneven terrain sloshing of water could cause tipping.

_____________________________                      ______________________________
Print Name                              Signature
SUPERINTENDENT: ____________________________
OPERATOR: _________________________________
PREFERRED INDUSTRIAL CONTRACTORS, INC.

BOOM LIFT OPERATOR

OBSERVATIONAL CHECKLIST

Operator Name: ___________________________ Date: ___________________________

(Print)

Equipment: ___________________________ Observer: ___________________________

(Print)

Yes No

☐ ☐ 1. Employee has on the appropriate personal protective equipment.

☐ ☐ 2. Employee completed a pre-shift inspection of the equipment prior to operating the equipment.

☐ ☐ 3. Any covers, guards, caps or safety devices removed for purposes of inspection have been replaced.

☐ ☐ 4. Employee can identify and understands the operation of each control.

☐ ☐ 5. Employees performed a functional test of each control.

☐ ☐ 6. Employee can identify and understands all placards, decals, warnings and instructions for the equipment.

☐ ☐ 7. Employee inspected the area for hazards prior to operation.

☐ ☐ 8. Employee appears comfortable operating the equipment and operates the equipment smoothly without any jerking or other unsafe movement.

☐ ☐ 9. Employee appears to have the proper eye, hand, foot coordination to safety operator the equipment.

☐ ☐ 10. Employee demonstrates working knowledge of the equipment.

☐ ☐ 11. Employee knows the procedures for reporting defects, malfunctions or other problems with the equipment.

Operator’s Signature ___________________________ Observer’s Signature ___________________________

PIC Rev 12/12/11
BOOM LIFT TEST

NAME: ____________________________  DATE: ___ / ___ / ___
(Print)

SS# ___ ___ - ___ - ___ ___ ___

Multiple Choice. Select the answer, which is the most correct

1. Where can the maximum platform capacity rating always be found on a boom lift?
   a. Unit serial number
   b. On the chassis
   c. In the equipment operation and safety manual
   d. At the ground control station

2. You should not accept responsibility for operation of any mobile equipment until:
   a. You are given the keys
   b. You have been properly trained and qualified on the equipment
   c. You check that the fuel tank is full
   d. You have five yrs. Experience on the equipment

3. What is the minimum clearance distance to be maintained between a boom lift and an energized power line?
   a. 10 feet up to 5,000 volts
   b. 50 feet up to 10,000 volts
   c. 5 feet up to 5,000 volts
   d. 10 feet up to 50,000 volts

4. What can be used to extend the maximum reach of a boom lift?
   a. Scaffolding
   b. Nothing
   c. A step ladder, if properly secured
   d. A spruce 2X10 and two 5 gallon buckets

5. When wearing a harness on a boom lift, one end of the lanyard is attached to the back D-ring and the other end is attached to:
   a. Around the hand rail of the platform
   b. To a designated attachment point on the platform
   c. Around the nearest structure
   d. Don’t need to attach it anywhere unless you are standing on the mid rail

6. If you put too much weight in the basket of a boom lift, you may:
   a. Tip the unit over
   b. Cause the boom to bend
   c. Lose your job
   d. All the above
7. How close can mobile equipment be parked to the centerline of a railroad track?
   a. 3 feet
   b. 6 feet
   c. 12 feet
   d. 8 feet

8. It is ok to climb up on the mid rail to reach higher as long as I have my harness on and am attached to the basket.
   a. True
   b. False

9. What is the first thing to be done if a malfunction of the boom lift occurs?
   a. Check the hydraulic oil
   b. Park the unit
   c. Yell for help
   d. Stop the unit

10. The ground control station should be used to lower the platform
    a. When the platform controls need repaired
    b. To scare the ----- out of the guys in the basket
    c. Anytime
    d. In an emergency

11. Boom lifts are not to be operated when wind conditions exceed:
    a. 5 mph
    b. 10 mph
    c. 20 mph
    d. 30 mph

12. What factors affect the stability of a boom lift?
    a. Length of the boom
    b. Platform loading
    c. Ground conditions
    d. Boom angle
    e. All the above

13. When inspecting the work area prior to operation, what hazards should be identified?
    a. Overhead obstructions
    b. Holes, rough terrain, un-compacted soil, unstable operating surfaces
    c. Debris or housekeeping hazards
    d. Unauthorized persons or vehicles
    e. All the above
14. Which of the following may not be hoisted in a boom lift?
   a. Hand tools
   b. Personnel
   c. Cutting torch
   d. Piece of 6” pipe 3 foot long

15. Where must an operator check for clearances prior to raising, lowering, swinging or extending the boom?
   a. Above
   b. Below
   c. To the side
   d. All the above

16. Smoking is not allowed within ______ feet of fueling operations:
   a. 5
   b. 10
   c. 25
   d. 30

17. Who is responsible for the safe operation of the equipment?
   a. The company
   b. My supervisor
   c. I am

18. When must the pre-shift inspection be performed?
   a. Daily
   b. Weekly
   c. At the beginning of each shift
   d. Prior to use during each shift

19. A boom lift will travel either direction so the travel arrows are of no concern.
   a. True
   b. False

20. The control placards and warning decals are generally an accessory and are of no concern to a good operator.
   a. True
   b. False
Respond to the following statements as being either True (T) or False (F)

1. Your tires should be checked weekly.  
2. When parking your boom lift, make sure the platform is left high enough to clear obstructions.  
3. Keep the engine oil level as the full mark on the dipstick.  
4. It is ok to work under the platform as long as there are no hydraulic leaks.  
5. It’s ok to smoke when refueling as long as you are in a restricted area.  
6. Stay in low gear when traveling on slopes.  
7. When the platform is lifted, you must be within 10% of level.  
8. As long as you are in the platform, it is ok to let an unauthorized person operate a boom lift.  
9. If you take special care, it’s ok to let bystanders walk beneath the platform and boom.  
10. A careful driver follows the rules of the road.  
11. A careful driver sticks his head and arms outside the platform.  
12. A careful operator watches above, below and to the sides when operating a boom lift.  
13. A good operator can lift all sorts of stuff with the platform.  
14. As long as you use proper rigging, it’s ok to lift light loads with the boom lift.  
15. Electrical lines are of no concern because the boom lift has rubber tires.  
16. The pre-shift inspection is just for inexperienced operators.  
17. A good operator always keeps the steps and his shoes clean of mud and grease.  
18. It’s OK to use a ladder in the platform for additional reach, as long as I hook off with my lanyard.  
19. Although the basic controls may be the same, the exact controls and instruments vary from one boom lift to another.
PREFERRED INDUSTRIAL CONTRACTORS, INC.

SCISSOR LIFT OPERATOR

OBSERVATIONAL CHECKLIST

Operator Name: __________________________ Date: __________________________

(Print)

Equipment: __________________________ Observer: __________________________

(Print)

Yes No

☐ ☐ 1. Employee has on the appropriate personal equipment.

☐ ☐ 2. Employee completed a pre-shift inspection of the equipment prior to operating the equipment.

☐ ☐ 3. Any covers, guards, caps or safety devices removed for purpose of inspection have been replaced.

☐ ☐ 4. Employee can identify and understands the operation of each control.

☐ ☐ 5. Employee performed a functional test of each control.

☐ ☐ 6. Employee can identify and understands all placards, decals, warnings, and instructions for the equipment.

☐ ☐ 7. Employee inspected the area for hazards prior to operation.

☐ ☐ 8. Employee appears comfortable operating the equipment and operates the equipment smoothly without any jerking or other unsafe movements.

☐ ☐ 9. Employee appears to have the proper eye, hand, foot coordination to safely operate the equipment.

☐ ☐ 10. Employee demonstrates a working knowledge of the equipment.

☐ ☐ 11. Employee knows the procedures for reporting defects, malfunctions or other problems with the equipment.

________________________________________  _______________________________________
Operator’s Signature                        Observer’s Signature
SCISSOR LIFT TEST

Name: ____________________________  Date: __ __ / __ __ / __ __

(Print)

SS# ___ ___ - ___ - ___ ___ ___

Multiple Choice. Select the answer, which is the most correct:

1. The platform may be raised when the chassis is on a:
   a. 5 degree slope
   b. Firm level surface
   c. 10 degree slope
   d. Soft or uneven ground
   e. a & c

2. Prior to operating a scissor lift, you must:
   a. Perform a walk around inspection
   b. Be properly trained
   c. Read and understand the operators manual
   d. Perform a functional check of all controls
   e. All of the above

3. What is the minimum safe approach distance to be maintained between a scissor lift and an energized power line?
   a. 10 feet up to and including 5,000 volts
   b. 20 feet up to and including 50,000 volts
   c. 10 feet up to and including 50,000 volts
   d. 15 feet up to and including 50,000 volts
   e. Do not make contact

4. Where can the maximum platform capacity always be found on a scissor lift?
   a. Attached to the railing
   b. Ground controls
   c. Operation and safety handbook
   d. Operators manual
   e. Why do you need to know that?
5. What is the first thing you need to do if the scissor lift malfunctions?
   a. Jump
   b. Drive to a safe and secure area
   c. Yell for help
   d. Shut down the lift
   e. Continue to operate in a cautious manner

6. The ground control station should be used to lower the platform
   a. When the platform controls need repaired
   b. To scare the --- out of the guys in the basket
   c. Anytime
   d. In an emergency

7. If you exceed the rated capacity of the scissor lift platform or a platform
   extension, you may:
   a. Cause structural damage or collapse to the lift
   b. Lose your job or your life
   c. Increase your productivity
   d. a & c above
   e. a & b above

8. You should not accept responsibility for operating a scissor lift until:
   a. You have had 5 yrs. Experience operating a scissor lift.
   b. You have received training on the operation of a scissor lift and have read and
      understood the operator’s manual.
   c. You are given the keys
   d. You have done your pre-shift inspection.
   e. b & d above

9. Safety props are to be used:
   a. To elevate the platform to increase stability.
   b. To perform maintenance or inspections in or around raised scissor lift
      platforms
   c. Driving the scissor lift
   d. When using the deck extension
   e. a & c above

10. If the labels for the controls are not legible, you should:
    a. Activate each control to determine what its function is, then proceed with
       caution till you have them memorized.
    b. Clean and/or replace the labels.
    c. Ask someone else, who knows the controls.
    d. Shut down the scissor lift.
    e. b & d above
11. Do not operate a scissor lift when wind speeds exceed
   a. 10 mph
   b. 20 mph
   c. 15 mph
   d. 30 mph
   e. None of the above

12. What can be used to extend the maximum reach of a boom lift?
   a. Scaffolding
   b. Nothing
   c. A step ladder, if properly secured
   d. A Spruce 2X10 and two 5 gallon buckets

13. When inspecting the work area prior to operation, what hazards should be identified?
   a. Overhead obstructions
   b. Holes, rough terrain, un-compacted soil, unstable operating surfaces
   c. Debris or housekeeping hazards
   d. Unauthorized persons or vehicles
   e. All the above

14. When must the pre-shift inspection be performed?
   a. Daily
   b. Weekly
   c. At the beginning of each shift
   d. Prior to use during each shift

15. The control placards and warning decals are generally an accessory and are of no concern to a good operator.
   a. True
   b. False

16. Smoking is not allowed within _____ feet of fueling operations:
   a. 5
   b. 10
   c. 25
   d. 50

17. Which of the following may not be hoisted in a scissor lift
   a. Hand tools
   b. Personnel
   c. Cutting torch
   d. Piece of 6” pipe 3 foot long
18. What factors affect the stability of a scissor lift?
   a. Height of the platform
   b. Platform loading
   c. Ground conditions
   d. Ground angle
   e. All the above

19. Who is responsible for the safe operations of the equipment?
   a. The company
   b. My supervisor
   c. I am

20. The control placards and warning decals are generally an accessory and are of no concern to a good operator
   a. True
   b. False
Respond to the following statements as being either True(T) or False(F)

1. Your tires should be checked weekly. T
2. When parking your scissor lift, make sure the loader platform is left high enough to clear obstruction. T
3. Keep the engine oil level at the full mark on the dipstick. T
4. It is ok to work under the platform as long as there are no hydraulic leaks. F
5. It’s ok to smoke when refueling as long as you are in a restricted area. F
6. Stay in low gear when traveling on slopes T
7. When the platform is lifted, you must be within 10% of level. T
8. As long as you are in the platform, it is ok to let an unauthorized person operate a scissor lift. F
9. If you take special care, it’s ok to let bystanders walk beneath the platform. F
10. A careful driver follows the rules of the road. T
11. A careful driver sticks his head and arms outside the platform. F
12. A careful operator watches above, below and to the sides when operating a scissor lift. T
13. A good operator can lift all sorts of stuff with the platform. T
14. As long as you use proper rigging, it’s ok to lift light loads with the platform. T
15. Electrical lines are of no concern because the scissor lift has rubber tires. F
16. The pre-shift inspection is just for inexperienced operators. F
17. A good operator always keeps the steps and his shoes clean of mud and grease. T
18. It’s ok to use a ladder in the platform for additional reach, as long as I hook off with my lanyard. T
19. Although the basic controls may be the same, the exact controls and instruments vary from one scissor lift to another. T
20. Any good welder can add an extension to the platform. F
# Preferred Industrial Contractors, Inc.
## Conventional Crane Periodic Safety Inspection

### Manufacturer:  
### Model No.:  
### Serial No.:  
### Crane ID No.:  
### Mileage/Hours:  

<table>
<thead>
<tr>
<th><strong>ITEM</strong></th>
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<th><strong>OK</strong></th>
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<td>Wear or Cracks</td>
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<td>Pawls or Dogs</td>
<td>Wear, Cracks, Distortion</td>
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PIC  Rev 12/12/11
### PREFERRED INDUSTRIAL CONTRACTORS, INC.

**CONVENTIONAL CRANE PERIODIC SAFETY INSPECTION**

<table>
<thead>
<tr>
<th>Manufacturer:</th>
<th>Model No.:</th>
<th>Serial No.:</th>
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<td>NEEDS REPAIR- SEE REMARKS</td>
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<td>BOOM CORDS &amp; LATTICES INCLUDING JIB</td>
<td>DENTS, CRACKS, FUNCTION</td>
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<td>SHEAVES INCLUDING BOOM POINT</td>
<td>WEAR, CRACKS, LUBRICATION</td>
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<td>LOAD BLOCK</td>
<td>FUNCTION, WEAR, CRACKS</td>
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<td>FUNCTION, WEAR, CRACKS</td>
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<td>FUNCTION, WEAR, CRACKS</td>
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<td>WEAR, CRACKS, DISTORTION</td>
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<td>DIAMETER, WEAR,</td>
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<td>CORROSION, BROKEN WIRES,</td>
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<td>UNSTRANDING</td>
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<td>PENDANTS</td>
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<tr>
<td>BOOM HOIST ROPE</td>
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</table>

**REMARKS**

________________________________________________________________________

**INSPECTED BY**

[Signature]

**DATE**

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PREFERRED INDUSTRIAL CONTRACTORS, INC.

CONVENTIONAL CRANE PERIODIC SAFETY INSPECTION

MANUFACTURER: MODEL NO.: SERIAL NO.: CRANE ID NO.: MILEAGE/HOURS:
CRANE OPERATOR

PHYSICAL OBSERVATIONAL CHECKLIST

Operator Name: ___________________________ Date: ___________________________
(Print)

Equipment: ___________________________ Observer: ___________________________
(Print)

Yes No

☐ ☐ 1. The employee has on the appropriate personal equipment.

☐ ☐ 2. Employee completed a pre-shift inspection of the equipment prior to operating the equipment.

☐ ☐ 3. Any covers, guards, caps or safety devices removed for purpose of inspection have been replaced.

☐ ☐ 4. Employee can identify and understands the operation of each control.

☐ ☐ 5. Employee performed a functional test of each control.

☐ ☐ 6. Employee can identify and understands all placards, decals, warnings, and instructions for the equipment.

☐ ☐ 7. Employee inspected the area for hazards prior to operation.

☐ ☐ 8. Employee appears comfortable operating the equipment and operates the equipment smoothly without any jerking or other unsafe movements.

☐ ☐ 9. Employee appears to have the proper eye, hand, foot coordination to safely operate the equipment.

☐ ☐ 10. Employee demonstrates a working knowledge of the equipment.

☐ ☐ 11. Employee knows the procedures for reporting defects, malfunctions or other problems with the equipment.

_________________________________________  ________________________________
Operator’s Signature  Observer’s Signature

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This is to verify that __________________________ received and understands the procedures of operating, handing, lubrication, safety features and safe operations of CRANES.

Understands the Proper Use of:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Seat Belts</td>
<td>Brake System</td>
<td>Fire Extinguisher</td>
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<tr>
<td>Working Near Electricity</td>
<td>Proper Placement</td>
<td>Hydraulic System</td>
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<tr>
<td>Control/Warning Device</td>
<td>Parking Brake</td>
<td>Gauges</td>
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<td>Load Charts</td>
<td>Ignition</td>
<td>Downhill Travel</td>
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<tr>
<td>Emergency Stopping</td>
<td>Warming up Period</td>
<td>Critical Lift Plans</td>
</tr>
<tr>
<td>Proper Hand Signals</td>
<td>Daily Inspections</td>
<td>Pre Lift Meeting</td>
</tr>
<tr>
<td>Outrigger Usage</td>
<td>Proper Rigging</td>
<td>Watch Swing Radius</td>
</tr>
<tr>
<td>Suspended Loads</td>
<td>Proper Tire Inflation</td>
<td>Ultimate Responsibility</td>
</tr>
</tbody>
</table>

Important Instructions. PLEASE READ AND INITIAL EACH ONE.

1. Tires should be inspected daily.
2. Sound horn when swinging load.
3. Never swing load over personnel.
4. Do not smoke while refueling.
5. Lift and swing load smoothly.
6. Never let unauthorized personnel operate a crane.
7. Never let bystanders stand or walk under the load.
8. Do daily and monthly inspections.
9. Use taglines on all loads.
11. Keep cab of crane clear of mud and trash.
12. Although the basic controls may be the same, the exact controls and instruments vary from one crane to another.
13. Always follow one flagman unless of an emergency stop.
15. Able to read and understand the load chart.

___________________________________________________________
Print Name

___________________________________________________________
SUPERINTENDENT: ________________________________ Signature

___________________________________________________________
OPERATOR: ________________________________
**A Lift Plan Should be Completed Prior to Mobilization of Equipment and Rigging.**

### LOCATION: 

### Lift Description:

#### A. WEIGHT

<p>| | | |</p>
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<tr>
<td>1.</td>
<td>Equipment Condition</td>
<td>New □ Used □</td>
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<tr>
<td>2.</td>
<td>Weight Empty</td>
<td>lbs.</td>
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<tr>
<td>3.</td>
<td>Weight of Headache Ball</td>
<td>lbs.</td>
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<tr>
<td>4.</td>
<td>Weight of Block</td>
<td>lbs.</td>
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<tr>
<td>5.</td>
<td>Weight of Lifting Bar</td>
<td>lbs.</td>
</tr>
<tr>
<td>6.</td>
<td>Weight of Rigging</td>
<td>lbs.</td>
</tr>
<tr>
<td>7.</td>
<td>Weight of Jib</td>
<td>lbs.</td>
</tr>
<tr>
<td>8.</td>
<td>Weight of Cable</td>
<td>lbs.</td>
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**Total Weight**:

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<tr>
<th></th>
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<tbody>
<tr>
<td></td>
<td>Weight Source of Load (Name Plate, Drawings, etc.)</td>
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<td>Weights Verified By:</td>
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#### B. JIB

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<tr>
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<td>Erected □ Stowed □</td>
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<tr>
<td>1.</td>
<td>Jib to be used?</td>
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<tr>
<td>2.</td>
<td>Length of Jib</td>
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<td>3.</td>
<td>Angle of Jib</td>
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<td>4.</td>
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#### C. CRANE PLACEMENT:

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<tr>
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<tr>
<td>2.</td>
<td>Electrical Hazards in the Area</td>
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<tr>
<td>3.</td>
<td>Obstacles or Obstructions to Lift or Swing Over?</td>
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<td>4.</td>
<td>Swing Direction and Degree (Boom Swing)</td>
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#### D. CABLE

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<tr>
<td>3.</td>
<td>Cable Weight per Foot</td>
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**Special Instructions or Restrictions for Crane, Rigging, Lifts, etc.**

Project Superintendent: ________________________

---

**E. SIZING OF SLINGS**

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<tr>
<td>a.</td>
<td>Type of Arrangement</td>
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</tr>
<tr>
<td>b.</td>
<td>Number of Slings in Hook-up</td>
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</tr>
<tr>
<td>c.</td>
<td>Sling Size</td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>Sling Length</td>
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<td>e.</td>
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**2. Shackle Selection**

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<td>a.</td>
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#### F. CRANE:

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<td>2.</td>
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<td>3.</td>
<td>Lifting Arrangement</td>
</tr>
<tr>
<td>a.</td>
<td>Max Distance to Center of Load to Center Pin of Crane</td>
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<tr>
<td>b.</td>
<td>Length of Boom</td>
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<td>c.</td>
<td>Angle of Boom at Pick Up</td>
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<tr>
<td>d.</td>
<td>Angle of Boom at Set</td>
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<td>e.</td>
<td>Rated capacity of Crane under Lifting Conditions (From Chart)</td>
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<td>4.</td>
<td>Over Rear</td>
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<td>5.</td>
<td>Over Front</td>
</tr>
<tr>
<td>6.</td>
<td>Over Side</td>
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<tr>
<td>7.</td>
<td>From Chart Rated Capacity of Crane for this Lift</td>
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<td>8.</td>
<td>List is % of Crane’s Rated Capacity</td>
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#### G. Pre-Lift Checklist

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<td>Outriggers fully Extended □ □</td>
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<td>3.</td>
<td>Crane in Good Condition □ □</td>
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<td>4.</td>
<td>Swing Boom □ □</td>
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<td>5.</td>
<td>Head Room Check □ □</td>
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<td>6.</td>
<td>Max Counterweights Used □ □</td>
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<td>7.</td>
<td>Tag Line Used □ □</td>
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<td>Experienced Operators □ □</td>
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<td>9.</td>
<td>Experienced Rigger □ □</td>
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<td>10.</td>
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<td>11.</td>
<td>Load Chart in Crane □ □</td>
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<td>Wind &amp; Weather Conditions □ □</td>
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# preferred industrial contractors, inc.

**Hydraulic Crane Periodic Safety Inspection**

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PREFERRED INDUSTRIAL CONTRACTORS, INC.

HYDRAULIC PERIODIC SAFETY INSPECTION

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<td>DIAMETER, WEAR, CORROSION, BROKEN WIRES, KINKING, CRUSHING, UNSTRANDING</td>
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</table>

REMARKS:

INSPECTED BY: 

DATE: 

PIC Rev 12/12/11
MOBILE CRANE QUESTIONNAIRE

1. T F A documented pre-shift inspection is required before use each day or at the beginning of each shift.

2. T F Crane set up is one of the most important aspects of crane safety.

3. T F When performing the pre-shift inspection, a visual check of all the controls is all that is necessary.

4. T F When hand signals are being used to direct a lift, it is acceptable for the operator to react to a stop signal from someone other than the designated signal person.

5. T F The capacities on the load charts are based upon perfect conditions.

6. T F The equal extensions of the power telescopic boom sections are not required for light loads.

7. T F The load block is part of the load.

8. T F A crane sitting 3 degrees off level can increase the boom stress by 50%.

9. T F The tension load on slings can be increased without increasing the load to be lifted.

10. T F When hoisting from the main boom point with the jib erected, no deduction is required from the capacity chart for the weight of the jib.

11. T F If tipping is not the limiting factor for capacity, then structural failure will occur.

12. T F Hooks and blocks are over designed and do not require inspection.

13. T F Reductions of capacity do not occur when moving the load from one quadrant to another on cranes with an over the front and over the side capacity chart.

14. T F Proper ground support is an integral part of the mobile crane lifting system.

15. T F Safety devices and load indicators are for the convenience of the operator and do not always have to work properly.

16. T F A Jib is an auxiliary boom, which is in effect an extension of the main boom.

17. T F A crane that “goes light” can be safely returned to normal by rapid load lowering.

18. T F It is the crane operator’s responsibility to maintain a safe distance from overhead power lines.

19. T F Outriggers should only be used when lifting maximum loads.

20. T F To prevent side loading or swinging of the load, the boom tip must be directly over the load to be lifted.
21. T F Taglines are required on all hoisted loads.
22. T F The maximum allowable lifting capacities are based upon the machine standing on a firm level surface.
23. T F When the boom length, radius or both are between values listed in the load chart, the smallest weight listed at either the next larger radius or boom length must be used.
24. T F The boom must be centered over the load and the boom sections must be extended equal before the lift is made.

Multiple Choice. Select the answer, which is the most correct.

25. When is it not acceptable for the operator to leave his controls?
   a. When the engine is running
   b. When the load is suspended
   c. All the above
   d. None of the above

26. The hydraulic crane (on outriggers) capacity charts are based on what percentage of tipping?
   a. 65%
   b. 75%
   c. 90%
   d. 85%

27. When lifting off the outriggers, the outriggers shall be:
   a. Fully extended
   b. Tires off the ground
   c. Cribbed under the outrigger beams
   d. a & b
   e. b & c

28. When a crane is not level, what will happen to the radius when the boom swings to the low side?
   a. Increase in radius, decrease in capacity
   b. Decrease in radius, increase in capacity
   c. There will be no change

29. Keeping all load handling devices a reasonable distance below the boom head is recommended to prevent the following condition:
   a. The load contacting the boom
   b. Two-blocking the hook block with the boom point
   c. All the above
   d. None of the above
**Use the enclosed load chart on the 50 Ton Linkbelt HSP – RT8050**

30. How much can you lift with the center pin 20’0” from the load and 45’0” of main boom out lifting over the front with outrigger fully extended?
   - In A-max mode? __________________________
   - In Boom Mode B? __________________________

31. Can this chart be used when making a lift on tires? Yes No

32. What are the maximum boom radius and the maximum boom length that can be used to lift a load of 38,000 pounds over the front of the crane, with the outriggers fully extended and in Boom Mode B?
   Radius__________ Boom Length ____________Boom Angle ____________
   - What would be maximum boom radius and maximum boom length that could be used to lift the same load in Boom Mode B on rubber?
   Radius__________ Boom Length ____________Boom Angle ____________

33. Why does the chart have a highlighted black line?

34. The load to be lifted weighs 24 tons, what is the maximum load radius and boom length that can be used on a 360-degree lift? *(Lifting from main boom. Outriggers fully extended. 60 ton block, 34 ft. offset fly erected but not used.)*
   Radius__________ Boom Length ____________Boom Angle ____________

35. Does the load chart include the weight of the block, slings, or any auxiliary devices? Yes No

36. Outriggers fully extended with Load Radius 45ft./ Boom Length 105 ft. / Boom Angle ____________
   - What is the lifting capacity for 360 degrees?________________________

37. Outriggers fully extended with Load Radius 100 ft./ 34 ft. offset fly section/ 15 degrees offset, 85 ft. Boom.
   - What is the Boom Angle? __________________________
   - What is the lifting capacity? __________________________
   - What is the height above ground? __________________________

38. If the boom angle is 40 degrees, and the boom length is 85 ft. What is the load radius? ____________

39. What is the maximum load that can be lifted and carried at a 12 ft. radius? ___________________________(Tire size 29.5x25 – 28 ply)
(Use the enclosed load chart on the Dresser 150A)

40. You have a 3-section boom and your boom angle is 45 degrees and the boom length is 40 feet.
   - What is the load radius from the centerline of rotation? ________________
   - What is the maximum capacity at this crane setup with outriggers? ________________
   - What is the maximum capacity over the front of this crane setup without outriggers? ________________

41. Radius is 40 feet from the center pin and the boom length is 60 feet. What is the boom angle? ________________

42. Load weighs 8 tons running multiple line hook block, jib stowed, lifting on outriggers.
   - What is the total weight? ________________
   - What is the maximum radius and boom length that can be used for this lift?

Radius ___________ Boom Length ___________ Boom Angle ___________

43. Outriggers extended / Load Radius 20′ / Boom Angle 45 degrees.
   - What is the capacity for 360 degrees? ________________
   - What is the boom length? ________________
   - What is the capacity over the front? ________________
   - What is the boom length? ________________

44. Load weighs 2 tons. Running single line weight hook, lifting with jib, 0 degrees angle, on outriggers.
   - What is the total weight? ________________
   - What are the maximum radius and the overall boom and jib length that can be used for this lift as 65 ft. above the ground?

Radius ___________ Boom Length ___________ Boom Angle ___________

45. When making a lift without the outriggers, can 7, 420 lbs be lifted and rotated 360 degrees?
   - Yes  ☐  No ☐
   - If so at what radius?

Radius ___________
   - Can the same lift be lifted of the front?

   - Yes ☐  No ☐
• If so at what radius?
  Radius ____________

• What size is the wire rope, how many strands must it have and how many wires are in each strand?
  Size of wire rope ____________ Number of strands ____________
  Number of wires ____________

• What is the single part winch line rated for? ____________
PREFERRED INDUSTRIAL CONTRACTORS, INC.

OPERATOR QUALIFICATION CHECKLIST

OPERATOR NAME: __________________________ JOB NUMBER: ____________________

IN ACCORDANCE WITH ANSI B30.5 SEC5-3.1.2 AND COMPANY REQUIREMENTS THE ABOVE NAMED INDIVIDUAL MEETS THE FOLLOWING PHYSICAL QUALIFICATIONS:

CHECK

(A) HAS VISION OF AT LEAST 20/30 IN ONE EYE AND 20/50 IN THE OTHER, WITH OR WITHOUT GLASSES.
   □

(B) IS ABLE TO DISTINGUISH RED, GREEN, AND YELLOW, REGARDLESS OF COLOR POSITION. IF COLOR DIFFERENTIATION IS REQUIRED FOR OPERATION.
   □

(C) HAS ADEQUATE HEARING, WITH OR WITHOUT HEARING AND AID TO OPERATE ASSIGNED CRANE.
   □

(D) DOES NOT HAVE A HISTORY OF EPILEPSY OR OF A DISABLING HEART CONDITION.
   □

(E) DOES NOT HAVE A HISTORY OF HIGH BLOOD PRESSURE AND IS NOT CURRENTLY TAKING MEDICATION FOR HIGH BLOOD PRESSURE.
   □

THE ABOVE NAMED INDIVIDUAL HAS COMPLETED THE FOLLOWING REVIEWS AND TESTS SATISFACTORYLY:

(A) HAS READ THE CRANE’S OPERATING MANUAL AND THE COMPANY CRANE OPERATION MANUAL.
   □

(B) HAD DEMONSTRATED PROPER INSPECTION PROCEDURES INCLUDING FLUID LEVELS, TIRES, ROPE CONDITION, CRANE START-UP AND GAUGE READINGS AND TESTED ALL CONTROLS FOR PROPER FUNCTION.
   □

(C) HAS REVIEWED AND UNDERSTANDS THE LOAD CHART WHICH IS AVAILABLE TO HIM WHILE HE IS AT THE CONTROLS. HE UNDERSTANDS THAT THE CRANE CAPACITY SHALL NOT EXCEED 75% WHERE TIPPING COULD OCCUR.
   □

(D) HAD DEMONSTRATED THE FOLLOWING OPERATION-PROCEDURES:

   1) MOVE THE CRANE INTO POSITION AND LEVEL THE CRANE
      □

   2) DROP HEADACHE BALL INTO A 55 GAL DRUM LOCATED AT RADIUS OF 25% OF BOOM LENGTH.
      □

   3) CONTROL COORDIATION – WITH A 4’ LONG STRAP HANGING FROM THE HOOK, KEEPS THE STRAP IN CONTACT WITH THE GROUND FOLLOWING A COURSE OUTLINE.
      □

VERIFIED BY: ___________________________ DATE __________ OPERATOR’S SIGNATURE __________

PIC Rev 12/12/11
PREFERRED INDUSTRIAL CONTRACTORS, INC.
PERSONNEL BASKET APPROVAL FORM

The use of a crane or derrick to hoist employees on a personnel platform is prohibited unless, the erection, use or dismantling of conventional means of reaching the worksite, such as a personnel hoist, ladder, scaffold, aerial lift, stairway or elevated work platform would be more hazardous or is not possible due to structural design or worksite conditions.

JOB #: ___________________________ JOB NAME: ___________________________
CRANE SIZE AND TYPE: _______________________________________________________
PERSONNEL BASKET MAKE AND MODEL: _______________________________________
JUSTIFICATION FOR PERSONNEL BASKET USE: __________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
SCOPE OF WORK PERSONNEL BASKET USE: __________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
USE ADDITIONAL SHEETS IF NEEDED ATTACH PRINTS AND/OR DRAWING
OF WORK LOCATION
SUBMITTED BY DATE DIVISION MGR. APPROVAL DATE
SAFETY DEPT. REVIEW DATE

*ALL REQUIREMENTS FOR CRANE SETUP, TESTING, AND USE OF PERSONNEL BASKETS
MUST BE FOLLOWED – REFER TO COMPANY SH&E MANUAL, SECTION 28, APPENDIX A.
PREFERRED INDUSTRIAL CONTRACTORS, INC.

INSPECTION REPORT SUSPENDED

PERSONNEL BASKET

(TO BE COMPLETED BEFORE EACH USE)

MODEL# __________ DATE: ________

SERIAL # __________ TIME: ________

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GUARDRAILS, FLOOR PLATE, TOEBOARDS ARE FREE OF DISTORTION.

SAFETY RAILING IN GOOD CONDITION.

IS RIGGING FREE OF DISTORTION, BROKEN WIRES. SHACKLES PROPERLY SECURED WITH COTTER KEYS.

SAFETY LATCH WORKING CORRECTLY.

LOAD HOOK IN PROPER CONDITION.

DOOR LOCKS AND Hinges WORKING FREELY.

IDENTIFICATION PLATE AND CAPACITY MARKING VISIBLE.

ALL WELDS FREE OF ANY DEFECTS.

SAFETY BELTS AND LANYARDS FOR EACH PASSENGER INSPECTED:

DATE __________ INSPECTED BY ______________________

CRANE INSPECTED IN ACCORDANCE WITH 29 CFR 1926.550:

DATE __________ INSPECTED BY ______________________

CRANE EQUIPPED WITH PROPER SAFETY EQUIPMENT.

OPERATIONAL TEST OF CRANE BEFORE LIFT IS MADE.

LOAD TEST OF SUSPENDED PERSONNEL PLATFORM.

PRE-LIFT SAFETY MEETING WITH ALL EMPLOYEES CONCERNED.

PIC Rev 12/12/11
FOREMAN’S SIGNATURE ___________________________

PREFERRED INDUSTRIAL CONTRACTORS, INC.

WIRE ROPE INSPECTION REPORT

LOCATION JOB NO. DATE OF INSPECTION

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| REMARKS: | | |
| INSPECTED BY: | | |
# FORKLIFT OPERATOR

## OBSERVATIONAL CHECKLIST

**Operator Name:** ____________________________  **Date:** ________________

**Equipment:** ____________________________  **Observer:** ____________________________

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<tr>
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| 1. | □   | □  | Employee has on the appropriate personal protective equipment.
| 2. | □   | □  | Employee completed a pre-shift inspection of the equipment prior to operating the equipment.
| 3. | □   | □  | Any covers, guards, caps or safety devices removed for purposes of inspection have been replaced.
| 4. | □   | □  | Employee can identify and understands the operation of each control.
| 5. | □   | □  | Employees performed a functional test of each control.
| 6. | □   | □  | Employee can identify and understands all placards, decals, warnings and instructions for the equipment.
| 7. | □   | □  | Employee inspected the area for hazards prior to operation.
| 8. | □   | □  | Employee appears comfortable operating the equipment and operates the equipment smoothly without any jerking or other unsafe movement.
| 9. | □   | □  | Employee appears to have the proper eye, hand, foot coordination to safely operate the equipment.
| 10.| □   | □  | Employee demonstrates working knowledge of the equipment.
| 11.| □   | □  | Employee knows the procedures for reporting defects, malfunctions or other problems with the equipment.

______________________________  ________________________________
Operator’s Signature  Observer’s Signature  

PIC  Rev 12/12/11
PREFERRED INDUSTRIAL CONTRACTORS, INC.

FORKLIFT TEST

Name: ______________________________ Date: _____ / ___ / ___
(PRINT)

SS# ___ ___ - ___ - ___ ___ ___

Multiple Choice. Select the answer, which is the most correct

1. When changing directions:
   a. Always stop
   b. Slow down to about 1 mph
   c. Don’t worry about speed; a forklift is built to take the shock

2. Never exceed the rated load capacity of your forklift.
   a. Unless you add additional counter weighting
   b. Unless your lift is under 84 inches high
   c. No never exceed the rated capacity

3. The greatest cause of accidents among new forklift operators is:
   a. Daydreaming
   b. Forgetting to watch overhead obstructions when lifting
   c. A & B are both correct

4. When taking a load down a ramp:
   a. Drive backwards
   b. Drive forwards
   c. Reduce speed by zigzagging

5. If you have to park on a ramp:
   a. Leave the machine in gear
   b. Set the brakes and block the wheels
   c. Set the load down and rest the machine against the load

6. As an operator.
   a. It is your responsibility to watch for pedestrians
   b. Their responsibility to watch for you
   c. Management’s responsibility to keep them out of your work area

7. On your forklift, the horn
   a. Makes a good device to catch the foreman off guard
   b. Should be sounded at intersections and blind corners
   c. Should be sounded when you are racing another forklift
8. What is the purpose of forklift training programs?
   a. Reduce accidents
   b. Reduce maintenance costs
   c. Increase productivity
   d. All the above

9. How often should the forklift be inspected?
   a. Every day
   b. Every week
   c. At the beginning of each shift
   d. Twice a week

10. Which of the following is the greatest hazard?
    a. Worn tires
    b. Brake failure
    c. Inoperative horn
    d. Weak batter

11. When should the horn be used on a forklift?
    a. When the operator wants to let others know that he has the right of way
    b. When a clear path is required to move a load
    c. To warn pedestrians and other traffic, and on blind corners
    d. When something is blocking your path

12. How high should the forks be raised when the forklift is traveling on a level surface?
    a. 3 inches
    b. 6 inches
    c. 12 inches
    d. The height depends on the visibility of the driver

13. How does the rear-end steering of the forklift compare with an automobile?
    a. The rear of the forklift swings more than an automobile.
    b. The rear of the forklift swings less than an automobile.
    c. Rear end steering allows the forklift to make sharper turns at higher speeds
    d. The forklift steers about the same as an automobile.

14. What is OSHA Definition of an “unattended vehicle”?
    a. If the operator is more than 25 feet away from the vehicle
    b. If the forklift is out of the operator’s view
    c. Both a & b are correct

15. The maximum allowable load for the forklift can be found:
    a. In the maintenance manual
    b. On the data plate of the forklift
    c. In the operators manual
    d. All the above
16. When is smoking permissible?
   a. In refueling areas when there is no evidence of a leak
   b. Whenever the forklift engine is turned off and there is no evidence of a leak
   c. Smoking is never permissible in refueling areas
   d. Smoking is permissible in fueling areas where no fuel vapors are present.

17. Who may operate a forklift?
   a. Only those who have an automobile driver’s license
   b. Anyone who has the permission of a qualified forklift operator
   c. Only a qualified forklift operator
   d. All the above

18. When is it possible to walk beneath elevated forks or loads?
   a. When the load is less than 100 pounds.
   b. Only when the operator has the load raised securely and gives his permission
   c. Anytime there is no load on the forks
   d. It is not permissible under any conditions

19. Who may make repairs on forklifts?
   a. Only persons trained and authorized to do so
   b. A driver is allowed to make repairs if time permits
   c. A supervisor may designate drivers who will make the repairs.

Respond to the following statements as being either True (T) or False (F)

____ 1. Your tires should be checked weekly.

____ 2. When parking your forklift, make sure the forks are left high enough to clear obstruction.

____ 3. Keep the engine oil level at the full mark on the dipstick.

____ 4. A forklift steers with its rear wheels and allows it to make sharper turns.

____ 5. It’s ok to smoke when refueling as long as you are in a restricted area

____ 6. Stay in low gear with every load.

____ 7. When lifted high, a load will reduce a forklifts’ stability.

____ 8. As long as you are beside him, it is ok to let an unauthorized person operate the forklift.

____ 9. If you take special care, it’s ok to let bystanders walk beneath the loads when you high-stacking.

____ 10. A careful driver follows the rules of the road except he backs up when a bulky load obstructs his forward vision.
11. A careful driver hangs his leg outside the forklift as long as it is protected by a wide load.

12. A careful operator drives slowly on slippery and wet floors or pavement.

13. An efficient operator checks the load for stability before moving them.

14. Skid marks are generally a sign of poor driving.

15. A forklift may be loaded beyond its rated capacity only if additional counterweights are added.

16. The mast should be tilted back when traveling with a load.

17. A good operator always considers the clearance of elevated loads.

18. When doing work that requires you to get on and off the forklift, you are exempt from wearing the seatbelt.

19. Although the basic controls may be the same, the exact controls and instruments vary from one forklift to another.

20. You can safely turn on a ramp or incline if it is more than two forklifts wide.
This is to verify that _______________ received and understands the procedures of operating, handing, lubrication, safety features and safe operations of LOADERS.

Understands the Proper Use of:

- Seat Belts
- Brake System
- Fire Extinguisher
- Working Near Electricity
- Working Near Stockpiles
- Hydraulic System
- Control/Warning Device
- Parking Brake
- Gauges
- Transmission / Shift
- Ignition
- Downhill Travel
- Emergency Stopping
- Joystick Controls
- Equipment Inspection
- Loading Operations
- Dump Instructions
- Gear Shift Lever
- Backing Safety
- Grounding Bucket
- Air Conditioner
- Proper Tire Inflation

Important Instructions. PLEASE READ AND INITIAL EACH ONE.

1. Tires should be inspected daily.

2. When parking the loader the bucket should always be grounded.

3. Never work under the loader bucket.

4. Do not smoke while refueling.

5. Start in low gear with every load.


7. Never let bystanders stand or walk under the loader bucket.

8. A careful operator follows the rules of the road.


10. Seatbelts are to be worn at all times.

11. Although the basic controls may be the same, the exact controls and instruments vary from one compactor to another.

Print Name: ________________________________ Signature: ________________________________

SUPERINTENDENT: ______________________________________________________________________

OPERATOR: ____________________________________________________________________________

PIC Rev 12/12/11
PREFERRED INDUSTRIAL CONTRACTORS, INC.

WELDING/BURNING

HOT WORK PERMIT

LOCATION AND DESCRIPTION:

LOCATION OF WORK: __________________________

WORK DESCRIPTION: __________________________

DATE: ___________________________ TIME: ___________________________

PERSON IN CHARGE OF WORK: ___________________________

No welding, grinding, cutting or other hot work is to be performed on any piping, pipelines, drums, barrels, tanks, vessels or other containers until they have been physically isolated, cleaned and adequate tests have been performed to ensure that no flammable materials, gases or vapors are present.

SITE PREPARATION

SYSTEM LOCKOUT/ DE-ENERGIZE □ SOURCE VALVES SHUT OFF LOCKED/TAGGED □

LINES BROKEN / CAPPED / BLANKED □ BLINDS INSTALLED AND MARKED □

FLUSH / VENTILATE LINES AND EQUIP. □ ADDITIONAL VENTILATION REQUIRED □

FIRE PROTECTION / FIREWATCH □ AREA BARRICADED □

COMBUSTABLE MATERIALS REMOVED □ FLAMMABLE MATERIALS REMOVED FROM OR COVERED WITH FIREBLANKETS □ AREA □

GAS TEST PERFORMED

<table>
<thead>
<tr>
<th>TEST PERFORMED</th>
<th>LOCATION</th>
<th>READING</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

ADDITIONAL SAFETY EQUIPMENT REQUIRED

FACESHIELD □ GOGGLES □ RESPIRATOR □ GLOVES □ OTHER □

SPECIAL PROCEDURES: ____________________________________________________________

AUTHORIZATIONS: I CERTIFY THAT I HAVE INSPECTED THE WORK AREA FOR SAFETY AND I HAVE REVIEWED ALL PRECAUTIONS RECORDED ON THIS PERMIT AND UNDERSTAND ALL PROCEDURES TO BE TAKEN.

SUPERVISOR AUTHORIZING WORK: _______________________________________________
PREFERRED INDUSTRIAL CONTRACTORS, INC.

ACKNOWLEDGMENT OF PERMIT
REQUIRED CONFINED SPACE TRAINING

I __________________________ HAVE READ AND UNDERSTAND THE
(PRINT NAME)
TRAINING PACKET, PERMIT-REQUIRED CONFINED SPACE
ENTRY. I HAVE ALSO COMPLETED AND ANSWERED ALL THE
QUESTIONS CORRECTLY ON THE PERMIT – REQUIRED
CONFINED SPACE QUIZ.

__________________________    ____________________    ____________________
(EMPLOYEE SIGNATURE)         (DATE)               (DIVISION OR SUBCONTRACTOR)

__________________________    ____________________    ____________________
(INSTRUCTOR’S NAME PRINTED)   (DATE)               (INSTRUCTOR’S SIGNATURE)
ALTERNATE ENTRY CONFINED SPACE WORK FORM

Space to be entered: __________________ Location/ Description: __________________
Purpose of entry: __________________ Permit Valid for Date: __________________
Supervisor Authorizing Work: __________________ (Print) __________________ (Signature)

Individuals Authorized to Perform Work:

________________________________________ __________________________
________________________________________ __________________________
________________________________________ __________________________
________________________________________ __________________________

(Print) (Signature)

I have evaluated the hazards of the above confined space and have determined that there are no hazards present. I have also made the required safety equipment available and instructed the authorized individuals accordingly as required by 29 CFR 1926.21.

Hazard Evaluator: __________________ Date of Evaluation: __________________

<table>
<thead>
<tr>
<th>ATOMIC SPHERIC TESTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen Deficiency Enriched</td>
</tr>
<tr>
<td>Hydrogen Sulfide</td>
</tr>
<tr>
<td>Hazardous Vapors/Gases</td>
</tr>
<tr>
<td>CO Level within Limits</td>
</tr>
<tr>
<td>Explosive Atmosphere</td>
</tr>
</tbody>
</table>

Ventilation Required to Control Atmospheric Hazard(s):

Comments:
### GENERAL INFORMATION:
- Permit No.: __________
- Authorized Duration of Permit: Date: ___ to ___
- Location/ Description: ____________________________
- Time: ___ to ___

### PERMIT SPACE HAZARDS (Indicate specific hazards w/ Initials)
- Oxygen deficiency (less than 19.5%)
- Oxygen enriched (greater than 23.5%)
- Flammable gases or vapors (greater than 10% of LFL)
- Airborne combustible dust (meets or exceeds LFL)
- Toxic gases or vapors (greater than PEL or TLV)
- Mechanical Hazards
- Electrical Hazards
- Chemical Hazards (material harmful to skin, eyes, respiratory tract, etc.)
- Engulfment
- Other: __________________

### EQUIPMENT REQUIRED FOR ENTRY AND WORK
- Specify as required:
  - Personal protective equipment: __________________
  - Respiratory Protection: __________________
  - Atmospheric Testing/Monitoring: __________________
  - Communication: __________________
  - First Aid/CPR Responders: __________________

### PREPARATION FOR ENTRY (Check after steps have been taken)
- Notification of affected groups of service interruption.
- Isolation Method: __________
  - Lockout/ Tagout: ___
  - Blank/blind: ___
- Purge / Clean: ___
- Inert: ___
- Ventilate: ___
- Atmospheric Test: ___
- Barriers: ___
- Other: ___

### PERSONNEL AWARENESS:
- Personnel Awareness:
  - Pre-entry briefing on specific hazards and control methods
  - Notify contractors of permit and hazards conditions
  - Other: __________________

### Additional Notifications required: __________________

### RESCUE PERSONNEL/ SERVICE
- Phone No. Contact Method: __________________

### Authorized Entrants (List by name or attached roster):
- ______________
- ______________
- ______________
- ______________

### Authorized Attendants (List by name or attached roster):
- ______________
- ______________
- ______________
- ______________

### ATMOSPHERE TEST FREQUENCY:
- ______________

### TESTING

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>ACCEPTABLE</th>
<th>RESULT</th>
<th>RESULT</th>
<th>RESULT</th>
<th>RESULT</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>__________</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
</tr>
<tr>
<td>Oxygen Level</td>
<td>&gt;19.5%&lt;23.5%</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
</tr>
<tr>
<td>Flammability</td>
<td>&lt;10% LEL/LFL</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
</tr>
<tr>
<td>Hydrogen sulfide</td>
<td>&lt;10 ppm</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
</tr>
<tr>
<td>Toxic – (specify)</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
</tr>
<tr>
<td>Cl₂</td>
<td>&lt;0.5%</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
</tr>
<tr>
<td>CO</td>
<td>&lt;35 ppm</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
</tr>
<tr>
<td>SO₂</td>
<td>&lt;2 ppm</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
</tr>
<tr>
<td>Heat</td>
<td>_____ deg</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
</tr>
<tr>
<td>Other</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
<td>_______</td>
</tr>
</tbody>
</table>

### AUTHORIZED BY ENTRY SUPERVISORS

I verify review of this permit and verify that all necessary precautions have been taken to provide entry work in this confined space.

- Printed Name: __________________
- Signature: __________________
- Date: ___
- Time: ___

---

THIS PERMIT MUST BE POSTED AT THE CONFINED SPACE AND IS GOOD ONLY ON INDICATED DATES
PREFERRED INDUSTRIAL CONTRACTORS, INC.
CONFINED SPACE ENTRY PERMIT
PREFERRED INDUSTRIAL CONTRACTORS, INC.
NON-PERMIT REQUIRED CONFINED SPACE WORK FORM

<table>
<thead>
<tr>
<th>Space to be entered:</th>
<th>Location / Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose of entry:</td>
<td>Permit Valid for Date:</td>
</tr>
<tr>
<td>Supervisor Authorizing Work:</td>
<td>(Print) (Signature)</td>
</tr>
<tr>
<td>Individuals Authorized to Perform Work:</td>
<td>(Print) (Signature)</td>
</tr>
</tbody>
</table>

I have evaluated the hazards of the above confined space and have determined that there are no hazards present. I have also made the required safety equipment available and instructed the authorized individuals accordingly as required by 29 CFR 1926.21.

<table>
<thead>
<tr>
<th>Hazard Evaluator:</th>
<th>Date of Evaluation:</th>
</tr>
</thead>
</table>

**ATMOSPHERIC TESTING**

<table>
<thead>
<tr>
<th></th>
<th>Yes □</th>
<th>No □</th>
<th>Results (%):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen Deficiency Enriched</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrogen Sulfide</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Explosive Atmosphere</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Results: □

This part of the permit is required to be completed prior to all work to be performed inside or above loading or unloading bins and hoppers. Permit expires at the end of the shift on which it was issued. A new permit must be issued for work, which continues into the next shift. The proposed work required the following:

- Body harness, lanyard, and separate lifeline (29 CFR 1926.104) Yes □ No □
- Conveyor system lockout/tagout at generator (29 CFR 1926.417) Yes □ No □
- Other personal protective equipment (29 CFR 1926.28) Yes □ No □

If yes, list: ___________________________

<table>
<thead>
<tr>
<th>Fire protection (if hotwork) 29 CFR 1926.352:</th>
<th>Yes □  No □</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendant:</td>
<td>Yes □  No □</td>
</tr>
<tr>
<td>Other Requirements:</td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
</tr>
</tbody>
</table>

PIC Rev 12/12/11
Write True or False  ALL QUESTIONS MUST BE ANSWERED CORRECTLY

1. ______ One feature of permit-required confined space is that they have small or obstructed ways of getting in and out.
2. ______ The only serious hazard of permit spaces is that the air might not have enough oxygen.
3. ______ Hazards in permit space are more serious because it can be difficult for rescuers to reach workers who need help.
4. ______ The employer identifies all permit spaces in the workplace and their hazards.
5. ______ If conditions are safe before anyone enters a permit space, they will stay safe throughout the work.
6. ______ After workers enter a permit space, the entry supervisor verifies and signs the permit.
7. ______ Whenever the air in a permit space may be oxygen deficient or IDLH, an emergency escape breathing system to back up supplied air must be worn.
8. ______ Before anyone enters a permit space, it is necessary to make sure no hazardous energy or material will be released into the space.
9. ______ Permit spaces must sometimes be cleaned before entry to get rid of hazardous materials.
10. ______ If ventilation is needed, it should be started prior to the space being entered.
11. ______ The air must be tested in only one part of the permit space, since it will be the same in all areas of the space.
12. ______ The three basic atmospheric tests checks the air’s oxygen level, flammability, and toxicity.
13. ______ A permit space can be entered if two of the three atmospheric tests show the air is safe.
14. ______ Special equipment is sometimes needed in permit spaces to guard against falls and electric shocks.
15. ______ When respiratory protection is needed, any type of respirator can be used.
16. ______ In some cases, permit space entrants and attendants need radio or video equipment to stay in contact with each other.
17. ______ Rescue equipment should be tested before entry begins.
18. ______ One duty of entry supervisor is to make sure conditions stay safe after the permit space has been entered.
19. ______ If the attendant sees a dangerous condition, he must ask the entrant supervisor to order the entrants to leave the permit space.
20. ______ In an emergency, the entrant should wait inside the permit space for help to arrive.
Date: ______________________

Company: ________________________________

Employee Name: __________________________

SSN: ______________________________________

Date Information Collected: _________________________

History: _______________________________________

Spirometry: ____________________________________

Blood Pressure: ________________________________

Pulse: _________________________________________

_________________________ Medical clearance for full-face or half-face positive and/or negative pressure respirator is given until _______________________

_________________________ Medical clearance for respirator is not given.

Sincerely,

__________________________________________

PIC Rev 12/12/11
PREFERRED INDUSTRIAL CONTRACTORS, INC.
RESPIRATOR FIT TEST RECORD

A. EMPLOYEE: ___________________________________________ DATE: __________________________
   EMPLOYEE NO: ___________________________
   EMPLOYEE JOB TITLE/DESCRIPTION: ________________________________________________

B. EMPLOYER: ___________________________________________
   LOCATION/ADDRESS: ____________________________________________________________

C. RESPIRATOR SELECTED: ___________________________________
   MANUFACTURER: ________________________________________________________________
   NIOSH APPROVAL NUMBER: ______________________________________________________
   MODEL: ______________________________

D. CONDITIONS WHICH COULD AFFECT RESPIRATOR FIT:
   □ CLEAN SHAVEN   □ FACIAL SCAR
   □ 1-2 DAY BEARD GROWTH   □ DENTURES ABSENT
   □ 2+ DAY GROWTH   □ GLASSES
   □ MOUSTACHE   □ NONE
   COMMENTS: __________________________________________________________

E. FIT CHECKS:
   NEGATIVE PRESSURE □ PASS □ FAIL □ NOT DONE
   POSITIVE PRESSURE □ PASS □ FAIL □ NOT DONE

F. FIT TESTING:
   □ QUANTITATIVE   □ ISOAMYL ACETATE QUALITATIVE   □ IRRITANT SMOKE QUALITATIVE
   FIT FACTOR: _______ □ PASS □ FAIL
   COMMENTS: __________________________________________________________

G. EMPLOYEE ACKNOWLEDGMENT OF TEST RESULTS
   EMPLOYEE SIGNATURE: ___________________________ DATE: __________________________
   TEST CONDUCTED BY: ___________________________ DATE: __________________________
# Respirator Inspection, Cleaning, Maintenance, and Storage Report

<table>
<thead>
<tr>
<th>Inspector Signature</th>
<th>Company / Title</th>
<th>Respirator ID#</th>
<th>Type</th>
<th>Model &amp; Make</th>
<th>Date of Inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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PIC Rev 12/12/11
PREFERRED INDUSTRIAL CONTRACTORS, INC.

RESPIRATORY PROTECTION QUALIFICATION SHEET

NAME: ____________________________________________

(PRINT)

TRAINED BY: _________________________________________

LOCATION/ UNIT: _______________________________________

1. MEDICAL QUESTIONNAIRE COMPLETED: ________________ DATE: __________
   (TRAINER’S SIGNATURE)

2. RESPIRATORY TRAINING COMPLETED: ________________ DATE: __________
   (TRAINER’S SIGNATURE)

3. RESPIRATORY FIT TEST COMPETED

   A. QUANTITATIVE TEST
   PROTECTION FACTOR _______ ________________ DATE: __________
   (TRAINER’S SIGNATURE)

   B. QUALITATIVE TEST _______ ________________ DATE: __________
   (TRAINER’S SIGNATURE)

I, ____________________________ ACKNOWLEDGE THE RECEIPT AND UNDERSTANDING OF
THE RESPIRATORY TRAINING AND FITTING.

__________________________________________ DATE: ________________
SIGNATURE
PREFERRED INDUSTRIAL CONTRACTORS, INC.

RESPIRATOR SELECTION WORKSHEET

1. Project Name: ________________________________
   Name of Project Superintendent / SH&E Representative: ________________________________

   Location: ________________________________
   Prepared By: ________________________________ Date Prepared: ________________________________

2. Respirator Use Identification
   Locations and/or jobs where the respirator selected is to be used: ________________________________

3. Nature of the Hazard
   Hazardous material and/or condition being evaluated: ________________________________

<table>
<thead>
<tr>
<th>Biological Effects</th>
<th>Yes □</th>
<th>No □</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen Deficiency</td>
<td>Yes □</td>
<td>No □</td>
</tr>
<tr>
<td>IDLH Atmosphere</td>
<td>Yes □</td>
<td>No □</td>
</tr>
<tr>
<td>Toxic Contaminant</td>
<td>Yes □</td>
<td>No □</td>
</tr>
<tr>
<td>If Yes, Identify:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gaseous:</th>
<th>Asphyxiant</th>
<th>Sensitizer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irritant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anesthetic</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   | Particulate: | Relatively Inert | Systemic |
   |             |                  |          |
   | Poisons     | Pulmonary Fibrosis | Allergy Producing |
   | Producing   |                  |            |
   | Febrile-Reaction Producing | |

   NOTE:
   This worksheet shall be prepared for each hazardous material where a specific type of respirator is to be selected. If the same material is present at a number of locations and the same type of respirator is to be specified, the selection should be based on the most hazardous condition reasonably expected. If the material is present at two or more places at sufficiently different concentrations to require different respirator types, a worksheet shall be prepared to cover each respirator type. The person preparing this worksheet is referred to ANSI standard Z 88.2-1992 or contact the Corporate SH&E Department for guidance.

   Combination Gaseous and Particulate: (Indicated in appropriate places in groupings given above)

<table>
<thead>
<tr>
<th>Any known additive or synergistic effect?</th>
<th>Yes □</th>
<th>No □</th>
</tr>
</thead>
<tbody>
<tr>
<td>If yes, describe:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   Respirator Selection Properties

<table>
<thead>
<tr>
<th>Gaseous:</th>
<th>Particulate:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inert</td>
<td>Dust</td>
</tr>
<tr>
<td>Acidic</td>
<td>Spray</td>
</tr>
<tr>
<td>Alkaline</td>
<td>Fume</td>
</tr>
<tr>
<td>Organic</td>
<td>Mist</td>
</tr>
<tr>
<td>Organometallic</td>
<td>Fog</td>
</tr>
<tr>
<td>Hydrides</td>
<td>Smoke</td>
</tr>
</tbody>
</table>

PIC  Rev 12/12/11
Other physical, chemical or physiological characteristics of hazardous material including warning properties:

Odor?  Yes □  No □
If yes, give threshold ______ppm.

(Odor is an important consideration in gaseous respirator selection)

Eye Irritant?  Yes □  No □
At what concentration? ____________________________

If yes, the respiratory protection selected must be compatible with eye protection.

Skin Absorption or Irritant?  Yes □  No □
At what concentration? ____________________________

If yes, the respiratory protection selected must be compatible with skin protection.

Approximate temperature of hazardous material? ____________________________
If material is liquid or volatile solid give vapor pressure at expected temperatures:

Is substance flammable?  Yes □  No □
If Yes,  Lower Limit: _________ Vol%  Upper Limit: _________ Vol%

Immediately Dangerous to Life or Health Conditions.

IDLH Concentration: ____________________________
Source of IDLH Information: ____________________________

4. Expected Exposure Levels
(From Industrial Hygiene monitoring program. Include copies of test data used with this worksheet) Source and Year(s): ____________________________

Summary of Key Results:

<table>
<thead>
<tr>
<th>TWA</th>
<th>STEL</th>
<th>CEILING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Average Range)

1- Indicate units used and the form of the compound to which they refer (e.g., Vanadium as V or V₂O₅)
2- Short term exposure limits.
3- Limit which is never to be exceeded. (Sometimes used interchangeably with STEL).

Is there a reasonable expectation that the toxic contaminant will exceed the IDLH Concentration?
Yes □  No □

Expected Exposure Level: ____________________________

Basis for Expected Exposure Level: ____________________________
5. **Permissible Exposure Limits**
Enter established permissible exposure limits (PEL):

<table>
<thead>
<tr>
<th>TWA_1</th>
<th>STEL_2</th>
<th>CEILING_3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MSHA (Usually ACGIH 1973)

OSHA__________________________________________

ACGIH (Identify year)

Other (Identify)_____________________________________

A. OSHA PEL’s must be shown. The TWA’s from the other regulatory or scientific agencies should be shown in order to provide perspective and also information on possible future changes that might impact on respirator selection.

B. Indicate units used and the form of the compound of which they refer (e.g., Vanadium as V or V₂O₅)

6. **Calculation of Respirator Protection Factor (RF) Needed**

\[
RF (\text{Needed}) = \frac{\text{Expected Exposure Level (From 4)}}{\quad} = (\_\_\_\_\_\_\_\_\_\_\_\_\_)
\]

\[
RF \ TWA = (\_\_\_\_\_\_\_\_\_\_) = (\quad)
\]

\[
FR \ STEL = (\_\_\_\_\_\_\_\_\_\_) = (\quad)
\]

\[
RF \ CEILING = (\_\_\_\_\_\_\_\_\_\_) = (\quad)
\]

\[
RF \ MPC (\text{DCG}) = (\_\_\_\_\_\_\_\_\_\_) = (\quad)
\]

7. **Characteristics of Hazardous Operation or Process**

Provide brief description of process characteristics for each job or location where the respirator is to be used that would impact on exposure levels.

8. **Location of Hazardous Area**

9. **Respirator Use Time Period**

Respirator use time consideration (check applicable items):

- Routine □
- Non-Routine □
- Emergency □
- Rescue □

Describe briefly the amount of time per day and the days per week, year or older appropriate time period that the respirator will be worn.

10. **Work Activity**

Worker activity in hazardous area (check applicable items):

- Continuous? □
- Intermittent? □

Work Rate:
- Light? □
11. Selection of Permissible Respirator Types
List the permissible respirator types:

12. Selection of Specific Respirators
Enter the appropriate protection factors from Item 6.
TWA
STEL
CEILING
MPC

Enter the physical or chemical characteristics from Part 3 that influence respirator selection:

Identify if it is a hazard with specific respirator approvals: (asbestos, silica, coal dust, textile fibers, cotton dust, nuisance dust, radio nuclide):

Does it have PEL less or more than 0.005 mg/M3 or 2 mppcf?
Above
Below

If gaseous or vapor, does it have adequate warning properties? Yes ☐ No ☐

Considering the factors just given, use Table 1A or 1B as applicable to identify acceptable respirator configurations. List them below:

Within the limit of the respirators just listed, the final choice of the respirators used is largely up to the location, provided that reasonable consideration of Items 6 through 10 in this worksheet is made in the final selection. When the final choices are made, list the respirators chosen and indicate the key reasons for such choices.

Respirators chosen:
Reason for choice:
PREFERRED INDUSTRIAL CONTRACTORS, INC.

RESPIRATOR TRAINING RECORD

Company: _____________________________ Date: _______________________

Location / Unit: ___________________________

Respirator Training was given in the accordance with the Corporate SH&E Department’s Respirator Protection Procedure. Qualitative fit testing was completed using an appropriate test atmosphere. NIOSH certified respirators were issued to the following individuals and each individual checked for proper fitting.

<table>
<thead>
<tr>
<th>Wearer’s Signature</th>
<th>Respirator Style &amp; No.</th>
<th>Cartridge Type &amp; No.</th>
<th>Qualitative Fit Test For</th>
<th>Passed Fit Test</th>
<th>Trainer’s initials</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yes □ No □</td>
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<td>Yes □ No □</td>
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</tbody>
</table>

Complete all Sections fully and Submit a copy to the Corporate SH&E Department Supervisor.

_________________________________________ Trainer

_________________________________________ Supervisor

PIC Rev 12/12/11
PREFERRED INDUSTRIAL CONTRACTORS, INC.

TRAINING FOR PERSON ISSUING RESPIRATORS

Name: ___________________________________________

Project Name: _______________________________________

Respirators

1. Basic Respirator Wearer Training
   Given By: ___________________________________________
   Date: ________________________________

2. Training on Respirators to be Used
   Given By: ___________________________________________
   Date: ________________________________

3. Training to Recognize Defective or Improperly Maintained Respirators.
   Given By: ___________________________________________
   Date: ________________________________

4. Training for Respirator Issue
   Given By: ___________________________________________
   Date: ________________________________

5. Annual Repeat of Training
   Given By: ___________________________________________
   Date: ________________________________
# TRAINING FOR SUPERVISORS FOR RESPIRATOR INSTRUCTION

Person Providing Training: ________________________________  Date: __________________

### Persons Trained

<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
</tr>
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<tbody>
<tr>
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PIC  Rev 12/12/11
### 8.0 SAFE PROGRAM

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EVERY TASK

8.0 SAFE PROGRAM
SAFETY AWARENESS FOR EMPLOYEES
EVERY DAY

8.1 Purpose
A. The Safe Program is a safety awareness process designed to assist in eliminating and reducing the risk of accidents, injuries, illnesses and unsafe conditions while protecting and preserving our environment.

8.2 Concept
A. The Safe Program adopts the principle that the task performer’s personal commitment and accountability must be promoted through his/her involvement in the safety task planning. The Crew Supervisor will convey a thorough understanding of the safety practices and implementation of procedures related to the job task.

8.3 Goal
A. The Company’s mission of safety excellence can be achieved by empowering the entire work force in the planning and decision making process. This will inspire the enthusiasm necessary for each employee to accept ownership of a safety process that is focused on continuous improvement.

8.4 Scope
A. The Crew Supervisor and the task performer(s) together review the Job Safety Analysis (JSA) to analyze the assigned task for hazards at the task location. After the hazards have been identified, the front line Supervisor and the Task performer(s) discuss the proper method to perform the assigned task.
B. This process has been developed for each employee to recognize the importance of the Safe Program, encourage teamwork, promote participation in hazard recognition and identify safe work procedures that will assist in eliminating injuries and or illnesses for every employee before execution of the tasks.
C. To elevate the awareness of the Company’s safety process by promoting teamwork that requires the task performer(s) to analyze the task in relation to safe work practices, health and environmental compliance and give feedback to the front line supervisor/designee, who in turn will cover any hazards that have been overlooked or not recognized by the task performer(s). The Crew Supervisor is responsible and accountable for the task performed and will ensure all tasks are performed in a safe manner.

8.5 Exhibit(s)
A. Safety Awareness For Employees Instructions
B. Safety And Health Management System

“SAFE is a Communication and Awareness Process”
JOB SAFETY ASSESSMENT (JSA)
This job will be completed before each shift for each task. Post this JSA in an obvious place during the length of the task. Each crewmember involved with the task will sign this JSA. If a deviation from safe work practice/procedure occurs, WORK WILL BE STOPPED AND RE-EVALUATED.

Job#__________ Location:__________

Task Description:__________________________

Contractor:______________________________

Permit/Work Order No:____________________

Date:___________/__________/_________ Emergency No:__________

Personal Protective Equipment:

_____ Hearing Protection
_____ Respirator-Type __________
_____ Gloves/ Glove Mat’l________
_____ Safety Glasses, Goggles, Shields
_____ Chemical Resistant Clothing
_____ Rubber Boots
_____ Fall Protection
_____ Other

1. List job steps associate with task.
(1) JOB STEPS

General Requirements

_____ Barricades
_____ Post Warning Signs
_____ Use Ventilation/Exhaust
_____ Relocate Flammable Mat’tls from work Area

Housekeeping

_____ Walkway Clean/Work Area Clean
_____ Trash and Scrap Metal Placed in Proper Containers

_____ Tools, Materials & Equipment Stored Properly

_____ Other

Unit Specific Training

_____ Known Potential Hazard Related to Job Task/Unit Area

Hazes (Body)

_____ Fall Potential
_____ Pinch Points
_____ Slip/Trip Potential

_____ Other

Hazard Communication

_____ Discuss Health Hazards
_____ Discuss Physical Hazards

_____ MSDS Available

2. List hazards associated with job steps.
(2) IDENTIFIED HAZARDS

Hazard (Environmental)

_____ Noise
_____ Heat Stress
_____ Airborne Particulate
_____ Electrical Shock
_____ Restricted Access/Egress
_____ Restricted Lighting
_____ Heavy Objects
_____ Sharp Objects
_____ Hot/Cold Surfaces
_____ Other

Specialized Operations

_____ Confined Space Entry
_____ Excavation and Shoring
_____ Lock Out / Tag Out
_____ Line breaking
_____ Crane Lift Study
_____ Crane Suspended Work Platform
_____ Scaffolding
_____ Asbestos Abatement
_____ Working on Energized Electrical Circuit
_____ Roof Access
_____ Scaffolds/Ladders
_____ Welding/ Burning / Cutting

Other-Notify Management for Procedures and Review

3. List safe work procedures to eliminate the hazards

(3) SAFE WORK PRACTICES

______________________________________

______________________________________

______________________________________

______________________________________

______________________________________

______________________________________

______________________________________

______________________________________

______________________________________

______________________________________

______________________________________

______________________________________

______________________________________

______________________________________
### Additional Job Instructions
List All Equipment Needed for Job Task. (Cranes, Fork Lift, Grinder, Come-Along, etc.)

---

**ATTENTION:** Verify that all workers understand their duties and job requirements. Employees Safety Concerns: Answer the following Questions with Yes, No or, N/A.

a. Could weather conditions affect the safety performance of this task?
   - Yes  
   - No  
   - N/A

b. Have all tools, ladders, electrical cords, rigging and safety equipment been inspected?
   - Yes  
   - No  
   - N/A

c. Has material storage area been identified and approved?
   - Yes  
   - No  
   - N/A

d. Have all scaffolds and ladders been inspected? Have scaffold tags been signed?
   - Yes  
   - No  
   - N/A

e. Is a fire watch or confined space attendant required?
   - Yes  
   - No  
   - N/A

f. Do you know how to summon help?
   - Yes  
   - No  
   - N/A

g. Will proper housekeeping methods be implemented?
   - Yes  
   - No  
   - N/A

h. Have areas been identified as requiring fall protection systems and have they been installed?
   - Yes  
   - No  
   - N/A

i. Are flammable/combustible materials stored, separated and secured?
   - Yes  
   - No  
   - N/A

---

### EMPLOYEE COMMENTS
I acknowledge receiving these instructions, understand the instructions and will fully comply with the assigned job task.

Employee(s) Assigned  
Badge/ID

---

### POST TASK SAFETY REVIEW

**Foreman/Supervisor**

Date:  
Time:  

1. Was anyone injured or did an unplanned incident occur today? If yes, explain.
   - Yes  
   - No  
   - N/A

2. Was it reported to the Foreman/Supervisor/Safety Rep?
   - Yes  
   - No  
   - N/A

3. What problems did you have with today’s work assignment?

4. What can we do to improve performance?

5. Miscellaneous Concerns:

6. Reviewed by:

---

**Employee(s) Assigned**  
**Badge/ID**
# 9.0 INCIDENT INVESTIGATION PROCEDURES

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<td>• Accident Participant(s) Log</td>
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<tr>
<td>• Accident Investigation Narrative Report</td>
<td>15</td>
</tr>
</tbody>
</table>
9.0 INCIDENT INVESTIGATION PROCEDURES

9.1 Scope

This procedure establishes a systematic, in depth approach to incident investigation by outlining the types of incidents to be investigated, management responsibility, selection of an Investigation Committee, and the investigation process.

9.2 General

A. Types of incidents to be investigated:

1. Lost workday cases (LWC).
2. Restricted workday cases (RWC).
3. All injuries, which require medical attention.
4. All incidents that had the potential for an injury.
5. Any fire which had the potential to result in significant injury or property loss.
6. Transportation incidents with potential or actual company regulatory, or public consequences.
7. Falls from elevated positions.
8. Any electrical incident.
9. Any incident, which interrupted or could have interrupted or adversely affected the company/client operations.
10. Any incident that indicates a need to upgrade existing project safety policies or procedures.
11. Any incident that results in a release or spill of material, which represents an environmentally significant event.

9.3 Management Responsibility

Project management shall establish an atmosphere that emphasizes the importance and usefulness of incident investigations. The purpose in pursuing factual, complete and timely discovery of the causes of an incident is not to assess blame, but to identify areas where corrective action should be made to prevent recurrence.

In incidents where injuries have occurred, the intention is to focus on the cause of the incident, not the injuries themselves.

9.4 Emergency Response

When an incident occurs that involves possible injury to personnel or circumstances requiring medical or other specialized assistance, the Project Management Emergency Response Team will respond to the incident when notified and render required assistance, collaborate with 911 Responders and note any difference from conditions at the time of
the incident. Responsibility for the incident/accident scene will rest with the Project Management Emergency Response Leader until the emergency response is completed and control of the incident area is released. Once the emergency response is conducted, the investigation process is to being immediately under the leadership of the Project Superintendent.

9.5 Selection of An Investigating Committee
The Project Superintendent will be the leader of the investigation committee. The committee will be comprised of the Project Superintendent, if any present. If a Safety Supervisor is present he/she will assist the Project Superintendent in writing and distributing the results of the investigation.

9.6 Investigative Process

When the Investigating Committee convenes, and has stated the purpose of the meeting, the immediate supervisor of the people involved is asked to describe in detail the following:

1. Assign a case number (Project Initials/Number – Date – Sequential Number). Example: CAH7765 – 4/4/11 – 01
2. Record the names of persons talked to, including the name of any injured person.
3. The nature of work being performed prior to and at the time of the incident.
4. The exact instructions given to the individuals directly.
5. How the work was planned to be done.
   a. Personnel involved in the incident will give their accounts of the details surrounding the event, followed by the comments from witnesses. (Where circumstances warrant, it may be desirable to conduct discussions separately).
   b. Based on the facts gathered during the investigations, the committee formulates (using the attached work sheet as an aid) the root cause(s), preventive actions to be taken to reduce the risk of the incident/injury from re-occurring, communicate findings to project personnel and forward final report to the Corporate SH&E Director in Baytown, Texas
   c. The Corporate SH&E Department will provide a summary of the investigation and corrective action taken and distribute this information to the project that experienced the incident and also to projects that are performing similar work.
PREFERRED INDUSTRIAL CONTRACTORS, INC.
INCIDENT INVESTIGATIONS WORKSHEET

JOB NUMBER: ____________  CASE NUMBER: ____________
Incident Location: ________ Date of Incident: ________ Time of Incident: ________

A. The incident (did) (did not) result in injury.
B. The incident (did) (did not) result in property damage, environmental concern, or fire.
C. If either A or B occurred, the potential for serious A or B was (high), (medium) or (low).

Description of Incident: ______________________________________________________

Root Cause(s): ________________________________________________________________

Action to be taken to prevent recurrence: _______________________________________

Person Injured: ______________________________________________________________

Injured’s on-site experience time: ______________________________

Injured’s service time on the project: ______________________________

Witness(es):
________________________________________________________________________

Witness(es) Statement:
________________________________________________________________________

Use additional paper and attach for witness(es) statement

Superintendent’s Name: _______________________________________________________

Prepared By: __________________________________ Date: _________________________

Signature of Preparer: _______________________________________________________

Title: ___________________________________________________________________

Probe each of the considerations listed below with open-ended questions (questions that begin with who, what, when, how, why, etc.) Question openly enough to get to essential information, determine root cause(s), as “why was the hazard not recognized?”, “why did the change occur?”.

Considerations

Yes  No  Was the hazard(s) that produced the incident recognized?

Oral? ____________  Written: ____________

Yes  No  Was there a plan to control the hazard? (SAFE Program Implement)
<table>
<thead>
<tr>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
<th>Was the plan adequately communicated (given, received, understood by those involved in the incident?)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
<th>Did the plan include back-up or secondary consideration to prevent injury even if the event began to occur?</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
<th>If tools or equipment were involved, were they right tools or equipment for the job?</th>
</tr>
</thead>
</table>

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<tr>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
<th>Did written safety procedures exist for the task(s) involved?</th>
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</thead>
</table>

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<thead>
<tr>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
<th>If written procedures existed and were known, were they followed?</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
<th>Had those involved in the incident received training and/or appropriate instructions concerning the hazard(s) involved?</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
<th>Did the person(s) involved have some personal condition that contributed to the incident? (i.e. color blindness, physical handicap, language barrier, inability to read, vision or hearing problems, etc.)</th>
</tr>
</thead>
</table>

<table>
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<tr>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
<th>Did a change occur prior to the incident that may have contributed to the incident? (i.e. change in tools, equipment, people, plans, scope of work, etc.)</th>
</tr>
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</table>

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<tr>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
<th>Were facility design deficiencies a factor in the incident?</th>
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<tr>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
<th>Did the layout of the work area/environment contribute to the incident?</th>
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<tr>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
<th>If an injury occurred, was the injured directly involved in causing the incident?</th>
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</table>

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<tr>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
<th>Was an unsafe work practice a contributing factor to the incident?</th>
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</table>

Prepared by: ___________________________ Date: ______________

Print Name

Signature of Preparer: ___________________________
9.7 Accident Investigation Packet – Major Incident

Instructions

This packet contains a number of accident investigation forms, which are to be completed for all major incidents. These forms are legal documents and should be treated as confidential. Only persons who have a need to know shall be allowed access.

1. All forms must be typed or plainly printed in ink.

2. Assign a case file number to each investigation and make sure this number is placed on all forms, maps, blueprints, photos and correspondence. This number shall be derived to as follows:

   Project contract initials/number—date/ year – sequential case number.

   Example: CAH7754 – 5/01/11 – 01

3. Follow the specific instructions contained on each form.

4. Utilize the checklist in the packet to ensure all necessary documentation for the formal investigation is completed.

5. This accident investigation packet is designed to be used as an intra-project instrument to document and analyze all project medical injuries / incidents and also to be used to develop preventive measures. It may also provide valuable data in case of an accident claim or suit against the company. Therefore, the forms contained herein shall not be transmitted to the insurance carrier or to any other agency or to persons outside of the company unless approved by Cory Roper.

6. Distribution – Copies of all forms will remain in the Project Safety files and the originals will be forwarded to Corporate SH&E Department at the Baytown Office.
**CHECKLIST**

**Instructions:** Use this checklist to ensure all forms and required actions for a medical injury and project incident are completed.

<table>
<thead>
<tr>
<th>Initials</th>
<th>Time/Date Completed</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Required notifications to Project, Corporate and Client personnel have been completed.</td>
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<tr>
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<td></td>
<td>Set up case file and determine file number.</td>
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<td></td>
<td>Distribute and have witnesses complete Witness Statement forms.</td>
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<td>Collect and process film taken at the accident scene. Set up Photo Evidence Sheets.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Research and collect background documents, i.e. training meeting reports, Safety Indoctrination, Equipment Inspection Reports, prior accident history, blueprints, maps, etc.</td>
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<td>Maintain “Accident Participants Log”.</td>
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<td>Prepare insurance report of injury, Foreman Superintendent and Incident Reports if applicable.</td>
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<td>Complete “Narrative Report”.</td>
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<td>Collect copies of any Safety citations and disciplinary documentation.</td>
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<td></td>
<td></td>
<td>Organize entire file and forward to the Corporate Safety Department in Baytown.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Distribute insurance reports as required. Do not forward other reports or internal documents to insurance carrier or other authority without approval of Cory Roper.</td>
</tr>
</tbody>
</table>
WITNESS STATEMENT

SUPERVISORY INSTRUCTIONS

Each person who witnessed the accident or who witnessed an event prior to the accident/incident, which may have a bearing on the accident/incident should be given a witness statement form to complete. These statements must be typewritten or printed plainly in ink. Have each statement signed and dated by the witness. If the witness refuses to fill out the statement form but describes the incident, fill out the form yourself and request the witness to sign the form. If the witness refuses to sign the form so indicate on the form.

Prior to issuing forms, write the case number in the upper right hand corner of each form. Also assign a different witness number (i.e. W-1, W-2, W-3, W-4, etc.) to each form.
Case Number: ________________  Witness Number: W- ____________

WITNESS STATEMENT
(PRINT CLEARLY IN INK)

Witness’s Name: ____________________________________________________________

Last            First            M.I.

Social Security No.: _____ -- _____ -- ___________           Birth Date: _____ / _____ / ______

Employer: ________________________________________________________________

Occupation: ______________________________________________________________________

Home Address: ___________________________________________________________________

_______________________________________________________________________________

City            State            Zip

Telephone: _____ -- _____ -- ___________           _____ -- _____ -- ___________ 

Message

Instructions:

Complete all sections on this form and remember to sign and date the form. Use additional sheets if necessary. It is important to include the following elements in your statement:

1. Who – Who did you see, who was injured and / or involved in the accident/incident.

2. What – Give a brief description of the accident/ incident.

3. When – Indicate time of day, date of accident/incident and any weather conditions (i.e. wet, clear, dark, dusty, foggy, etc.).

4. How – According to what you saw, how did the accident/incident occur? What equipment was involved (including model, serial numbers, license numbers, if known).

5. Where – Accurately describe where the accident / incident occurred, the location on the project site should be clearly indicated. If necessary draw a map or reference a fixed landmark.

Witness Statement Sheet Attached
WITNESS STATEMENT (continued)

(PRINT CLEARLY IN INK)

Who: ________________________________

What: ________________________________

How: ________________________________

Where: ________________________________

DRAW LOCATION
WITNESS STATEMENT (continued)
Date: ___/___/_______  Signature of Witness: ________________________________

Case Number: ____________________

PHOTO EVIDENCE SHEET

Instructions:
All photographs are to be identified by number on the back and then they must be attached to a photo sheet. Pertinent information such as the printed number, time and date photos were taken, direction camera was pointing and relationship to accident/incident below each photo.

Date of Accident/Incident: ___/___/_______

Photos Taken By: ________________________________
(Last)  (First)  (M.I.)

Job Title: ________________________________

Sheet Prepared By: ________________________________
(Last)  (First)  (M.I.)

**************************************************************************

PHOTOS

Attach Photo Here  Attach Photo Here

Print Number: ________________  Print Number: ________________

Time/Date Taken: ________________  Time/Date Taken: ________________

Direction: ________________  Direction: ________________

**************************************************************************
WITNESS STATEMENT
(PRINT CLEARLY IN INK)

Witness’s Name: ______________________________________

Last  First  M.I.

Social Security No.: ______-____-_______  Birth Date: ___/___/_____

Employer: __________________________________________

Occupation: __________________________________________

Home Address: _______________________________________

City  State  Zip

Telephone: ______-____-_______  _____-____-_______

 Instructions:
Complete all sections on this form and remember to sign and date the form. Use additional sheets if necessary. It is important to include the following elements in your statement:

1. Who – Who did you see, who was injured and / or involved in the accident/incident.
2. What – Give a brief description of the accident/incident.
3. When – Indicate time of day, date of accident/incident and any weather conditions (i.e. wet, clear, dark, dusty, foggy, etc.).
4. How – According to what you saw, how did the accident/incident occur? What equipment was involved (including model, serial numbers, license numbers, if known).
5. Where – Accurately describe where the accident / incident occurred, the location on the project site should be clearly indicated. If necessary draw a map or reference a fixed landmark.

Witness Statement Sheet Attached
WITNESS STATEMENT (continued)

(PRINT CLEARLY IN INK)

Who: 

What: 

How: 

Where: 

DRAW LOCATION
WITNESS STATEMENT (continued)

Date: ____/____/_____    Signature of Witness: _______________________________
Case Number: ________________

PHOTO EVIDENCE SHEET

Instructions:

All photographs are to be identified by number on the back and then they must be attached to a photo sheet. Pertinent information such as the printed number, time and date photos were taken, direction camera was pointing and relationship to accident/incident below each photo.

Date of Accident/Incident: ____/____/____

Photos Taken By: ____________________________

(Last)  (First)  (M.I.)

Job Title: _________________________________

Sheet Prepared By: _________________________

(Last)  (First)  (M.I.)

******************************************************************************

PHOTOS

******************************************************************************

Attach Photo Here

Print Number: ________________

Time/Date Taken: ________________

Direction: ________________

 Attach Photo Here

Print Number: ________________

Time/Date Taken: ________________

Direction: ________________

******************************************************************************
Accident Participant(S) Log

Case Number: ____________

Instructions:

- It is important to note the name, affiliation and purpose of each participant during the accident / incident investigation. Items such as persons interviewed, evidence taken, meetings and requests for information should be noted on this form. Duplicate this form if additional sheets are needed.

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
Accident Investigation Narrative Report

Instructions:

- This report is to be completed by the Project Superintendent in charge of the accident/incident investigation with the Safety Supervisor if present. Attached sections must be completed and the report must be signed and dated.

- The purpose of this report is to give a narrative summary of the significant events during and after the accident/incident. Persons and equipment involved, probable causes and corrective actions must be explained.

- Use additional sheets as necessary.

Pre-Accident/Incident Conditions/Events

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

Describe Accident/Incident

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

Root Cause(s)

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________
Describe Any Contributing Causes:

_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________

Describe Corrective Action Taken:

_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________

Post-Accident/Incident Events (i.e. conditions of equipment, tools, site, etc.):

_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________

Investigator’s Name: ____________________________ (Print)

Position Title: ____________________________ (Print)

Signature: ____________________________ Date: ____________________________
### 10.0 GENERAL SAFETY, HEALTH AND ENVIRONMENTAL RULES

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<td>B. Vehicle and Equipment Operators</td>
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<td>C. Physical Examinations</td>
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<td>B. Toilet Facilities</td>
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<tr>
<td>C. Washing Facilities</td>
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<td>10.4 Mandatory Safety, Health and Environmental Rules</td>
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<td>10.5 Exhibit</td>
<td>3</td>
</tr>
<tr>
<td>A. Exhibit 10-1 Mandatory Safety Health and Environmental Rules</td>
<td>4-5</td>
</tr>
</tbody>
</table>
10.0 GENERAL SAFETY, HEALTH AND ENVIRONMENTAL RULES

10.1 Introduction
The Safety, Health and Environmental rules contained in this section are applicable to all Company operations. In addition, all applicable clients, local, state and federal codes will be complied within the performance of Company operations.

In the event that there is a conflict between the Company Safety, Health and Environmental rules and regulations and other mandatory safety and health standards, the stricter regulation or standard will apply.

10.2 Physical Qualifications Of Employees
   A. General

   1. All persons employed, throughout the course of the work, shall be physically qualified for performing the duties to which they are assigned. Factors to be considered include:
      a. Strength.
      b. Endurance
      c. Health Status
      d. Agility
      e. Emotional stability
      f. Coordination
      g. Visual and Hearing acuity

   2. No person shall be permitted or required to work while that person’s ability or alertness is impaired by fatigue, illness, injury or other causes that might unnecessarily expose that person or another to injury or property damage.

   B. Vehicle and Equipment Operators

   1. Vehicle and equipment operators shall be able to read and understand the signs, signals, operating instructions and must have a valid driver’s license.

   C. Physical Examinations

   1. All persons who are required to wear a respirator or work under compressed or supplied air conditions must be physically qualified by a competent physician.
2. Operators of hoisting equipment, material and personnel hoists and man‐
haul vehicles should have periodic physical examinations.
3. A current physician’s certifications of physical fitness to perform scuba diving
is required for all diving personnel.
4. Prior to employment, all prospective employees must successfully pass a pre‐
employment substance abuse test.

10.3 Health and Sanitation

A. Drinking Water
1. An adequate supply of potable drinking water shall be provided on the project
site.
2. Outlets and portable containers for drinking water shall be kept in a clean and
sanitary condition. Portable containers used to supply drinking water shall be
capable of being tightly closed and equipped with a tap.
3. Portable drinking water containers shall be clearly marked as such.
4. The use of a common drinking cup shall be prohibited and where disposable
cups are used, as waste receptacle shall be provided.
5. Outlets for non‐potable water such as water for industrial or fire‐fighting
purposes will be conspicuously posted “Danger, Water Unfit for Drinking”.

B. Toilet Facilities
1. Flush toilets should be installed and used where sanitary sewers are readily
available. If sanitary sewers are not available then chemical toilets shall be used.
2. Toilet facilities shall be maintained and the sewage disposed of in accordance
with appropriate sanitary requirements under good Public Health practices and
standards.
3. Toilets shall be constructed so that the interior is lighted, by artificial or natural
light, adequate ventilation and all windows and vents are screened.
4. Toilets shall be kept clean at all times. Flush toilets should be scrubbed daily with
soap and water and sterilized at least once a week.
5. Toilet facilities should be provided on each project at a ratio of one for each 20
employees.

C. Washing Facilities
1. Each washing facility shall be maintained in a sanitary condition and should be
provided with adequate water, soap, individual towels of cloth or paper and
covered receptacles for disposal waste.
2. Emergency showers and eyewash facilities shall be provided as required.
10.4 Mandatory Safety, Health and Environmental Rules

Exhibit 10-1 (see page ____ of this section) lists employee Mandatory Safety, Health and Environmental Rules. This list shall be posted on employee bulletin boards and these rules should be strictly enforced on all projects.

10.5 Exhibit(s)

1. 10-1 Mandatory Safety, Health and Environmental Rules
MANDATORY SAFETY, HEALTH AND ENVIRONMENTAL RULES

1. The following Safety, Health and Environmental Rules are a partial list of general regulations that shall apply to all work. Any employee who carelessly or callously disregards these rules or other applicable safety, health and environmental regulations shall be subject to disciplinary action up to and including termination.

2. All occupational injuries and illnesses, no matter how slight, must be reported to your Supervisor immediately. If you are injured on the job and do not report the occurrence to your Supervisor, the Company will not be responsible for any medical expense incurred by you on your own.

3. Submitting false or fraudulent information when reporting an accident or injury is unlawful and will be cause for dismissal.

4. Fighting, gambling, horseplay and other misconduct, are not permitted, nor shall threatening or attacks upon another employee be tolerated.

5. The use, or possession of intoxicants or drugs on the project is prohibited. Any employee reporting to work intoxicated or under the influence of intoxicating liquor or drugs will not be allowed to work and will be administered disciplinary action which could result in immediate termination.

6. Only authorized and properly trained and supervised personnel are permitted to operate equipment, vehicles, valves, electrical switches and similar machinery.

7. Keep clear of all equipment. Avoid pinch points and blind areas. Be alert to avoid swinging and suspended loads.

8. Unless authorized, do not attempt to repair or tamper with equipment that is not functioning properly. Report malfunctions to your Supervisor.

9. Misuse of tools and equipment or circumventing safety devices can result in injury to yourself or others. Do not use makeshift tools or equipment to perform your job.

10. Riding loads, slings, the ball, crane hook or other material hoisting equipment is prohibited.

11. Ride only in vehicles designated and designed for transporting personnel.

12. Jumping on or off equipment or vehicles, either moving or stationary is prohibited.

13. Whenever anyone is required to work on or in close proximity to electrical equipment or circuitry, appropriate tagging will be placed to identify all controls deactivating the circuit and the circuit shall be locked out, when possible.

14. Keep all machinery guards, guardrails and other protective devices in place and in good operating order.
15. Personal protective equipment such as hard hats, eye, face, hearing and respiratory protection will be furnished and used as required. As a minimum, sturdy work shoes or boots will be required for foot protection.

16. Be alert for and heed all information and warning signs at all times.

17. Store and use gas cylinders in a secure, upright position, with their valve caps secure and the cylinders shielded from the sunlight.

18. Do not smoke in areas marked “No Smoking” or near flammable or combustible materials or their storage areas.

19. Be alert at all times to conditions and work processes in your area, surrounding areas and with the presence of other workers and equipment so that you can foresee and avoid potential dangers.

20. Full body clothing will be required to avoid sunburn and exposure to sparks and hazardous chemicals. T-shirts with short sleeves will be required as a minimum during hot weather.

21. Unless specifically authorized, explosives are prohibited on the project.

22. All fire protection and emergency equipment must be plainly marked and kept free of obstruction for emergency use.

23. Maintain good housekeeping. Keep waste, debris and rubbish cleaned up. Place all lunch papers, cups, cans and other litter in trash receptacles. Discard and/or store all oily rags, waste and similar combustible materials in metal containers provided for that purpose.

24. Do not use compressed air to “dust-off” yourself.

25. Report all unsafe and unhealthy practices and conditions to your Supervisor at once.

26. Each employee must cooperate in promoting and maintaining an effective safety program.

27. If you are in doubt about the safe or proper way to perform a specific job or duty, get instructions from your Supervisor before proceeding.

28. When you are relieved from a job that has unusual or concealed hazards, immediately inform the person relieving you that such hazards exist. BE SPECIFIC.

29. Work area guidelines and regulations for environmental protection must be strictly followed. All hazardous material must be properly handled, stored and disposed of.
# 11.0 FIRST AID AND MEDICAL TRAINING

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<th>PAGE</th>
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<tr>
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<tr>
<td>A. 11-1 Daily First Aid Treatment Record</td>
<td>5</td>
</tr>
</tbody>
</table>

PIC  Rev 12/12/11
11.0 FIRST AID AND MEDICAL

11.1 General

This Company will provide first aid services and arrange for emergency transportation of employees who sustain occupational injuries or illnesses.

A. There shall be available on each shift all projects, no matter what size; a person trained in standard First Aid and CPR. This person will be the Project Superintendent and one other supervisory person. Contact the Corporate SH&E Department to schedule first aid and CPR training.

B. On a project where there is a Project SH&E Supervisor, he/she shall be responsible for rendering first aid with at least one more supervisor(s) trained in first aid/CPR.

C. On some projects, the client’s first aid or medical facilities may be made available to us.

D. First aid supplies will be available to all employees for the treatment of work related injuries and sudden illnesses.

E. The Project Superintendent or his/her designee must document each instance of first aid treatment on the first aid log (see Exhibit 11-1).

F. The Project Superintendent is also responsible for ensuring that emergency phone numbers are posted.

G. Medical cases which require treatment beyond first aid will be referred to an off-site medical facility as determined by the severity of the injury or illness. Arrangements with the medical facilities, i.e., doctors, hospitals, etc., will be prearranged by the Corporate Office prior to startup of the project.

H. In all cases where treatment is provided by a medical facility, the insurance department at the corporate office is to be notified in order to coordinate treatment, return to work and payment.

I. Eye wash stations will be supplied for flushing when employees are working with or around hazardous materials. Showers will be furnished as required with employees are working lead, asbestos, etc.

11.2 Transportation Non-Emergency

A. Non-emergency transportation shall be provided to the first aid station or to a designated physician by project safety or supervisory personnel.

11.3 Transportation Emergency

A. The method of transportation to the hospital or first aid facility will be prearranged.

B. In a situation where the injured cannot be moved, the person on the project responsible for first aid will go to the location and administer first aid and coordinate emergency transportation.

C. The proper handling of injured or ill employees and their transportation to a hospital is of crucial importance.

D. In cases of a medical injury, the Project Superintendent or his/her designee shall call the medical facility and while the ambulance is en-route or certainly while the victim is still in the emergency facility to give them all the available information regarding the nature and the extent of the injury or illness. A drug and alcohol screen will be requested in addition to any treatment prescribed.
11.4 Injury Management
A. An employee who has sustained on-the-job injury or illness may return to work provided that the attending physician has approved such return in writing and provided that the normally assigned job of that employee is still available and he meets any physical restrictions or limitations.
B. Employees who are given restriction to their work will not be permitted to return to work until a review of the case has been made by:
   1. The Project Superintendent
   2. Corporate SH&E and Workers Compensation Departments
C. The use of restricted-duty assignments to facilitate the injured employee’s rapid return to productive work is Corporate Policy.

11.5 First Aid Kits and Medical Supplies
A. First aid kits of appropriate size will be maintained on each project. The following lists of approved first aid supplies should be used. First aid supplies, when needed, are to be obtained from an approved first aid supplier. The Project Superintendent or his/her designee is responsible to ensure that the first aid kits are maintained and restocked on a regular basis. The following is a list of first aid supplies recommended for a project with 15 or more employees:

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
<th>Qty</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Box clean wipes 50/bx</td>
<td>1</td>
<td>Box antiseptic swabs 50/bx</td>
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<tr>
<td>1</td>
<td>Hydrogen peroxide</td>
<td>1</td>
<td>Antibiotic ointment 25/bx</td>
</tr>
<tr>
<td>1</td>
<td>Antiseptic spray</td>
<td>1</td>
<td>Hydrocortisone cream 25/bx</td>
</tr>
<tr>
<td>1</td>
<td>3 cut adhesive tape 2”x 5yds</td>
<td>1</td>
<td>Elastic tap 1”x 5 yds.</td>
</tr>
<tr>
<td>1</td>
<td>Box cotton tip applicators 24/bx</td>
<td>2</td>
<td>Eye wash solution</td>
</tr>
<tr>
<td>1</td>
<td>Eye and skin neutralizer</td>
<td>1</td>
<td>Eye cups</td>
</tr>
<tr>
<td>1</td>
<td>Eye dressing pad/adhesives 4/bx</td>
<td>1</td>
<td>Box fingertip bandages 40/bx</td>
</tr>
<tr>
<td>1</td>
<td>Box knuckle bandages 40/bx</td>
<td>1</td>
<td>Box elastic strips 7/8” x 3” 50/bx</td>
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<tr>
<td>1</td>
<td>Box elastic strips 1” x 3” 100/bx</td>
<td>1</td>
<td>Box lr. Patch bandage 2”x3”25/bx</td>
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<tr>
<td>2</td>
<td>Roller bandage 2” x 6yds</td>
<td>2</td>
<td>Box gauze pads 4”x4” 25/bx</td>
</tr>
<tr>
<td>1</td>
<td>Box telfa pads 2” x 3” 12/bx</td>
<td>1</td>
<td>Coban 3” x 5 yds</td>
</tr>
<tr>
<td>1</td>
<td>Box povidone iodine swabs</td>
<td>1</td>
<td>Box ammonia inhalants</td>
</tr>
<tr>
<td>2</td>
<td>Triangular bandages</td>
<td>1</td>
<td>Compress bandage</td>
</tr>
<tr>
<td>2</td>
<td>Ice packs</td>
<td>1</td>
<td>Tweezers kit</td>
</tr>
<tr>
<td>1</td>
<td>Scissor kit</td>
<td>1</td>
<td>Sting relief</td>
</tr>
<tr>
<td>1</td>
<td>Box butterfly closures medium</td>
<td>1</td>
<td>Pair latex gloves</td>
</tr>
<tr>
<td>1</td>
<td>Box pain aid</td>
<td>1</td>
<td>Box non-aspirin pain reliever</td>
</tr>
<tr>
<td>1</td>
<td>Box trail anti-acids</td>
<td>1</td>
<td>First aid handbook</td>
</tr>
<tr>
<td>1</td>
<td>One Way CPR Shield</td>
<td>1</td>
<td>Biohazard Plastic Bag</td>
</tr>
</tbody>
</table>
B. The following is a list of first aid supplies recommended for projects with less than 15 employees.

<table>
<thead>
<tr>
<th>Qty.</th>
<th>Description</th>
<th>Qty.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Antiseptic spray</td>
<td>1</td>
<td>Box adhesive bandages 1”x3” 16/ bx</td>
</tr>
<tr>
<td>1</td>
<td>Adhesive tape ½” x 5 yds</td>
<td>1</td>
<td>Compress bandage 3” 2/bx</td>
</tr>
<tr>
<td>1</td>
<td>Eye wash 4 oz.</td>
<td>1</td>
<td>Box fingertip bandage 10/bx</td>
</tr>
<tr>
<td>2</td>
<td>Roller bandage 2” x 6 yds</td>
<td>1</td>
<td>Box knuckle bandage</td>
</tr>
<tr>
<td>1</td>
<td>Box telfa pads 1 ½” x 2” 12/bx</td>
<td>1</td>
<td>Tweezers kit</td>
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<tr>
<td>1</td>
<td>Small ice pack</td>
<td>1</td>
<td>Pack ammonia inhalants</td>
</tr>
<tr>
<td>1</td>
<td>Triangular bandage</td>
<td>1</td>
<td>Box aspirins or non-aspirin</td>
</tr>
<tr>
<td>1</td>
<td>One Way CPR Shield</td>
<td>1</td>
<td>Pack clean wipes</td>
</tr>
<tr>
<td>1</td>
<td>Biohazard Plastic Bag</td>
<td>1</td>
<td>Pair latex gloves</td>
</tr>
</tbody>
</table>

11.6 Responsibilities and Organization

A. The Project Superintendent is responsible for ensuring that the appropriate safety related reports concerning occupational injury/illness are properly completed and maintained.

B. The physician is responsible for maintain an accurate record of medical treatment and providing the Company with a copy of these records.

C. Employer’s First Report of Injury is used to advise the insurance company of an injury and possible worker’s compensation claim. This must be completed within 24 hours of an injury/illness and sent to the home office.
   1. All blanks are to be completed or marked N/A.
   2. Pay particular attention to description of accident, regulation or safety apparel or appliance provided and whether it was used.
   3. Fully describe how the accident occurred and what the employee was doing.

D. The Accident/Incident Report, (See Section 9 Incident Investigation Procedure) is to be filled out on all injury cases involving a doctor’s care or incidents resulting in property or equipment damage.
   1. Investigate the accident and note all factors, which contributed to the cause.
   2. List all witnesses and give a detailed description of accident, including written statements.
   3. List all steps, procedures, actions or measures taken to prevent the same type of accident from happening again.
   4. All blanks are to be filled in. If line is non-applicable, mark it N/A.
   5. Copy is to be filed in the project safety files and the original sent to the Corporate Office.
   6. Send a copy to the corporate office along with Employer’s First Report of Injury.

11.7 Exhibit(s)

A. Daily First Aid Treatment Record
# DAILY FIRST AID TREATMENT RECORD

<table>
<thead>
<tr>
<th>CASE NUMBER</th>
<th>TREATMENT DATE</th>
<th>INJURY DATE</th>
<th>EMPLOYEE NAME</th>
<th>BADGE NUMBER</th>
<th>CRAFT FOREMAN OR WITNESS</th>
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# 12.0 EMERGENCY ACTION PLAN

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12.0 EMERGENCY ACTION PLAN

12.1 General
Emergencies are defined as anything that can endanger the life of an employee or others exposed to our work of operations, that falls under close government or media scrutiny, significantly interferes with business operations or threatens the Company's financial or legal condition. Specific examples are:
A. Fatalities or major accidents
B. Environmental incidents such as hazardous substance spills or releases. C. Major equipment damage.
D. Structure failure.
E. Explosion.
F. Acts of Nature such as hurricanes, tornado, flooding, etc.
G. Property damage due to fire or other cause. H. Violation of codes, laws or regulations.

12.2 Action Plan
A. Planning Process
Once potential emergencies have been identified, it is important to analyze and plan for such emergencies utilizing the followings steps:
1. Assess the probability of an event.
2. Assess the hazards involved and degree of potential severity for injury and/or property damage.
3. Designate an Emergency Action Plan Coordinator. (If assigned, this is generally the Project SH&E Supervisor).
4. Select Rescue/ Disaster Team.
5. Submit to the Corporate SH&E Department and client the emergency plan for approval.
6. Familiarize all employees with the plan and train rescue /disaster team members
7. Test the plan by conducting drills.
8. Periodically review and revise the plan as needed.

B. Development Phase
1. At the beginning of each project or operation, project management will develop a site-specific plan, which anticipates potential emergencies and takes into account local conditions and emergency agencies/resources.
2. It is important to identify and understand the following key elements:
   a. Anticipated emergencies. b.
      Community resources
   c. Responsible parties and contact information. d.
      Alarm systems.
   e. Evacuation plans and escape routes.
   f. Training requirements
   g. Emergency procedures for employees who remain on the project site during the emergency.
   h. Communication methods.
i. Equipment shutdown procedures.

j. Emergency equipment.

12.3 Coordination
During development and after implementation, it is critical to work with and coordinate emergency action plan activities with local authorities, client representatives and with rescue and medical facilities.

12.4 Emergency Evacuation General Requirements
A. In the event of a fire, earthquake, tornado, chemical release or similar types of emergencies, it may be necessary to evacuate the project site. Attempt to coordinate evacuations with the client.
B. All project personnel must be familiar with the emergency warning system.
C. The project site is to be immediately secured to avoid a more hazardous situation. All equipment is to be shut down such as: mobile equipment, compressed gas cylinders, etc. The Project Superintendent must be notified of anything left in an unsafe condition due to the necessity of evacuating the area. Steps to correct any situation will be based upon immediate or foreseeable conditions.
D. Each crew shall have a predetermined place to meet their Supervisor for a headcount and further instructions. Employees are not to leave the project site until they have checked in with their Supervisor and have been given permission to leave the project or to return to work.
E. Some projects may have specific evacuation plans required by the client. The evacuation plan must be posted.

12.5 Security
A. Keep visitors and unnecessary personnel from entering the project site after an emergency has occurred.
B. Safeguarding property, equipment and/or materials during and emergency is important. If the project has client security they should be integrated into the emergency action plan. If not, it may be necessary to assign project management employees to act as watch persons during and after the emergency.

12.6 Community Relations
A. Plan ahead on how to handle the media. The Project Superintendent will be the Company Spokesperson. In cases of a fatality or similar disaster, the recommended procedure is to keep informed and to refer the media inquiries to the Corporate Office.
B. Be factual but do not minimize or deny the existence of a problem.
C. If the project emergency places the community at risk, the appropriate community emergency response personnel must be notified and given pertinent information on the occurrence.
### 13.0 PERSONAL PROTECTIVE EQUIPMENT

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13.0 PERSONAL PROTECTIVE EQUIPMENT

13.1 Appropriate Personal Protective Equipment

Appropriate personal protective equipment (PPE) shall be worn by personnel working where the potential for injuries and/or health hazards exist. The purpose of this procedure is to define the safety requirements as they pertain to personal protective equipment (PPE). In some cases the client may require additional PPE’s.

13.2 Design

PPE is designed to protect the employee from health and safety hazards that cannot practically be removed from the work environment. PPE is designed to protect many parts of the body including eyes, face, head, feet and ears.

13.3 Condition of Employment

The wearing of suitable personal protective equipment is a condition of employment. Individuals and employees that disregard this condition will be removed or terminated from the project. The company will not take disciplinary action against employees who refuse to perform work when the company has not provided suitable personal protective equipment.

13.4 Personal Protective Equipment for Women

As more women enter the construction industry, in order to maintain safety, they need personal protective equipment that is suited to and fits their bodies and needs. In most cases, women cannot be fitted into men’s sizes. Coveralls are long in the crotch, boots are too large for their feet, suspenders can give friction burns to necks and breasts and air pack masks may not seal on smaller and thinner female faces. Adjusting a man’s suit to fit a woman’s body does not work and should not be attempted. Women’s torsos are shorter and thinner than a man’s. Hand sizes are also significantly smaller for women. Since female hands are much smaller the possibility of gloves slipping off or getting caught in machinery is much greater due to there being too much space in the fingers, both in length and width.

13.5 Hazard Assessment

A hazard assessment must be conducted and documented in writing using the SAFE Program and the JSA form (See Section 8). From this assessment the proper PPE will be selected and properly fitted to the affected employees. When selecting personal protective equipment the following requirements must be met:

A. Approved for use by the Corporate SH&E Department.
B. Manufactured in accordance with standards for performance and materials. Standards are typically set by the American National Standards Institute (ANSI), National Occupational Health (NIOSH).
C. Durable, readily available and maintainable by project personnel, if possible.
D. Provide desired protection to workers against hazard exposure.
E. Maximum comfort with minimal weight.
F. Minimum restriction of essential body movement, vision, etc.

13.6 Definitions

A. Containment – Any material which by reason of its action upon, within, or to a person in likely to cause physical harm.
B. O.D. (Optical Density) – Refers to the light characteristics of a lens
C. Radiant Heat – Energy that travels outward in all directions from its source(s).

13.7 Responsibilities

A. Superintendents
   1. Must be aware of the activities
   2. Train employees in the proper use of Personal Protective Equipment (PPE).
   3. Assurance that appropriate personal protective equipment is worn.
   4. Review issuing practices and records to control equipment misuse.
   5. Administering the program and approve temporary deviations.

B. Employee
   1. Employees are responsible for PPE maintenance and are accountable for the care and use of assigned PPE. Defective PPE’s must be turned in for replacement immediately upon discover.
   2. Employees shall inform their superintendent whenever a need arises to use PPE for which the employee has not received training, or when a condition exists where adequate PPE is not available.
   3. Employees that want to use their own PPE’s must obtained approval from the Project Superintendent prior to use. If approved the employee must adhere to the same standards of use as required to Company issued PPE’s.

13.8 Head Protection

A. Employees working in areas where there is the possible danger for head injury from the impact of falling or flying objects, striking against objects, electrical shock and/or burns, or any combination of these hazards will be protected by protective hard hats/helmets. Hard hats will be worn on all construction projects unless this condition violates a client’s procedure.
B. Hard hats are designed to protect the employee from impact and penetration cause by objects hitting their head, and from limited electrical shock or burns and shall meet the specifications contained in American National Standard Institute (ANSI), Z89.1-1969 / 1986, Safety Requirements for Industrial Head Protection.

C. The suspension, which consists of the headband and strapping, is even more critical for absorbing impact. It must be adjusted to fit the wearer and to keep the shell a minimum distance of one to one-fourth inches above the wearer’s head. Materials should not be stored in the suspension of the hard hat.

D. Hard hats for head protection of employees exposed to high voltage electrical shock or burns shall meet the specifications contained in ANSI Z89.2-1971.

E. Hard hats may not be altered in a way that will downgrade their efficiency. Typical prohibition alterations include: painting, drilling holes in the shell, application of metal jewelry, etc. Hats with these alterations or excessive scratches will be replaced.

F. The headband must be kept snug enough to keep the hard hat on when the wearer leans over, looks up, or not be blown off in a strong wind gust. The hat should not be so tight that it leaves the band mark on the forehead.

G. Never attempt to repair a damaged or cracked shell. Damaged hats are to be replaced immediately.

H. Hard hats should be worn with the bill or visor to the front over the eyes. The bill keeps chips, dust, and dirt particles from going behind the safety glasses and into the eyes.

I. Hardhats shall be worn at all times in “Hard Hat” designated areas.

J. ANSI Requirements

1. Class “G” gear provides protection against impact, penetration, and limited electrical hazards (up to 2,200 VAC) (Z89.1).
2. Class “E” gear meets the same criteria, but electrical protection is increased to higher voltage (up to 20,000 VAC) (Z89.1)
3. Class “C” gear has no electrical protection, only provide impact and penetration protection (Z89.1).
4. Class “D” gear is designed for fire fighting.
5. Specialty gear (ANSI Z90.1a -1973 / Z90.1 b -1979) is specifically designed to provide protection against specialized hazards such as snow machines, ATV, or motorcycle helmets.
6. Bump helmets are not recognized by ANSI or PREFERRED INDUSTRIAL CONTRACTORS, Inc., for general exposure.

K. Modified Headgear Requirements – The following activities require specialized protection equipment.
1. Employees working around helicopters (such as receiving a load) will wear a chinstrap on their hard hats.
2. Welding and cutting operations required head protection (welding hood or hard hat and welding hood goggles). Hard hats will be available for use when welding helmet is removed.
3. Employees using or riding ATV’s, snow machines, etc. will wear protective headgear that meets ANSI Standard Z90.1.
4. Mechanic working in a shop and on equipment where the working is in tight quarters can wear bump caps: but, only under these conditions.

13.9 Hearing Protection

A. Wherever it is not possible to reduce the noise levels by engineering methods or limit the duration of exposure to acceptable levels, hearing protection devices shall be provided and used.

B. The two types of hearing protection available to reduce the exposure to excess noise levels are:
   1. Ear Plug
   2. Ear Muffs

C. Ear protection devices inserted in the ear shall be fitted or determined individually by a competent person.

D. Allowable noise exposure is computed based on the number of hours in an 8-hour workday. The following is a list of the Occupational Exposure Limits:

<table>
<thead>
<tr>
<th>Duration Per Day</th>
<th>Sound Level dba</th>
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<tbody>
<tr>
<td>Hours</td>
<td>Slow Response</td>
</tr>
<tr>
<td>8</td>
<td>90</td>
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<tr>
<td>6</td>
<td>92</td>
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<tr>
<td>4</td>
<td>95</td>
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<tr>
<td>3</td>
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<td>2</td>
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<td>1 ½</td>
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<td>1</td>
<td>105</td>
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<tr>
<td>½</td>
<td>110</td>
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<td>¼ or less</td>
<td>115</td>
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</table>

E. Plain cotton is not an acceptable protective hearing device.

F. When earmuffs are used for hearing protection, they must be cleansed and disinfected prior to issue to another employee.

G. Hearing protection is always required when performing the following task or when working in the vicinity of this type of work:
1. Pile Driving
2. Jack Hammering
3. Operating a Grinder
4. Air Arcing or Plasma Arcing
5. Needle Sealers
6. Chipping concrete or Steel
7. Other types of equipment and tools may also require hearing protection.

H. Pay particular attention to areas in plants or around industrial machinery, which, due to the sound levels present, require hearing protection.

I. Contact the Corporate SH&E Department for additional information on hearing protection and other PPE concerns.

13.10 Eyes and Face Protection

A. The company will provide employees with suitable eye and face protection equipment when machines or operations create the real risk of eye or face injuries due to physical, chemical and/or radiation hazards. Employees will be required to wear the provided eye or face protective equipment when work assignments or operations present the real risk of eye or face injuries.

Employees desiring eyes and face protection, who are not normally assigned to the foregoing activities, will be provided with suitable eye protection upon request.

The employee is responsible for the safekeeping of the provided eye and face protection equipment and for return of the same upon termination. The company will replace, at no charge to the employee, that equipment provided which is defective or damaged in use. The company reserves the right to charge the employee its cost to replace provided equipment, which the employee has lost or abused.

B. Procedures

1. Employees, contractors and subcontractors will be advised of our mandatory eye and face protection program at the pre-shift, pre-job, or pre-employment briefings. Specific reference will be made to the Project SH&E Program, which outline the requirements to each individual.

2. Prescription glasses are by law impact resistant and will be accepted as eye protection provided that the prescription glasses are fitted with side shields or goggles are worn over the prescription glasses.

3. Where owners or clients have a stricter eye protection program, all personnel will be expected to comply.

4. When work is continually outdoors or over water, shaded lenses may be worn.

5. Shaded lenses are not to be worn at night, inside buildings, or other areas where as shaded lends may adversely affect vision.
C. Contact Lenses
1. The use of contact lenses in the construction environment is strongly discouraged. Dust caught underneath the lens can cause painful abrasions. Some chemicals can even react with the contacts to cause permanent injury. If medical conditions, such as cataracts, make use of contacts necessary then it should be so noted on the employee’s personal file. However, keep in mind that contact lenses are not considered protective devices. If eye hazards are present, the employee must wear eye protection in addition to or instead of contact lenses. Certain environments, facilities and/or clients may prohibit the use of contact lenses.

D. Face Shields
1. Face shield/hardhat combinations, in addition to safety glasses, are required for the following:
   a. Grinding, chipping, scaling, sanding or operating similar type of power equipment.
   b. When handling caustics, acids, solvents, or any other chemical where a spill or splash hazard exists.
   c. When operating hydraulic or pneumatic hammers.

E. Eye and Face Protection For Welding and Cutting.
1. Welding hood/hat combination shall be worn on all field erection sites. The project superintendent or site safety supervisor may give special permission for certain work locations due to cramped or hard to reach areas provided the work area offers no overhead hazards.
2. Welding hoods must not have any cracks or other damage, which could allow the eyes or face to be exposed to the radiant energy from the arc.
3. Welding hoods must be equipped with a lens of at least shade #10.
4. Oxygen acetylene cutting, burning and welding require either:
   a. Eye cup type cutting goggles
   b. Full lens type cutting goggles (will cover most prescription glasses).
5. Cutting goggles must be equipped with a lens of at least shade #3.
6. Safety glasses are not to be used as a substitute for cutting goggles.

13.11 Hand Protection

A. Fingers, hands and arms are injured more often than any other parts of the body. Hand protection must be provided and worn when employees are exposed to hazards such as, but not limited to, those from skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns and harmful temperature extremes.

B. The superintendent is responsible for instructing the employee(s) on the best type of hand protection available for the job. Whatever gloves are selected, the superintendent and employee must make sure that they fit correctly.
C. Gloves are used to protect the hands from being injured in most cases. The tops of the gloves should be taped closed to keep liquids from running inside your gloves or onto your arm.

D. Gloves made from natural and/or man-made materials (neoprene, rubber, synthetic, vinyl, etc.) are to be used when working with most chemicals and/or petroleum-based products. Proper selection will depend on the product and its concentration.

E. Leather or cotton knitted gloves are appropriate for handling most abrasive materials. Gloves reinforced with metal staples offer greater protection from sharp objects.

F. Metal or metal reinforced gloves are not to be worn when working with electrical equipment or on electrical services. Proper leather and rubber gloves, designed and tested for this purpose are to be provided and used.

13.12 Foot Protection

A. Good heavy work boot/shoes shall be worn on the project. Employees are encouraged to purchase and wear boots/shoes with steel toes, sole penetrating and ankle protection. Some MSHA and some clients require the wearing of steel toe safety footwear and employees are expected to comply.

B. Employees not required to wear protective footwear (steel toed boots, metal tarsal protection, rubber boots, insulated boots, etc.) shall wear substantial, leather, work-type shoes or boots. Sandals, high-heeled shoes, etc. are not allowed on project sites. The weather may dictate that leather boots do not provide the necessary protection from the elements. In this case the proper footwear will be worn by the employees. Specialized footwear will be provided by the company.

C. Employees are not to wear shoes with loose or worn through soles and toes, or excessively worn down heels.

D. Employees should wear rubber boots when their work requires them to wade in fresh concrete, or when working in locations, which are constantly wet. Rubber boots are to be steel toed.

E. Appropriate specialized protective foot wear, such as foot guards and heal and ankle shields, etc., is mandatory for the following working environments:
   1. Working on or around molten metal processes.
   2. Using harmful corrosive substances and processes such as acids or caustics.
   3. Having a high probability of foot injuries of a crushing nature (materials handling, barrels, cylinders, pallets, etc.).
   4. Performing regular assembly or disassembly of heavy systems components and/or equipment.
   5. Using hand-held earth compactors and snow blowers.
   6. Abnormal weather conditions.
7. Extreme cold.
8. Using a steam cleaner or equipment and/or vehicles.
9. Work around exposed electrical wires or connections require metal-free nonconductive boots.
10. Other activities and areas as designated by the Project Superintendent and/or Project SH&E Supervisor.

F. Foot protection for temperature extremes shall be given priority over hard toe protection. Steel-toe footwear may not provide adequate protection against cold in sub-zero and/or extended exposure to cold temperatures. Arctic packs with fiber and hard toes are the best alternatives.

13.13 Uses/ Limitations

Personal protective equipment has its intended and its limitations. It is important that the Project Superintendent properly informs and train employees in these limitations as well as the inspection, maintenance, care and storage of the PPE assigned to them.

13.14 Fall Protection

A. General
1. Employees working over any operating machinery, open spaces, hazardous substances, unguarded heights, steep slopes or otherwise subjected to falls 6 feet or greater and not protected by fixed scaffolding, guard rails or safety nets shall be secured with a safety harness, a shock absorbent lanyard and/or lifeline.
2. A personal fall arrest system is designed to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, and a body harness and will include a shock absorbent lanyard with double locking snap hooks, deceleration device, lifeline, or suitable combination of these.
3. Safety harnesses, lanyards and lifelines shall be used only for safeguarding employees and for no other purposes.
4. Safety belts shall be used only as part of an employee work positioning system and shall no longer be used for fall protection.
5. Safety harnesses, lanyards and lifelines shall be inspected and maintained in safe condition. Prior to use, they shall be visually inspected for any signs of damage or deterioration such as wear, fraying, cuts, tears, or damage cause by heat (melting, charring, burning). Safety harnesses shall be inspected also for stitch failures in fabric or worn, cracked, or deformed buckle and D-rings. Lanyards found to have one or more damaged areas which exceeds .25 by .25 by .03 inch deep, or eight or more damage areas which exceed .20 by .20 by .01 inch deep, and any other fall protection equipment which is found to be damaged, shall be removed from services. Must meet ANSI/ASTM standards.
6. Any safety harness, lanyard, or lifeline, subjected to in-service loading as a result of a fall shall be removed from service.
7. Lifelines, lanyards and safety straps shall be free of knots or splices except at the terminals.
8. Lifelines, lanyards and safety straps shall be so arranged that the worker cannot fall more than six feet.
9. All safety harness and lanyard hardware shall be drop forged or pressed steel, cadmium plated in accordance with type 1, Class B plating specified in Federal Specification Q-P-416. Surfaces shall be smooth and free of sharp edges.
10. All safety harness and lanyard hardware, except rivets, shall be capable of withstanding a tensile loading of 5,400 pounds without cracking, breaking, or making a permanent deformation.
11. One of the most important aspects of personal fall protection systems is fully planning the system before it is put into use. The Project Superintendent, with assistance from the Corporate SH&E Department, is responsible for developing the fall protection plan. Probably the most overlooked component is the planning for suitable anchorage points. Such planning should ideally be done before the construction activity on the structure or building so anchorage points can be incorporated during construction for later use for building maintenance.

The following topics must be addressed in the fall protection plan:
   a. Controlled Access – All controlled accesses will be posted, barricaded and a watch individual will be assigned to ensure that unauthorized personnel are prevented from entering the controlled area.
   b. Safety Monitoring – Safety Monitoring is strictly PROHIBITED, alternate means of protection will be implemented such as; Barricades, 100% Fall Protection, Guard Rails.

13.15 Safety Belts/ Harnesses

A. Safety/Body belt is a strap with the means for securing about the waist and for attaching to a lanyard, lifeline or deceleration device. **Safety belts are to be used for employee work positioning only, they are no longer an approved means for fall protection.**
B. Safety / Body harness means a design of straps which may be secured about the employee in a manner to distribute the fall arresting forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.
C. Employees shall be provided with and be required to use approved safety harness, adjusted to the correct size to properly fit them.
D. The safety harness shall be attached by means of a lanyard with double locking snap hooks to either a fixed anchor or a lifeline.
E. Where the employee must be lifted through a manhole or other opening of such size as to necessitate lifting him in a vertical attitude, that worker shall wear a harness, which will permit lifting him in such a manner. A waist-harness alone is not acceptable for this purpose.

F. Persons tying reinforced steel over 6 feet above the ground or surface shall wear safety harness equipped with appropriate closed type hooks or snaps.

G. Each employee will wear a safety harness with a lanyard secured to a separate vertical lifeline while working from swing scaffolds, bos’n chairs or other suspended platforms where a falling hazard is present.

13.16 Lanyards
A. “Lanyard” means rope or strap, suitable for supporting one person. One end is fastened to a safety harness and the other end is secured to an approved attachment point object or a safety line.

B. The safety harness lanyard will have a maximum length to provide a fall of no greater than 6 feet.

C. When axes or other tools are used which are likely to sever, abrade or burn the life-line, lanyard or safety strap, wire rope of equivalent strength or four strand wire-cord manila rope of not less than 7/8 inch (16 mm) diameter and having a breaking point of not less than 5,4000 lbs. (23.4kN), shall be used.

D. Where a hook is used to attach a lanyard to a fixed anchor it shall be an approved safety hook.

E. A window cleaner’s safety strap or lanyard shall be so attached to the safety harness so that it cannot pass through the belt fittings, should either end become loose from its anchorage.

F. Where workers are engaged in work in proximity to energized electrical circuits in other work conductive safety straps cannot be used, two non-conductive safety straps shall be worn to provide the additional protection as required.

13.17 Lifeline
A. A lifeline is a component consisting of a flexible line for connection to an anchorage point at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting a lanyard or safety belt/harness to the anchorage.

B. Secure attachment points shall be used, and each shall be visually inspected for damage or deterioration immediately prior to use. Any visual damage or deterioration will be considered adequate reason for replacement or repair of the questionable attachment point.

C. Each employee must have a separate lifeline when the lifeline is vertical, such as when working from scaffolds, bos’n chairs or other suspended work platforms where a falling hazard is present, or when required to work on stored materials in silos, hoppers, tanks and similar storage.

D. The design of systems using horizontal lifelines must be done by qualified persons.

E. Extreme care should be taken in considering a horizontal lifeline for multiple tie-offs. Horizontal lifeline and anchorages strength should be increased for each additional employee to be tied-off.
F. Each anchorage serving as an attachment point for lifelines or lanyards shall be load tested prior to first use, after rework, and annually.

G. Lifelines used shall be of sufficient length to reach the bottom of the potential drops and fastened to approved attachment points located above the personnel being protected.

H. Thimbles shall be installed to protect ropes from chaffing at points of connection to eyes, rings and snaps.

I. Lifelines shall be secured above the point of operation to an anchorage or structural member capable of supporting a minimum dead weight of 5,400 pounds.

J. Lifelines used on rock-scaling operations, or in areas where the lifelines may be subjected to cutting or abrasion, shall be a minimum of 7/8-inch wire core manila rope. For all other lifeline applications, a minimum of ¾-inch manila or equivalent, with a minimum breaking strength of 5,400 pounds, shall be used.

K. When a worker is employed under circumstances where he/she might become entrapped by material, or be overcome by any other cause, he/she shall wear a safety harness attached to a lifeline or other device, attended by another person who shall be stationed, equipped and capable of immediately affecting a rescue.

13.18 Safety Net

A. Safety nets shall be provided when work places are more than 25 feet above the ground, water or other surfaces where the use of ladders, scaffolds, platforms, or safety belts and lifelines are impractical.

B. Nets shall be inspected daily for damage from abrasion, chemicals or heat and repairs shall be made before work above the net is resumed.

C. Nets shall extend 8 feet beyond the edge of the work surfaces where employees are exposed and shall be no more than 25 feet below the work surfaces.

D. Maximum mesh of nets shall be 6 inches by 6 inches.

E. Where public traffic, pedestrians, or other workmen are required to be under a work area, safety nets or other suitable protection devices or structures such as enclosed walkways shall be used. Nets should be lined with material having a maximum mesh of 1 inch by 1 inch out of 22-guage wire or no. 18 synthetic twine.

F. The net suspension shall be designed and constructed with at least a safety factor of four and as a minimum shall withstand the test loading without permitting contact between the net and any surface or object below the net.

G. Forged steel safety hooks or shackles shall be used to fasten the net to its supports.

H. Connection between net panels shall develop the full strength of the net.

13.19 Training – Fall Protection

A. A training program shall be provided for each employee who might be exposed to fall hazards. The program shall enable each employee to recognize the hazards of falling
and shall train each employee in the procedures to be followed in order to minimize these hazards.

B. The Corporate SH&E Department is responsible for the training development and also ensure that each Project Superintendent is trained as the competent person. The Project Superintendent will conduct the fall protection training on the project unless there is a full time SH&E Supervisor assigned.

C. Employees will be re-trained if work conditions change or if the training program has been revised.

D. Each employee must be trained by a competent person qualified in the following areas:
   1. The nature of fall hazards in the work area.
   2. The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used.
   3. The use and operation of guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones and other protection to be used.
   4. The role of each employee in the safety monitoring system when this system is used.
   5. The limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs.
   6. The correct procedures for the handling and storage of equipment and materials and erection of overhead protection.
   7. The role of employees in fall protection plans.

13.20 Schedule of Inspections

A. It is the responsibility of the USER to inspect his safety equipment daily before each use, regardless of ownership.

B. Semi-annual inspections are to be performed and documented by a qualified person using the criteria listed in this program or other recognized procedures, which will ensure the integrity of, fall protection systems in use.

C. ANY EQUIPMENT FOUND TO BE DEFECTIVE SHALL BE REMOVED FROM SERVICE! DEFECTIVE EQUIPMENT IS TO BE REMOVED FROM THE PROJECT SITE AND DESTROYED!

D. In service Testing
   1. Safety harnesses, lanyards, lifelines or other components of an in service fall arresting system (FAS) are not to be test. Any tests performed to prove
whether the system can take the maximum impact loading are to be considered as destructive tests, and the components tested are to be considered unsafe for further use and must be destroyed. Components of a fall arresting system, which have been subjected to an actual fall impact, are to be destroyed to prevent reuse. Retractable lanyards subjected to actual fall impacts are to be tested and re-certified by the manufacturer.

E. Cleaning

1. Clean synthetic rope and webbing by removing dust, dirt and other foreign matter with a damp sponge. Then with a mild solution of commercial soap and warm water, work up to a thick lather with a vigorous back and forth motion. Wipe dry with a clean cloth and hang to dry, but away from excessive heat.

13.21 Respiratory Protection

A. General

1. It is the responsibility of this company to provide its employees with a safe and healthful working environment. This is accomplished with accepted engineering and administrative controls. Where these methods are not feasible or do not provide adequate protection, respiratory protection is to be provided to each affected employee, to reduce employee exposure to harmful airborne particulates and/or gases and vapors to concentrations which are predictably non-injurious to most individuals according to standards listed with professional and regulatory agencies.

2. It is the policy of this company that all employees, when using respirators or administrating the respiratory program, are to adhere to the requirements of this program and to maintain respiratory protection consistent with the goal of protecting our employees.

B. Program Administration

1. Unless notified otherwise, the Project Superintendent on each project site is designed as the person responsible for the implementation and administration of the respiratory program. The superintendent is to act on any and all matters relating to the operation and administration of the respiratory program and to coordinate all activities with the Corporate SH&E Department.

C. Medical Evaluation

1. Each employee required to wear a respirator as a requirement of his duties is to be evaluated initially upon employment or job assignment, and periodically thereafter, as to whether the employee can wear the required respirator without undue physical or psychological risk.

2. Employees are not to be assigned tasks requiring the use of respiratory...
equipment unless it has been determined by a licensed physician that the employee is physically able to perform the work and properly use the respiratory equipment and that the employee will not suffer undue physical or psychological harm due to wearing the equipment.

3. In addition to the above medical evaluation, certain exposures may require employees to submit to other medical tests required by OSHA, MSHA, or the consulting physician, prior to the start of the job and at periodic intervals.

D. Use of Approved Respirators
   1. Only those respirators approved by the National Institute for Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA) are to be used in any operation by employees of this company. Employees are not allowed to purchase their own respirators and use them in any work area.

E. Hazard Evaluation
   1. Proper respirator selection is to be made only after the determination has been made as to the real and/or potential employee exposure to harmful concentrations of contaminants in the workplace atmosphere has been made.
   2. This determination is to be made prior to the start of any routine or non-routine task, which requires respiratory protection. A review of the respiratory protection and the real/potential exposures are to be conducted periodically thereafter to determine if the protection provided is still adequate or if the exposure still exists. All respirator selections and respiratory hazard evaluation are to be coordinated with the Corporate SH&E Department.

F. Respirator Selection
   1. Respirators are to be selected on the basis of the hazards to which employees are exposed. They are to be appropriate for the hazard and used only in those locations and/or job functions for which they are approved.
   2. Respiratory hazards can be classified as follows:
      a. Oxygen Deficiency
      b. Gas and Vapor Contaminants:
          1) Immediately dangerous to life and health (IDLH).
          2) Not immediately dangerous to life and health.
      c. Particulate Contaminants (aerosols, dusts, fumes, fog, mist, smoke and spray):
          1) Immediately dangerous to life and health (IDLH)
          2) Not immediately dangerous to life or health.
      d. Combination of Gas, Vapor and Particulate Contaminants:
          1) Immediately dangerous to life or health.
          2) Not immediately dangerous to life or health.
G. Respirator Fitting
1. No employee is allowed to wear a respirator in a work situation until it is demonstrated that an acceptable fit has been obtained. Either a qualitative or a quantitative fit test is to be performed to determine that a proper fit of the respirator can be obtained. Respirator fitting is to be done initially upon employment or assignment of any employee who is required to wear a respirator and is to be performed periodically thereafter. The employee is to wear only the same type of respirator with which the fit test was performed.

H. Respirator Training
1. Employees are to be given training in the use, inspection, maintenance and the capabilities and limitations of the respirators in use initially upon employment or assignment to any job, which requires the use of respirators and is to be performed periodically thereafter. No employee is allowed to wear a respirator in a work situation until proper training has been performed.
2. Employees shall use the respiratory equipment provided in accordance with the manufacturer’s instruction and the training received.
3. All required fit testing and training is to be coordinated with the Corporate SH&E Department.

I. Eye and Face Protection/ Facial Hair
1. Eye and Face Protection
   a. Goggles, face shields, welder’s helmets, safety glasses or other personal protective equipment may been worn with a respirator provided that they do not interfere with the normal positioning or seal of the face piece.
2. Corrective lenses
   a. Corrective glasses with temple bars will interfere with the seal of full-face respirator and are not to be worn. If corrective glasses are needed to perform normal job functions, corrective glasses inside the face piece will be provided which do not interfere with the respirator seal.
3. Facial Hair
   a. When respiratory equipment is required to be worn in areas of hazardous substances, beards, goatees, sideburns, or any other type of facial hair which would prevent the ability of the respirator to obtain a seal to effectively keep contaminates from the employee, shall not be permitted and must be removed.

J. Issuance of Respirators
1. Only the project superintendent, foremen, or the company safety department are permitted to issue respirators, and only to those individuals who have been medically evaluated, and properly fitted and trained in the use, inspection, maintenance and the capabilities and limitations of the respirator issued.
K. Respirator Inspection and Maintenance

1. Inspection
   a. Prior to use, the respirator is to be inspected by the wearer for defects and
      signs of deterioration, which could affect its ability to protect against exposure.
      No respirator is to be worn with a known defect. If found defective during
      inspection, the respirator is to be turned in to the supervisor for repair or
      replacement.

2. Maintenance
   a. During cleaning and maintenance, all respirators are to be inspected for defects
      and worn or deteriorated parts are to be replaced prior to use. No attempt is to
      be made to make repairs on a respirator which is beyond that recommended by
      the manufacturer.
   b. If possible respirators are to be assigned to individuals for their exclusive
      use. Employees assigned respirators are responsible for inspecting, cleaning and
      performing minor maintenance on the equipment. Respirators are to be cleaned,
      inspected and maintained as per the manufacturer’s instructions and the training
      received.
   c. Respirators are to be cleaned daily after each use.

L. Responsibilities During Respirator Use

1. Supervisors
   a. It is the responsibility of the project superintendent and/or foremen to
      supervise the use of respirators on the project site and/or
      foremen to supervise the use of respirators on the project site and to
      ensure that respirators are used when required and in the manner in
      which the wearer has been trained.

2. Respirator Wearers
   a. It is the responsibility of each respirator wearer to properly wear the
      respirator when and where it is required, to ensure that the
      respirator is fully functional at all times, and to report any
      malfunction of the respirator to the appropriate supervisor.
   b. It is the responsibility of each respirator wearer to guard against
      mechanical damage to the respirator, and to ensure that the
      respirator is cleaned and maintained as instructed.
   c. A clean and sanitary location will be provided for each respirator
      and it will be the responsibility of each individual to maintain the
      respirator in the clean and sanitary location between wearings.

M. Emergency Use Respirators

1. In the event of an emergency where respirators are required for the protection of
   employees, due to a particular hazard, a program of evaluation, use, training,
   inspection, and maintenance will be developed for the project site.
N. Program Evaluation

1. A written evaluation of the Respiratory Protection Program is to be performed by
   the Corporate SH&E Department annually. Any deficiencies are to be corrected and
   the corresponding change made in the program.

   NOTE: Refer to Section 34 for the Respiratory Protection Program and Training.

13.22 Training – General

A. Requirements which must be answered include:
   1. When is PPE necessary?
   2. What PPE is necessary?
   3. How to don or put on PPE.
   4. How to remove the PPE.
   5. Limitations of the PPE.
   6. Proper care and maintenance of PPE
   7. Useful Life of PPE
   8. Proper disposal of PPE

B. When training is to be performed:
   1. Upon initial assignment to an area or activity that requires PPE.
   2. Changes in the workplace that render previous training obsolete.
   3. Changes in PPE, which render previous training obsolete.
   4. Employees no longer demonstrate proficiency with their assigned PPE.

C. General information on testing:
   1. Each employee must be tested to determine their understanding of PPE
      requirements and proficiency in its use.
   2. Written certification must be provided to verify that the affected
      employees have received and understand the mandated training.
   3. The certification must contain the employee’s name and social security
      number, dates of training, and the subject of the training.

13.23 Employee Understanding

A. It is important that employees understand what they have been taught concerning
   personal protective equipment. In order to have some record of their training and
   knowledge of the material, a competency quiz should be developed to fit the
   particulars of the project. The areas covered must include PPE for the:
   1. Head
   2. Hearing
   3. Eyes and Face
   4. Hands
   5. Feet
   6. Project specific hazards
B. A copy of a simple type of quiz is included to use, add to, or follow to devise a project specific quiz. If this quiz is adopted, the training afforded, the employees must thoroughly cover the information necessary to pass the quiz.

C. The purpose of the quiz is to assure the instructor that the participants have been receptive to and have mastered the objectives of the training program. The test results demonstrate that the individual was aware of and had been informed regarding PPE.

D. Each participant should be able to demonstrate mastery of the objectives by achieving a score of 80% or higher. A participant who scores lower than 80% should review the entire program before retaking the quiz.

13.24 References

A. ANSI Z87.1 – 1989
B. ANSI Z90.1a – 1973
C. ANSI Z89.1 – 1969 / 1986
D. ANSI Z90.1b – 1079
E. ANSI Z89.2 – 1971
F. ANSI 359.1 – 1999
G. OSHA subpart E, 1926.95 - .107

13.25 Exhibit(s)

A. Personal Protective Equipment Quiz
   • Personal Protective Equipment Quiz Answers
**PERSONAL PROTECTIVE EQUIPMENT QUIZ**

Circle **T** if the statements is TRUE or **F** is the statement is FALSE.

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<tbody>
<tr>
<td><strong>T</strong></td>
<td><strong>F</strong></td>
<td>1.</td>
<td><strong>T</strong></td>
<td>Personal Protective Equipment (PPE) must be worn and used correctly to protect you.</td>
<td></td>
</tr>
<tr>
<td><strong>T</strong></td>
<td><strong>F</strong></td>
<td>2.</td>
<td><strong>T</strong></td>
<td>Not wearing PPE in the correct manner is better than not wearing it at all.</td>
<td></td>
</tr>
<tr>
<td><strong>T</strong></td>
<td><strong>F</strong></td>
<td>3.</td>
<td><strong>T</strong></td>
<td>Multiple PPE (such as eye, face, hand, respiratory, etc.) May be required when you work with liquid chemicals, closed welding operations, molten metals, hazardous gases, flying particles, and high radiant energy sources.</td>
<td></td>
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<tr>
<td><strong>T</strong></td>
<td><strong>F</strong></td>
<td>4.</td>
<td><strong>T</strong></td>
<td>Anytime there is a chance that something may strike your eyes, safety glasses and/or goggles are required.</td>
<td></td>
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<tr>
<td><strong>T</strong></td>
<td><strong>F</strong></td>
<td>5.</td>
<td><strong>T</strong></td>
<td>Tinted lenses should not be worn for inside operations unless they are required for the operations.</td>
<td></td>
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<tr>
<td><strong>T</strong></td>
<td><strong>F</strong></td>
<td>6.</td>
<td><strong>T</strong></td>
<td>Tinted lenses can be used around welding or other radiant energy sources so long as your exposure to the source is brief.</td>
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<td><strong>T</strong></td>
<td><strong>F</strong></td>
<td>7.</td>
<td><strong>T</strong></td>
<td>A class C hard hat requires that it be dry and free of holes in order to provide protection against electrical shock.</td>
<td></td>
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<tr>
<td><strong>T</strong></td>
<td><strong>F</strong></td>
<td>8.</td>
<td><strong>T</strong></td>
<td>The suspension is a hard hat’s most important part because it must keep the shell at least one and one-fourth inches above the head.</td>
<td></td>
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<tr>
<td><strong>T</strong></td>
<td><strong>F</strong></td>
<td>9.</td>
<td><strong>T</strong></td>
<td>Class A and B hard hats are constructed of materials that insulate and protect the wearer from electrical shock as well as falling object.</td>
<td></td>
</tr>
<tr>
<td><strong>T</strong></td>
<td><strong>F</strong></td>
<td>10.</td>
<td><strong>T</strong></td>
<td>Decals and painted designs are necessary additions to a hard hat.</td>
<td></td>
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<tr>
<td><strong>T</strong></td>
<td><strong>F</strong></td>
<td>11.</td>
<td><strong>T</strong></td>
<td>Goggles with direct ventilation ports provide the greatest protection from vapors, liquids and dust, but may have a tendency for fog-up occasionally.</td>
<td></td>
</tr>
<tr>
<td><strong>T</strong></td>
<td><strong>F</strong></td>
<td>12.</td>
<td><strong>T</strong></td>
<td>Synthetic gloves should be inspected before each use and frequently during use for evidence of pinholes leaks, cuts and abrasions, etc.</td>
<td></td>
</tr>
<tr>
<td><strong>T</strong></td>
<td><strong>F</strong></td>
<td>13.</td>
<td><strong>T</strong></td>
<td>When working with chemicals it is a good practice to secure the tops inside the arms of a protective jacket or tape the top of the gloves to keep liquids from dripping inside them.</td>
<td></td>
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<tr>
<td><strong>T</strong></td>
<td><strong>F</strong></td>
<td>14.</td>
<td><strong>T</strong></td>
<td>Gloves reinforced with metal or constructed with Kevlar offer greater protection from sharp objects than do leather or cotton knitted gloves.</td>
<td></td>
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<tr>
<td><strong>T</strong></td>
<td><strong>F</strong></td>
<td>15.</td>
<td><strong>T</strong></td>
<td>Metal reinforced gloves should not be worn when working with electrical systems and/or equipment.</td>
<td></td>
</tr>
<tr>
<td><strong>T</strong></td>
<td><strong>F</strong></td>
<td>16.</td>
<td><strong>T</strong></td>
<td>Leather footwear that is contaminated with oil or chemicals should be cleaned right after contamination.</td>
<td></td>
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</table>
| **T** | **F** | 17. | **T** | Leather footwear provides good protection against spills of caustic chemicals.
19. Two of the best places to safely store your hard hat are on the front seat of your pickup or the back seat of your car.

20. Face shields can be used as primary eye protection since they cover such a large area of the face.

21. Puncture resistant soled footwear or inserts should be worn when sharp objects may be present in walking surfaces, such as in demolition and construction activities.

22. Anyone who works around exposed electrical wires or connections should wear metal-free non-conductive shoes or boot and/or use non-conductive mats.

23. Permanent hearing loss is likely to occur only when someone is exposed to painful noise levels.

24. Hearing loss can be a result of non-occupational exposure and/or aging.

25. Facial hair, earrings, and eyeglasses do not decrease the protection offered by earmuff type hearing protection by breaking the seal around the ear.

26. In an extremely loud environment, you may need to wear both earplugs and earmuffs together.

27. Hearing protection worn incorrectly is like wearing nothing at all.

28. If you work with chemicals, regularly inspect your rubber boots, gloves and outerwear and repair or replace them if they become worn or damaged.

29. It is not necessary to check the suspension of your hard hat periodically for damage to the suspension system.

30. Tingling in the fingers, wetness, burning, itching, etc. are all evidence of contact with chemicals.

31. Indirect ventilation reduces the potential for fogging and provides maximum protection while handling chemicals.

32. Elastomeric gloves are made of materials such as latex, nitrile, neoprene, Viton, pvc, etc.

33. Safety footwear is intended to protect the wearer against injury due to falling or rolling objects, objects piercing the sole or exposure to electrical hazards.

34. Fall protection is not required until work is being performed ten feet or higher off the floor.

35. Safety belts are an acceptable form of fall protection.

36. Employees are not held accountable for the maintenance and care of their Personal Protection Equipment.

37. 100% Fall Protection is accomplished by tying off to a minimum of four anchor points.
PERSONAL PROTECTIVE EQUIPMENT QUIZ ANSWERS

1. T
2. F
3. T
4. T
5. T
6. T
7. F
8. T
9. T
10. F
11. F
12. F
13. T
14. T
15. T
16. T
17. F
18. F
19. F
20. F
21. T
22. T
23. F
24. T
25. T
26. F
27. T
28. T
29. F
30. T
31. T
32. T
33. T
34. F
35. F
36. F
37. F
14.0 CLOTHING REQUIREMENTS

14.1 Work Clothes

A. Wear clothes that are suitable for your work. Working without shirts is not permitted. Buttoned, long sleeved cotton shirts should be worn when burning, welding, grinding or performing other types of work where sparks or hot metal are present, or where the work involves the handling of chemicals, solvents, oils, etc.

B. On projects where the client has special requirements pertaining to work clothes, such as fire retardant clothing, the client’s requirement pertaining to work clothes, such as fire retardant clothing, the client’s requirement will be adhered to.

C. Loose, torn or ragged clothing creates a special hazard when operating lathes, drill presses, reamers, and other machines with revolving spindles or cutting tools, and shall not be worn while working. Welders are recommended to wear approved safety glasses in addition to welding helmet. Shaded lenses are recommended when welders are working close to one another.

D. Approved ear plugs or muffs should be worn when there is an usual hazard of sparks, molten metal, etc. entering the ears from burning, welding, or gouging; or where high noise levels may exist.

E. Avoid wearing oily or paint-soaked clothing. Should your clothes become coated with such substance, keep away from fires or operations where hot metal or sparks may ignite clothing.

F. It is recommended that rings, watches, and other hand or arm type jewelry not be worn during working hours.

G. If an employee’s hair is long enough that it may become entangles in machinery, the employee will be required to contain the hair in a safe manner.

H. Long shirttails should be tucked in to prevent entanglement in machinery.
15.0 HEALTH AND SANITATION

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15.0 HEALTH AND SANITATION

15.1 Potable Water (Water Suitable For Drinking)
   
   A. An adequate supply of potable water shall be provided in all places of employment.
   
   B. Portable containers used to supply drinking water shall be capable of being tightly closed and equipped with a tap. Water shall not be dipped from containers.
   
   C. Any container used to distribute water shall be clearly marked “DRINKING WATER” and shall not be used for any other purpose.
   
   D. The common drinking cup is prohibited.
   
   E. Where disposable single service cups are used, both a sanitary container for the unused cups and a receptacle for the disposal of the used cups must be provided.
   
   F. If water fountains are used they shall:
      
      1. Be connected to a potable water supply.
      2. Be connected to a sanitary sewer, storm sewer or French drain.
      3. Maintained in a clean and sanitary condition.

15.2 Non-Potable Water (Water Unsuitable For Drinking)

   A. Outlets for non-potable water, such as water for firefighting or industrial purposes, shall be identified by signs clearly indicating that the water is unsafe and is not to be used for drinking, washing or cooking purposes.
   
   B. There shall be no cross-connection, open or potential, between a system furnishing potable water and a system furnishing non-potable water.

15.3 Toilet Facilities

   A. Toilet facilities shall be provided for employees

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<th>Number of Employees</th>
<th>Minimum Number of Facilities</th>
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<tr>
<td>20 or less</td>
<td>1</td>
</tr>
<tr>
<td>20 or more</td>
<td>1 toilet seat and 1 urinal per 40 workers</td>
</tr>
<tr>
<td>200 or more</td>
<td>1 toilet seat and 1 urinal per 50 workers</td>
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   B. Under temporary field conditions, provisions shall be made to assure not less than one toilet facility is available.
   
   C. Project sites not provided with a sanitary sewer, shall be provided with chemical toilet facilities services and maintained in a sanitary condition.
   
   D. Toilets in poor repair shall be removed from the jobsite and replaced.
   
   E. The requirements of this section do not apply to mobile crews having transportation readily available to nearby toilet facilities.
15.4 Washing Facilities

A. Contractors and subcontractors shall provide adequate washing facilities for employees engaged in the application of paints, coatings, herbicides, insecticides or in any other operation where contaminants may be harmful to the employees. Washing facilities shall be in close proximity to the worksite and will enable employees to remove such substance.

B. Washing facilities shall be kept in a sanitary condition.

C. When required by a particular standard, showers are to be provided in accordance with the following:
   1. One shower is to be provided for each 10 employees of the same sex.
   2. Body soap or other appropriate cleansing agent shall be provided.
   3. Employees who use showers are to be provided clean towels.
   4. Showers shall be provided with hot and cold water feeding a common discharge line.

D. No employee shall be allowed to consume food or beverages in any toilet room, washroom, or any area exposed to toxic materials.

E. Whenever a particular standard requires the use of personal protective equipment, due to the possibility of cross contamination with a toxic materials, employee change rooms will be provided. These change rooms will have separate storage areas for street clothes and protective clothing.

F. Certain operations may require that waste water be filtered or treated prior to being discharged.
# 16.0 FIRE PROTECTION AND PREVENTION

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16.0 FIRE PROTECTION AND PREVENTION

16.1 Purpose
A. This section will define the safety terms and procedures applicable to fire protection and prevention.

16.2 Definitions
A. Approved
   1. Equipment listed or approved by a nationally recognized testing laboratory, i.e. Factory Mutual Engineering Corporation or Underwriters Laboratories, Inc.; or Federal Agencies, the Bureau of Mines or U.S. Coast Guard.

B. Closed Container
   1. A container sealed by means of a lid or other device in which neither liquid nor vapor will escape at ordinary temperatures.

C. Combustible Liquids
   1. Liquids with a flash point at or above 100 degrees F.

D. Combustion
   1. A chemical process, which involves oxidation sufficient to produce light or heat.

E. Fire Brigade
   1. An organized group of employees knowledgeable, trained, and skilled in the safe evacuation of employees during emergency situations and assisting in fire-fighting operations.

F. Fire Resistance
   1. Materials resistant to fire for a specified period time and under conditions of standard heat intensity. The material will not fail structurally nor permit the side opposite the fire to become hotter than a specified temperature.

G. Flammable
   1. Capable of being easily ignited, burning intensely, or having a rapid rate of flame spread.

H. Flammable Liquids
   1. A liquid with a flash point of below 100 degrees F.

I. Flammable Range
   1. The difference between the lower and upper flammable limits expressed in terms of percentage of vapor or gas in air by volume. (Lower Explosive Limit – LEL, Upper Explosive Limit– UEL).
J. Flash Point
1. The temperature at which the liquid gives off enough to form an ignitable mixture with air vapor to produce a flame.

K. Liquefied Petroleum Gases. “LPG and LP Gas”
1. Material composed predominately of any of the following Hydrocarbons, or mixtures of them such as propane, Propylene, Butane (normal Butane or Iso-butane) and Butylenes.

L. Portable Tanks
1. A closed container having liquid capacity more than 60 U.S. gallons not intended for fixed installations.

M. Safety Can
1. An approved closed container, of not more than 5 gallons capacity, having a flash-arresting screen, spring closing lid and spout cover and designed to safely relieve internal pressure when subjected to fire exposure.

N. Vapor Pressure
1. The pressure, measured in pounds per square inch (absolute), exerted by volatile liquid.

16.3 Fire Protection

A. The approved fire protection program will be followed throughout all phases of construction and demolition work. There shall be no delay in providing the necessary equipment as fire hazards occur.

1. Access to available firefighting equipment shall be maintained at all times.

2. Firefighting equipment will be inspected monthly and maintained in operating condition. Defective equipment will be immediately replaced. (Monthly Inspection Tags are available from the Corporate Safety, Health and Environmental Department)

3. Firefighting equipment will be conspicuously located and not obstructed from view in the workplace.

4. The Project Superintendent will provide a trained and equipped firefighting organization (fire brigade) to assure adequate protection on initial project startup and annually thereafter.

B. A temporary or permanent water supply (sufficient volume, duration, and pressure) required to properly operate the firefighting equipment will be made available as soon as combustible materials accumulate.
1. Underground Water Mains
   a. Where underground water mains are to be provided, they will be installed, completed and made available for use as soon as practicable.

2. Fire Hose and Connections
   a. One hundred feet, or less, of 1.5 inch hose, with a nozzle capable of discharging water at 25 gallons or more per minute, may be substituted for a fire extinguisher rated not more than 20 ABC in the designated area, provided the hose line can reach all points in the area.
   
   b. If fire hose connections are not compatible with local firefighting equipment, the Project Superintendent will provide adapters, or equivalent to permit connections.
   
   c. During demolition involving combustible materials, charged hose lines supplied by hydrants, water trucks with pumps, or equivalent, will be made available.

3. Fixed Firefighting Equipment
   a. Sprinkler Protection
      1) If the facility being constructed includes the installation of automatic sprinkler protection, the installation of sprinklers will closely follow the construction and be placed into service as soon as practicable.
      
      2) During demolition or alterations, existing automatic sprinkler installations should be retained in service as long as reasonable. Only authorized persons will permit the operation of sprinkler control valves. Modifications of sprinkler systems to permit alterations or additional demolition should be expedited so that the automatic protection may be returned to service as quickly as possible. Sprinkler control valves will be checked daily, at close of work, to ascertain that the protection is in service.
   
   b. Standpipes
      1) In all structures requiring standpipes or where standpipes exist in structures being altered, they will be maintained to
always be ready for fire protection use. Conspicuously marked standpipes will be provided with connections on the outside of the structure (at the street level). There will be at least one standard hose outlet at each floor.

c. Fire Alarm Devices

1) An alarm system, e.g., telephone system, siren, etc., will be established to alert employees on the site and the local fire department of an emergency.

2) The alarm code and reporting instructions will be conspicuously posted at phones and at all employee entrances.

d. Fire Cutoffs

1) Firewalls and exit stairways required for the completed buildings shall be given construction priority. Fire doors, with automatic closing devices, shall be hung on openings as soon as practicable.

2) Fire cutoffs will be retained in buildings undergoing alterations or demolition until operations necessitate their removal.

4. Project Site Requirements

a. Material storage areas will be equipped with fire extinguishers adequate for their size, construction, and the material stored therein.

b. Welding, cutting, grinding, and burning shall not be done near any material fuel storage area. Fire extinguishers will be provided at the site of welding, cutting or other hot work operations.

c. Flammable materials will be stored as far as possible from the working area. Safety cans will be used when handling and transporting fuel, gas, and other flammables.

d. Fire extinguishers will be located on all self-propelled equipment.

e. Fire extinguishers used to protect areas involving welding, cutting or grinding shall be checked daily prior to start of operation.

f. Only approved solvents are to be used for cleaning purposes.
g. Extinguishers are to be adequately maintained.

h. The telephone number of the nearest organized fire-fighting group is to be displayed at the project site telephones.

C. Portable Firefighting Equipment

1. Fire Extinguisher and Small Hose Lines
   a. A fire extinguisher, rated not less than 20# ABC, shall be provided for each 3,000 square feet of the protected building area travel distance from any point of the protected area to the nearest fire extinguisher will not exceed 100 feet.
   b. One 1.5-inch diameter hose (100 feet in length) with a nozzle may be substituted for a 20# ABC rate fire extinguisher. It must be capable of discharging a minimum of 5 gallons per minute with a minimum hose stream of 30 feet horizontally. The hose must be mounted on a conventional rack or reel. The number and location of hose racks or reels will be adequate so at least one hose stream can be applied to all points in the area.
   c. One or more fire extinguishers, rated no less than 20# ABC, will be provided on each floor. In multi-storied buildings, at least one fire extinguisher will be located adjacent to each stairwell.
   d. Fire hoses and lines subject to freezing will be protected from freezing.
   e. A fire extinguisher, rated not less than 10# ABC, will be provided within 50 feet of areas containing more than 5 gallons of flammable or combustible liquids or 5 pounds of flammable gas are being stored on the project. (This requirement does not apply to the integral fuel tanks of motor vehicles.)
   f. Carbon Tetrachloride and other toxic, vaporizing liquid fire extinguishers are prohibited.
   g. Portable fire extinguishers will be inspected monthly and maintained accordingly. The inspections are to be documented.
   h. Fire extinguishers listed or approved by a nationally recognized testing laboratory, shall be used to meet the requirements of this section.
   i. All employee who will be using fire extinguishers will be trained prior to the start of work and annually thereafter.

16.4 Fire Prevention

The purpose of this section is to identify the safety requirements for fire preventions.

A. Ignition Hazards
1. Electrical wiring and equipment for light, heat, or power purposes shall be properly installed.

2. Internal combustion powered equipment will be located with the exhausts positioned away from combustible materials. When the exhausts are piped outside the building under construction, a clearance of at least 6 inches shall be maintained between piping and combustible material.

3. Smoking is prohibited at or in the vicinity of operations, which constitute a fire hazard. These areas shall be conspicuously posted: “NO SMOKING OR OPEN FLAME”.

4. Portable, battery powered lighting equipment, used in connection with the storage, handling, or use of flammable gases or liquids, will be approved for the hazardous locations.

5. The nozzle of air, inert gas, and steam lines or holes, used in the cleaning or ventilation of tanks and vessels containing hazardous concentrations of flammable gases or vapors, will be bonded to the tank or vessel shell. Bonding devices will not be attached or detached while in hazardous concentrations of flammable gases or vapors.

B. Temporary Buildings

1. Temporary buildings will not be erected where the location adversely affects any means of employee exit.

2. Temporary buildings, located within another building or structure, will be of noncombustible construction or combustible construction having a fire resistance rating of not less than 1 hour.

3. Temporary buildings, located other than inside another building and not used for the storage, handling, or use of flammable or combustible liquids, flammable gases, explosives, or blasting agents, or similar hazardous occupancies, will be located at a distance of not less than 10 feet from another building or structure. Groups of temporary buildings, not exceeding 2,000 square feet in aggregate, will, for the purpose of this section, be considered a single temporary building.

C. Open Yard Storage

1. Combustible materials will be stored with regard to the stability of piles and in no case higher than 10 feet.

2. Driveways, between and around combustible storage piles, will be at least 15 feet wide and maintained free of accumulations of rubbish, equipment, or other articles or materials. Driveways will
be spaced to produce a maximum grid system unit of 50 feet by 150 feet.

3. The entire storage site will be kept free from accumulations of unnecessary, combustible materials. Weeds and grass will be maintained and procedures will be established for periodic cleanup of the entire area.

4. The method of piling combustible materials will be solid and in orderly, regular piles. No combustible material will be stored outdoors within 10 feet of a building or structure.

5. Portable fire extinguishing equipment, suitable for the fire hazard involved, will be provided at convenient, conspicuously accessible locations in the yard area. Portable fire extinguishers, rated not less than 20 ABC, shall be placed to assure maximum travel distance to the nearest unit will not exceed 100 feet.

D. Indoor Storage

1. Storage shall not obstruct, or adversely affect, means of exit.

2. Materials will be stored, handled, and piled with regard to their fire characteristics.

3. Non-compatible materials which may create a fire hazard, will be segregated by a barrier having a fire resistance of at least 1 hour.

4. Materials shall be pile to minimize the spread of fire internally and to permit convenient access for firefighting. Stable piling shall be maintained at all times. Aisle space shall be maintained to safely accommodate the widest vehicle used within the building for firefighting purposes.

5. Clearance of at least 36 inches shall be maintained between the top level of the stored material and the sprinkler deflectors.

6. Clearance shall be maintained around lights and heating units to prevent ignition of combustible materials.

7. A clearance of 24 inches shall be maintained around the fire doors path of travel, unless a barricade is provided, in which case no clearance is needed. Material shall not be stored within 36 inches of a fire door.

16.5 Liquid Petroleum Gas (LP Gas)

A. Approval of Equipment and Systems
1. Each system shall have containers, valves, connectors, manifold valve assemblies, and regulators of an approved type for use with LP Gas.

2. Cylinders shall meet the Department of Transportation identification specification requirements.

B. **Welding on LP Gas Containers Is Prohibited**

C. **Container Valves and Container Accessories**

1. Valves, fittings, and accessories connected directly to the container, including primary shutoff valves, shall have a rated working pressure of at least 250 psi and shall be of material and design suitable for LP Gas service.

2. Connections to containers, except safety relief connections, liquid level gauging devices, and plugged openings, shall have shutoff valves located as close to the container as practicable.

D. **Safety Devices**

1. Containers and vaporizers shall be provided with one or more approved safety relief valve or device. These valves shall be arranged to afford free vent to the outer air with discharge not less than 5 feet horizontally away from any opening into a building below such discharge.

2. Shutoff valves shall not be installed between the safety relief device and the container, the equipment or piping to which the safety device is connected, except that a shutoff valve may be used where the arrangement of this valve is the type that full required capacity flow through the safety relief device is always afforded.

3. Container safety relief devices and regulator relief vents shall be located not less than 5 feet in any direction from an air opening into sealed combustion system appliances or mechanical ventilation air intakes.

E. **Dispensing**

1. Filling of fuel containers for trucks or motor vehicles from bulk storage containers shall be performed not less than 10 feet from the nearest masonry walled building, or not less than 25 feet from the nearest building or other construction and, in any event, not less than 25 feet from any building opening.

2. Filling of portable containers or containers mounted on skids from storage containers shall be performed not less than 50 feet from the nearest building.

F. **Requirements For Appliances**

1. LP Gas consuming appliances shall be of the approved type.
2. Any appliance that was originally manufactured for operation with a gaseous fuel other than LP Gas, and is in good condition, may be used with LP Gas only after it is properly converted, adapted, and tested for performance with LP Gas before the appliance is placed into use.

G. Containers And Regulating Equipment Installed Outside Of Buildings or Structures

1. Containers shall be upright upon firm foundations or otherwise firmly secured. A flexible connection or special fitting shall guard against the possible effect of settling on the outlet piping.

H. Containers and Equipment Used Inside of Buildings or Structures

1. When operational requirements make necessary the use of portable containers, and locating the containers outside of buildings or structures is impractical, it is permitted that containers and equipment be used inside of buildings or structures in accordance with Paragraphs 2 through 11 below.

2. “Containers in Use” means connected for use.

3. Systems utilizing containers having a water capacity greater than 2 ½ pounds (nominal 1 pound LP Gas capacity) shall be equipped with excess flow valves. Such excess flow valves shall be either integral with the container valves or in the connections to the container valve outlets.

4. Regulators shall be either directly connected to the container valves or to manifold connected to the container valves. The regulator shall be suitable for use with LP Gas. Manifolds pressure regulator inlets shall be designed for at least 250-PSI service pressure.

5. Valves on containers having water capacity greater than 50 pounds (nominal 20 pounds LP Gas capacity) shall be protected from damage while in use or storage.

6. Aluminum piping or tubing shall not be used.

7. Hoses shall be designed for a working pressure of at least 250 psi. design, construction, and performance of hose, and hose connections, shall have their suitability determined by listing a nationally recognized testing agency. The hose length shall be long enough to permit compliance with spacing provisions of Paragraphs 1 through 13 herein without kinking or straining, or causing hose to be so close to a burner as to be damaged by heat.

8. Portable heaters shall be equipped with an approved automatic device to shut off the flow of gas to the main burner, and pilot if used, in the event of flame failure. Such heaters, having output of above 50,000 BTU per house, shall be equipped with either a pilot, which must be lighted and proved before the main burner can be turned on, or an electrical ignition system.

9. Container valves, connectors, regulators, manifolds, piping, and tubing shall not be used as structural supports for heaters.
10. Containers, regulating equipment, manifolds, piping, and tubing shall be located to minimize exposure to high temperatures and physical damage.

11. Containers having a water capacity greater than 2 ½ pounds (nominal 1 pound LP Gas capacity) connected for use shall stand on a firm and substantially level surface and, when necessary, shall be secured in an upright position.

12. The maximum water capacity of individual containers shall be 24.5 pounds (nominal 100 pounds LP Gas capacity).

13. Temporary heaters (other than integral heater-container units) shall be located at least 6 feet from any LP Gas container. This will not prohibit use of heaters specifically designed for attachment to the container or to a supporting standard provided they are designed and installed so as to prevent direct or radiant heat application from the heater onto the containers. Blower and radiant type heaters shall not be directed toward any LP Gas container within 20 feet.

14. When two or more heater-container units, of either the integral or non-integral type, are located in an un-partitioned area on the same floor, the container(s) of each unit shall be separated from the container(s) of any other unit by at least 20 feet.

15. When heaters are connected to containers for use in an un-partitioned area on the same floor, the total water capacity of containers, manifolded together for connection to a heater(s), shall not be greater than 735 pounds (nominal 300 pounds LP Gas capacity). Such manifolds shall be separated by at least 20 feet.

16. Storage of containers in reserve shall be maintained in accordance with Paragraphs J through K.

I. Multiple Container Systems

1. Valves in the assembly of multiple container systems shall be arranged to allow replacement of containers to be made without shutting off the flow of gas in the system. This provision is not to be construed as requiring an automatic changeover device.

2. Heaters shall be equipped with an approved regulator in the supply line between the fuel cylinder and the heater unit. Cylinder connectors shall be provided with an excess flow valve to minimize the flow of gas in the event the fuel line becomes ruptured.

3. Regulators and low-pressure relief devices shall be rigidly attached to the cylinder valves, cylinders, supporting standards, the building walls, and will be installed or protected from the elements.

J. Storage of LPG Containers

1. Storage of LP Gas within buildings is prohibited.
K. Storage Outside of Buildings
   1. Storage outside of buildings, for containers awaiting use, shall be located
      away from the nearest buildings or group of buildings, in accordance with
      the following:

      | Quantity of LP Gas Stored | Distance (feet) |
      |--------------------------|----------------|
      | 500 lbs or less          | 0              |
      | 501 to 6,000 lbs.        | 10             |
      | 6,001 to 10,000 lbs.     | 20             |
      | Over 10,000 lbs.         | 25             |

   2. Containers shall be in a suitable ventilated enclosure or otherwise
      protected against tampering.

L. Fire Protection
   1. Storage locations shall be provided at least one approved portable
      fire extinguisher having a rating of not less than 20 ABC

16.6 Temporary Heating Devices

This section is to identify the safe operating requirements for temporary
heating devices.

A. Ventilation
   1. Fresh air shall be supplied in sufficient quantities. Where natural
      means of fresh air supply are inadequate, mechanical ventilation shall
      be provided.
   2. Heaters used in confined space, require special care to be taken to
      provide sufficient ventilation in order to ensure proper combustion,
      maintain the health and safety of workmen, and limit temperature rise
      in the area.

B. Clearance and Mounting
   1. Temporary heating device shall be installed to provide clearance to
      combustible materials not less than the amount shown in Table
      11.6.B.2.
   2. Temporary heating devices, which are listed for installations with
      lesser clearance than specified in Table 11.6.B.2. must be installed in
      accordance with the manufacturer’s specifications.

      | Heating Appliances          | Sides | Rear | Chimney Connector |
      |-----------------------------|-------|------|-------------------|
      | Room heater, circulating type | 12    | 12   | 18                |
      | Room heater, radiant type    | 36    | 36   | 18                |

   3. Only heaters suitable for use on wood floors shall be set directly upon
      them or other combustible materials, all other heaters used shall rest on
      suitable insulating material or at least one (1) inch concrete, or equivalent.
      The insulating material shall extend beyond the heater two (2) feet or
      more in all directions.
4. Heaters used in the vicinity of combustible tarpaulins, canvas, or similar coverings shall be located at least 10 feet from the coverings. The coverings shall be securely fastened to prevent ignition or upsetting of the heater due to wind action on the covering or other material.

C. Stability
   1. Heater, when in use shall be set horizontally, level unless otherwise permitted by the manufacturer’s instructions.

D. Solid Fuel Salamanders
   1. Solid fuel salamanders are prohibited in buildings and on scaffolds.

E. Oil Fueled Salamanders
   1. Flammable liquid-fired heaters shall be equipped with a primary safety control to stop the flow of fuel in the event of flame failure. Barometric or gravity oil feed shall not be considered a primary safety control.
   2. Heaters designed for barometric or gravity oil feed shall be used only with integral tanks.
   3. Heaters specifically designed and approved for use with separate supply tanks may be directly connected for gravity feed, or an automatic pump, from a supply tank.
# 17.0 HOUSEKEEPING AND CLEAN-UP

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17.0 HOUSEKEEPING AND CLEAN-UP

17.1 General Requirements

The term “housekeeping” means a clean and orderly arrangement of tools, materials, operations, equipment, storage facilities and supplies. Your compliance with the following rules and recommendations will make your job and that of others as safe as possible.

A. General Requirements
   1. General waste, scraps, debris and rubbish shall be cleared from work area, passageways and stairs, in and around buildings and other structures on a daily basis.
   2. Oil, grease, or other hazardous materials shall not be allowed to accumulate so as to prevent slipping or fire hazards.
   3. All stairways, gangways and accessways shall be kept free of materials, supplies and obstructions at all times.
   4. Dispose of empty boxes, cans, oily rags, etc. promptly in the appropriate container. Beware of fire hazards.
   5. Tools, material extension cords, hoses and/or debris shall not be strewn about in a manner, which may cause tripping or other hazards.
   6. Keep material and equipment out of aisles and walking area. Always return tools and equipment to their proper place after using them.
   7. Pile all materials in a neat and orderly manner. Be careful where and how you place material overhead; you may cause injury to yourself or to others should it fall.
   8. If you see something on the floor or ground that might cause someone to trip or fall, pick it up and put it in a safe place.
   9. It is important to keep machinery and equipment as clean as possible at all times.
   10. It is the responsibility of each employee to maintain good housekeeping in his or her immediate area.
   11. Locker rooms, toilet facilities, water supplies, and washrooms are provided for your convenience. Help keep them clean and sanitary for your own protection.
   12. Clearly label all containers as to their contents. (E.g., “TRASH”, “USED OIL”, “CLEAN WATER”, “FORM OIL”, etc.)

B. Disposal
   1. Metal or other approved containers shall be provided in adequate numbers to handle waste and rubbish disposal.
2. Garbage and other hazardous waste such as caustics, acids, and toxic materials shall be stored in approved, covered containers. Containers are to be appropriately labeled as to contents.

3. Employees, while cleaning up, shall not throw drop materials from upper levels to lower levels or to the ground unless disposals are provided or the area below is barricaded or secured.

C. Storage
1. Nails, wire ties, and other accessories will either be removed or bent over on form lumber or any other used lumber at the time of stripping or dismantling.

2. Materials shall be maintained in safe, neat stockpiles for ease of access and to prevent collapse or falling.

3. See Section 22 for proper storage procedures for various

4. See Section 22 for proper storage of flammable / combustible materials.

17.2 Manufacturing

A. General Requirements
1. All areas shall be kept clean to the extent that the nature of the work will allow.

2. General waste, scraps, debris, and rubbish shall be cleared from work areas, passageways and stairs on daily basis.

3. All stairways, gangways and accessways shall be kept free of materials, supplies and obstructions at all times.

4. Tools, materials, extension cords, hoses and/or debris shall not be strewn about in a manner, which may cause tripping or other hazards.

5. Oil, grease or other hazardous materials shall not be allowed to accumulate so as to prevent slipping or fire hazards.

6. The floor of every work area shall be maintained, so far as practicable, in a dry condition.

B. Disposal
1. Approved containers for putrescible solid or liquid waste or refuse shall be provided. These containers shall be thoroughly cleaned and maintained in a sanitary condition on a daily basis.

2. All sweepings, solid or liquid waste, refuse and garbage shall be removed on a daily basis.

3. Metal or other approved containers shall be provided in adequate numbers to handle waste and rubbish disposal.

4. Hazardous waste such as caustics, acids and toxic materials shall be stored in approved, covered containers. Containers are to be appropriately labeled as to contents.
## 18.0 MATERIAL HANDLING, STORAGE AND USE

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18.0 MATERIAL HANDLING, STORAGE AND USE

18.1 General

A. All employees handling heavy or awkward material shall receive instruction on, and shall use, safe lifting procedures.

1. Additional personnel and/or equipment shall be made available to provide assistance with heavy or awkward material.
2. All persons lifting or lowering material shall be instructed to keep their knees bent, back straight, and to use their arms and legs for lifting, not their backs. These procedures, if followed, will greatly reduce the possibility of a hernia, a rupture and/or injury to the back.
3. When carrying loads with other workers always give adequate warning on any action to be taken, such as raising/ lowering the load, turning, etc.
4. Plan the route in which to carry the load ahead of time so that everyone can work together and keep in step, it makes the load easier to handle.
5. Never carry a load that blocks vision so that tripping hazards can be avoided and to prevent running into objects.
6. Various job classifications may require different weight lifting requirements. While no two persons may have the same lifting capabilities, there are several factors, besides weight, to consider; size and shape of the load, body position and condition, distance needed to carry, travel path and surface conditions. While there is no weight limit that can be set for everyone to follow, employees need to be instructed to not lift beyond their own strength and capabilities and that help need to be requested.

B. Maximum safe loads for all floors above grade in pounds per square foot should be posted.

C. All materials stored in tiers shall be stacked, racked, blocked, interlocked or otherwise secured to prevent sliding, falling or collapse.

D. Aisles, passageways and other accessways shall be kept clear to provide for the free and safe movement of material handling equipment or employees. Permanent aisles should be marked.

E. Non-compatible materials should be segregated in storage.

F. A tag line or guide rope should be used on all loads that swing freely. Loads should not be lifted or swung over the heads of persons and no one shall be permitted to walk under a load.

G. Material stored inside buildings under construction shall not be placed within 6 feet of any hoist way or inside floor openings, nor within 10 feet of an exterior wall which is lower than the top of the material stored.
18.2 Specific Storage Requirements

A. Bagged Materials:
   1. Bags of cement and lime stacked over 10 bags high should be provided with restraining walls of appropriate strength.
   2. Cement, lime and similar materials in bags shall be so stacked that the mouths of the outside bags are facing the center of the stack.
   3. During un-stacking, the entire top of the stack shall be kept nearly level and the necessary setback maintained.
   4. Employees handling cement or lime shall be warned about skin burns and shall be required to wear goggles and clothing that fits snugly about the neck and wrists.
   5. Lime must be stored in a dry place to prevent premature slaking action that may cause a fire.

B. Bricks:
   1. Brick stacks should not exceed 7 feet and they should be tapered back starting at 4 feet.
   2. Bricks should always be stacked on planks, asphalt or concrete and never on uneven or soft surfaces.
   3. The top of brick stacks shall be kept level and the taper maintained during unstacking operations.

C. Masonry Blocks:
   1. Blocks shall be stacked in tiers on solid, level surfaces, and should be tapered back over the 6-foot level.

D. Lumber
   1. In stacking lumber, cross strips should be placed on stacks more than 4 feet high.
   2. Used lumber should have all the nails removed before stacking unless the lumber is to be burned or hauled away without further handling.
   3. Lumber shall be stacked on level and solidly supported sills so as to be stable and self-supporting.
   4. Lumber should not be stacked more than 16 feet high.

E. Reinforcing and Structural Steel
   1. Steel rods should be stored in separate stacks according to length and size.
   2. Structural steel shall be carefully stacked to prevent danger of members sliding off of the stack toppling over.
   3. “I” beams must never be stored with the webs vertical.

F. Foundation Bolts:
   1. Bolts should be stacked in separate stacks according to length and size.
G. Corrugated and Flat Iron.
   1. Corrugated and flat iron should be stacked flat and not more than 4 feet high.
   2. Spacing strips shall be placed between bundles.
H. Pipes, Poles and other Cylindrical Materials:
   1. Cylindrical material shall be stacked and blocked in such a way to keep the material from spreading or toppling.
   2. When removing pipe or other material larger than 2 inches in diameter from storage and where pipe stacked runs in one direction and is more than one pipe high, employees shall be instructed to approach the stack from the ends, not from the side.
I. Sand, Gravel and Crushed Stone.
   1. In withdrawing sand, gravel and crushed stone from stockpiles, no overhanging or vertical face shall exist at any time.
   2. Material dumped against walls or partitions shall not be stored to a height that will endanger the stability or exceed the resisting strength of such walls and partitions.
# 19.0 FLAMMABLE & COMBUSTIBLE LIQUIDS

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19.0 FLAMMABLE & COMBUSTIBLE LIQUIDS

19.1 Flammable And Combustible Liquids

A. General Requirements

1. Only approved containers and portable tanks shall be used for storage and handling of flammable and combustible liquids. Approved metal safety cans shall be used for the handling and use of flammable liquids in quantities greater than one gallon. This requirement will not apply to those flammable liquid materials, which are highly viscous (extremely hard to pour), which may be used and handled in original shipping containers. For quantities of one gallon or less, only the original container or approved metal safety cans will be used for storage, use, and handling of flammable liquids.

2. Flammable or combustible liquids shall not be stored in areas used for exits, stairways, or normally used for the safe passage of employees.

B. Indoor Storage Of Flammable and Combustible Liquids

1. No more than 25 gallons of flammable or combustible liquids shall be stored in a room outside of an approved storage cabinet.

2. Quantities of flammable and combustible liquid in excess of 25 gallons shall be stored in an acceptable or approved cabinet meeting the following requirements.
   a. Acceptable wooden storage cabinets shall be constructed in the following manner, or equivalent: The bottom, sides and top will be constructed of an exterior grade plywood at least 1 inch in thickness which will not break down or delaminate under standard fire test conditions. Joints will be rabbeted and will be fastened in two directions with flathead wood screws. When more than one door is used there will be a rabbeted overlap of not less than 1 inch. Steel hinges will be mounted in such a manner as to not lose their holding capacity due to loosening or burning out of the screws when subjected to fire. Such cabinets will be painted inside and out with fire retardant paint.
   b. Approved metal storage cabinets are acceptable.
c. Cabinets shall be labeled in conspicuous lettering, “FLAMMABLE-
NO FIRE OR SPARK PRODUCING MATERIALS”.

3. Any one storage cabinet shall not store more than 60 gallons of
flammable or 120 gallons of combustible liquids. A single storage area
may contain no more than three such cabinets. Quantities in excess of
this limit shall be stored in an inside storage room.

4. Inside storage rooms shall be constructed to meet the required fire
resistive rating for their use.
   a. Where an automatic extinguishing system is provided, the system
      shall be designed and installed in an approved manner. Openings
to other rooms or building shall be provided with noncombustible
liquid-tight raised sills or ramps at least 4 inches below the
surrounding floor. Openings shall be provided with approved self-
closing fire doors. The room shall be liquid-tight where the walls
join the floor. A permissible alternate to the sill or ramp is an open-
grated trench inside of the room, which drains to a safe location.
Where other portions of the building or other buildings are
exposed, windows will be protected per the standard for fire doors
and windows, NFPA No. 80-1970, for class E and F openings. Wood
of at least 1-inch nominal thickness may be used for shelving,
racks, dunnage, scuffboards, floor overlay, and similar installations.
   b. Materials, which will react with water and create a fire hazard,
      shall not be stored in the same room with flammable or
combustible liquids.
   c. Electrical wiring and equipment located in inside storage rooms
      shall be approved for Class 1, Division 1, Hazardous locations in
accordance with the National Electrical Code.
   d. Inside storage rooms shall be provided with a gravity or a
mechanical exhausting system. The system shall commence not
more than 12 inches above the floor and be designed to provide a
complete change of air within the room at least 6 times per hour. If
a mechanical exhausting system is used, a switch located outside
of the storage room door shall control it. The same switch shall
operate the ventilating equipment and any lighting fixtures. Where
gravity ventilation is provided, the fresh air intake, as well as the
exhausting outlet from the room, shall be on the exterior of the
building in which the room is located.

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e. In every inside storage room there shall be maintained one clear aisle, at least 3 feet wide. Containers over 30 Gallons capacity shall not be stacked one upon the other.
f. Flammable and combustible liquids, in excess of that permitted in inside storage rooms, shall be stored outside of the building in accordance with Paragraph (1).

C. Storage Outside Buildings

1. Storage of containers (of no more than 60 gallons each) shall not exceed 1,100 gallons in any one pile or area. Piles or groups of containers shall be separated by a five-foot (5') clearance. Piles or groups of containers shall not be nearer than ten (10') feet to a building.

2. A 12-foot wide access way to permit approach of fire control apparatus shall be maintained within 200 feet of each pile of containers.

3. The storage area shall be graded in a manner to divert possible spills away from buildings/other exposures, or be surrounded by a curb/earthen dike tall enough to impound the total gallons of liquids stored within the earthen dike. When curbs or dikes are used, provisions shall be made for draining off accumulations of ground or rainwater, or spills of flammable or combustible liquids. Drains will terminate at a safe location and will be accessible to operation under fire conditions.

   a. “Drainage”. Where protection of adjoining property or waterways is by means of a natural or manmade drainage systems, such systems shall comply with the following:

      1) The drainage system shall terminate in a vacant land or other area or in an impounding basin having a capacity not smaller than that of the largest tank served. This termination area and the route of the drainage system shall be so located that, if the flammable or combustible liquids in the drainage system are ignited, the fire will not seriously expose tanks or adjoining property.

   b. “Diked areas”. Where protection of adjoining property or waterways is accomplished by retaining the liquid around
the tank by means of a dike, the volume of the diked area shall comply with the following requirements:

1) The volumetric capacity of the diked area shall not be less than the greatest amount of liquid that can be released from the largest tank within the diked area enclosing more than one tank shall be calculated by deducting the volume of the tanks other than the largest tank below the height of the dike.

2) Walls of the diked area shall be of earth, steel, concrete or solid masonry designed to be liquid tight and to withstand a full hydrostatic head. Earthen walls 3 feet (.0912 m) or more in height shall have a flat section at the top not less than 2 feet (.0608 m) wide. The slope of an earthen wall shall be consistent with the angle of repose of the material of which the wall is constructed.

3) No loose combustible material, empty or full drum or barrel, shall be permitted within the diked area.

D. Outdoor Portable Tank Storage

1. Portable tanks shall not be nearer than 20 feet from any building. Two or more portable tanks having a combined capacity in excess of 2,200 gallons, shall be separated by a 5-foot clear area when grouped together.

2. A 12-foot wide access way to permit approach of fire control apparatus shall be maintained within 200 feet of each portable tank.

3. Storage areas shall be kept free of weeds, debris, and other combustible material not necessary to the storage.

4. Portable tanks, not exceeding 660 gallons, shall be provided with emergency venting and other devices, as required by Chapter M and IV of NFPA 30-1969, The Flammable and Combustible Liquids Code.

5. Portable tanks, in excess of 660 gallons, shall have emergency venting and other devices (required by Chapters II and M of the Flammable and Combustible Liquids Code, NFPA 30-1969).

E. Fire Control For Flammable or Combustible Liquids Storage

1. At least one portable fire extinguisher, having a rating of not less than
20#ACB shall be located outside of, but not more than 10 feet from the door opening into any room used for storage of more than 60 gallons of flammable or combustible liquids.

2. At least one portable fire extinguisher having a rating of no less than 25 feet, no more than 75 feet, from any flammable liquid storage area located outside.

3. When sprinklers are provided, they shall be installed in accordance with the Standard for the Installation of Sprinkler System, NFPA 13 1969.

4. At least one portable fire extinguisher having a rating of not less than 20# ABC shall be provided on tank trucks or other vehicles used for transporting and/or dispensing of flammable or combustible liquids.

F. Dispensing Liquids

1. Areas in which flammable or combustible liquids are transferred at one time, in quantities greater than 5 gallons from one tank or container to another tank or container shall be separated from other operations by 25 feet distance or by construction having a fire resistance of at least 1 hour. Drainage or other means shall be provided to control spills. Adequate natural or mechanical ventilation shall be provided to maintain the concentration of flammable vapor at or below 10 percent of the lower flammable limit.

2. Transfer of flammable liquids from one container to another shall be done only when containers are electrically interconnected (bonded).

3. Flammable or combustible liquids shall be drained from or transferred into vessels, containers, or tanks within a building or outside only through a closed piping system; from safety cans, by means of a device drawing through the top; or from a container, or portable tanks, by gravity or pump, through an approved self-closing valve. Transferring by means of air pressure on the container of portable tanks is prohibited.

4. The dispensing units shall be protected against collision damage.

5. Dispensing devices and nozzles for flammable liquids shall be of an approved type.

G. Handling Liquids At Point of Final Use

1. Flammable liquids shall be kept in closed containers when not actually in use.
2. Leakage or spillage of flammable or combustible liquids shall be disposed of promptly and safely.

3. Flammable liquids may be used only where there are no open flames or other sources of ignition within 50 feet of the operation, unless conditions warrant greater clearance.

H. Service and Refueling Areas

1. Flammable or combustible liquids shall be stored in approved closed containers, in tanks located underground or in aboveground portable tanks.

2. The tank truck shall comply with the requirements covered in the Standard for Tank Vehicles for Flammable and Combustible Liquids, NFPA No. 385-1966.

3. The dispensing hose shall be of an approved type.

4. The dispensing nozzle shall be an approved automatic closing type with a latch-open device.

5. Clearly identified and easily accessible switch(es) shall be provided at a location remote from the dispensing devices to shut off the power to all dispensing devices in the event of an emergency.

6. Heating equipment of an approved type may be installed in the lubrication or service area where there is no dispensing or transferring of flammable liquids, provided the bottom of the heating unit is at least 18 inches above the floor and is protected from physical damage.

7. Heating equipment installed in lubrication or service areas, where flammable liquids are dispensed, shall be of any approved type for gauges and will be installed at least 8 feet above the floor.

8. There shall be no smoking or open flames in the areas used for fueling, servicing fuel systems for internal combustion engines, receiving or dispensing of flammable or combustible liquids.

9. Conspicuous and legible signs prohibiting smoking shall be posted.

10. The motors of equipment being fueled shall be shut off during the fueling operation.

11. Each service or fueling area shall be provided with at least one fire extinguisher having a rating of not less than 20# ABC located so that an extinguisher will be within 75 feet of each pump, dispenser, underground fill pipe opening, and lubrication or service area.

12. Sources of ignition. In location where flammable vapors may be present, precautions shall be taken to prevent ignition by eliminating
or controlling sources of ignition. Sources of ignition may include open flames, lighting, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, and mechanical), spontaneous ignition, chemical and physical-chemical reactions, and radiant heat.

I. For information regarding the following subjects, please contact the SH&E Dept.:
   1. Installation of outside aboveground tanks.
   2. Venting of tanks.
   3. Removal of underground tanks known to store flammable and combustible liquids.
   4. Procedures and information on areas prone to natural disasters (earthquakes, floods, hurricanes, etc.).
# 20.0 TOOLS

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20.0 TOOLS

20.1 General
A. Only non-sparking tools shall be permitted in locations where sources of ignition may cause fire or explosion.
B. Tools shall be used only for the purpose for which they were designed.
C. Defective or unsafe tools shall be replaced and turned in for repair immediately.
D. When working overhead, unused tools shall be kept in containers or otherwise secured to prevent them from falling. Tools shall not be left in passageways, access ways, and walkways or on ramps, platforms, stairways or scaffolds where they can create a tripping hazard.
E. Throwing or dropping of tools to another area or level shall be prohibited.
F. When not in use, tools shall be stored in suitable tool rooms, toolboxes, racks or other containers.
G. All power-operated tools designed to accommodate guards shall be equipped with such guards when in use.
H. Tools must be kept clean and free from oil and grease to prevent slipping.
I. When workers furnish their own tools, such tools must conform to the requirements demanded for satisfactory, efficient work and for safety.
J. The supervisor is responsible for the safe conditions of tools and equipment used by employees, including tools and equipment, which may be furnished by employees.

20.2 Hand Tools
A. Chisels, Drift Pins and Wedges.
   1. Chisels, drift pins and wedges shall be kept free of mushroomed heads.
   2. A machinist hammer or sledgehammer and not a carpenter’s hammer should be used to drive metal wedges.
   3. Dull points require heavier blows and cause splintering, chipping and mushrooming. Keep points sharp. Use a coolant in sharpening to prevent loss of temper.
   4. Eye protection should be provided and worn to prevent eye injuries from flying splinters or chips.
   5. Impact tools must be held in a secure, safe manner.
   6. A cold chisel becomes brittle when it is cold enough to gather frost. Warm to about 65 degrees Fahrenheit before using.
   7. The chisel should be held in the most secure and comfortable position. With a firm grip, there is less chance of mashing fingers and hand if the point slips. When working with a helper, tongs should be used.
   8. Be sure the work piece is solidly supported.
9. When flying splinters or chips are being produced, the work should be shielded to protect other workers.

B. Files
   1. Files shall not be used as a chisel or hammer as they are made of hard brittle metal and may chip.
   2. Files should be kept clean and free of accumulations. A sharp, clean file requires little pressure.
   3. A handle should be placed on the tang (sharp point of a file) and the file should be stroked in the direction away from the edge being filed.
   4. Chalk rubbed into the teeth of a file will help prevent slipping and a possible injury.
   5. The metal in a file is not made for use as knives, punches or chisels. Do not make other tools from files.
   6. Keep files free of oil and grease and store each file separately. If files are store together, they wear and chip each other.
   7. Use a soft metal scraper and file card to remove accumulations from file teeth.
   8. Select the proper file needed for a job, use it correctly and keep it in good condition.

C. Hacksaws
   1. The metal to be cut should be in a firm, secure position. A rolling piece of metal may break the brittle blade and cause an injury.
   2. A sharp blade with fine teeth should be used to cut hard metal and a sharp blade with coarse teeth should be used to cut soft metal.
   3. The metal in hacksaw blades is brittle and breaks easily and should not be bent or otherwise stressed so that it may break and cause injuries.
   4. Do not attempt to sharpen a hacksaw blade. Get a new one. The manufacturer sharpens the blade and then hardens it.
   5. Select the proper blade to cut metal to prevent breaking the blade and possible injury.
   6. To start a cut safely, be sure the blade is taut on the frame. Score the cutting line with two (2) or three (3) up strokes.
   7. To complete a cut, use pressure on the forward or cutting stroke. Stay clear of falling pieces to avoid foot injuries.
   8. A coat of oil or antirust will protect the hacksaw when not in use.

D. Hammers
   1. The right weight and type of hammer should be selected for each job.
   2. When working with hammers where there is danger of chips or other flying objects, eye protection should be worn.
   3. Use the hammerhead to strike the work. It is hardened for this purpose and
may be checkered or scored to prevent slipping. Grasp a hammer near the end of the handle. The hand will stand a better chance of escaping injury in case of a miss or if something gives.

4. Hold nails near the head with the thumb and forefinger to start the drive. The fingers will likely be driven away in case of a miss and not crushed.

5. Use the claws of a hammer to draw nails – not to strike objects. When withdrawing nails, use a wood block under hammerhead to increase handle leverage.

6. A steel hammerhead may cause sparks if striking against metal. Remember, sparks may ignite flammable mixtures of air and vapors or air and explosive dusts. Special hammers made of non-sparking metals should be used when conditions described above are known or suspected.

7. Keep hammers free from oil and grease.

8. Hammer handles should be free of slivers and made of hickory, ash or maple. A band of friction tape around the end of the handle will keep it from slipping out of your hand. Handles should be wedged squarely and securely into the head. A mixture of two (2) parts linseed oil and one(1) part turpentine is used to coat wooden handles.

9. Redress any hammerhead that becomes marred.

E. Hand Saws

1. Saw cuts and silver injuries should receive immediate first aid attention as lumber can carry tetanus germs.

2. Keep the saw teeth sharp and properly set to prevent the saw from choking in the cut.

3. A cross cut saw has teeth angled to cut across wood grain, not with the grain.

4. A ripsaw has teeth angled to cut with the grain.

5. Start to cut slowly until the saw takes a smooth bite. Guide the saw initially with the thumb while taking one(1) or two (2) long, slow strokes to make an active groove.

6. Use a steady support to saw a piece of lumber. Stand in a position so the saw will not strike the knee or leg on a cut through.

F. Screwdrivers

1. Screwdrivers should not be used as a chisel, pry or wedge.

2. Screwdrivers should be used in a manner such that the hand will not be punctured or will not strike the work piece in case of a slip.

3. Use the proper size and type of screwdriver for the kind of screw to be driven.
4. Screwdrivers slip when not securely held or the use is off balance. The work piece should not be held by hand. Secure the work piece with clamps or a vise.
5. While working around electrical equipment, wear protective equipment or use an insulated screwdriver to avoid shock. Use safety glasses to avoid flash burns.
6. Replace a split screwdriver. Dress a screwdriver tip if it becomes dull or chipped. Use other tools for work that a screwdriver is not designed to do.

G. Sharp-Edged Tools
1. Tools with sharp edges such as saws, axes, scythes, knives, chisels, awls, wood planes and drill bit should have the cutting edge guarded or covered when in storage or being carried.
2. Sharp-edged tools should be used so that the cutting edge is stroked or pointed away from the body.
3. The piece being cut should be secured in a vise or other safe manner.
4. Keep tools sharp and properly oiled, or use an anti-rut coating material. A tool in good condition helps prevent injuries.
5. Stroke sharp-edged tools away from the body.
6. Protect materials from damage by sharp edged tools
7. Eye protection should be used when there is danger from flying objects.

H. Wrenches
1. The right size and type of wrench should be selected for each job.
2. Hammering on a wrench or the use of extension pipes “cheaters” is dangerous, can break the wrench and is not a safe work practice.
3. The teeth of pipe wrenches should be kept clean and sharp to avoid chips.
4. Wrenches used improperly may break, slip or spread. Hammering a wrench may break the handle; so will extension of the handles to get more leverage. Check on other ways to do the job.
5. An adjustable wrench has more parts. Inspect the knurl pin and the adjustable jaws. Replace defective parts.
6. Workers should be positioned to avoid striking hands or body parts in case the wrench slips or falls.
7. Do not use a shim to make jaws fit. This is an unsafe practice. Get a wrench that fits.
8. When working at high levels, do not place wrenches where they can be jarred or accidentally knocked into machinery or fall on employees working at lower levels.
9. Use extensions and universal joints when reaching for difficult parts with a wrench. Then keep hands out of danger zones.
20.3 Power Tools

A. General

1. All power tools and similar equipment shall be maintained in a safe condition.
2. Do not issue nor permit the use of unsafe tools.
3. Power tools that are designed to accommodate guards shall be equipped with such guards when in use.
4. Employees using hand and power tools and exposed to hazards of falling, flying, abrasive and splashing objects or exposed to harmful dust, fumes, mist, vapors or gases shall be provided with, trained in their use and required to utilize approved personal protective equipment.
5. Tools shall be used only for the purpose for which they were designed.
6. Defective or unsafe tools shall be replaced and turned in for repair immediately.

B. Electrical Power Tools

1. Electric power operated tools shall either be of the approved double-insulated type or grounded in accordance with the National Electric Code.
2. The use of the electric cord for hoisting and lowering electric tools is an unsafe practice and should not be permitted.
3. All handheld powered platen sanders, grinders with wheels 2-inch diameter or less, routers, planers, laminate trimmers, nibblers, shears, scroll saws and jigsaw with blade shanks ¼ of an inch wide or less may be equipped with only a positive “on-off” control.
4. All handheld powered drills, tappers, fastener drivers, horizontal, vertical and angle grinders with wheels greater than 2 inches in diameter, disc sanders, belt sanders, reciprocating saws, saber saws and other similar operating powered tools shall be equipped with a momentary contact “on-off” control and may have a lock-on control provided that turnoff can be accomplished by a single motion of the same finger or fingers that turn it on.
5. Electric cords are not to be jerked or pulled from receptacles. Strain relief is to be maintained on all electric tools.
6. All other handheld powered tools such as circular saws, chain saws and percussion tools without positive accessory holding means shall be equipped with a constant pressure switch that will shut off the power when the pressure is released.
7. Inspections of all electrically powered tools and cords are to be made as per Section 25.4 Assured Equipment Grounding Program. All electrical tools and cord sets shall be tested and marked using the following color code:

<table>
<thead>
<tr>
<th>Month or Quarter</th>
<th>Color Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan., Feb., Mar.</td>
<td>White</td>
</tr>
</tbody>
</table>
Apr., May., June Green
July, Aug., Sept. Red
Oct., Nov., Dec. Orange
Repair or Incident Brown

8. Generators greater than five (5) kilowatts and other power sources must also be grounded. Test power sources to ensure that they are wired correctly. Use a 3-wire circuit analyzer to perform these tests.

9. All electric cords and cables must be covered or elevated to a height of 7 feet to prevent damage and to eliminate tripping hazards.
   a. Covers are to be sturdy enough to withstand the traffic in the area.
   b. When elevating cords, hoses or leads, non-metallic non-conducting material is to be used, such as rope, twine, tape, etc. Never use wire, nails or welding rod.

C. Pneumatic Powered Tools

1. Employees are strictly forbidden from engaging in horseplay with compressed air hoses. Practical jokes with compressed air can cause serious injury.

2. Hose lines shall be so placed to eliminate tripping hazards.

3. Employees shall not use compressed air for the purpose of cleaning or blowing off clothing or otherwise directing compressed air towards themselves or others. Even when reduced to 30-psi compressed air can penetrate the skin and cause serious injury.

4. Pressure shall be shut off and exhausted from the line before disconnecting the line from any tool or connection.

5. Safety clips, chains, wires or other retainers shall be used to secure sections of hose together and to secure the hose to the power source and the tool to the hose in order to prevent dangerous whipping in case of disconnection or failure.

6. Compressed air shall not be used for cleaning purposes unless the pressure is reduced to 30 psi or less. This rule does not apply for concrete from mill scale, green cutting, and similar cleaning operation. Personnel involved in these operations shall be provided with adequate personal protective equipment including safety goggles or face shield, hearing protection, etc.

7. Safety chains or other suitable retaining devices must be used at connections on pneumatic hoses of 1 inch inside diameter or larger.

8. Safety clips or retainers must be installed on all pneumatic tools to prevent the accidental release of the tool from the barrel.
9. Compressed air receivers shall be equipped with drain valves, pressure gauges, and automatic pressure relief valves.

10. Check all hoses and connectors for cuts, breaks and loose fittings prior to pressurizing the system. Hose clamps should not be used as a substitute for press type clamps.

11. Before making adjustments or changing tools, unless equipped with quick-change connectors, the air supply shall be shut off and the hose bled at the tool before breaking any connections.

D. Powder (Explosive) Actuated Tools

1. In some states there are specific regulations governing the use of powder-actuated tools. Strict compliance with applicable regulations shall be mandatory.

2. With each tool, the manufacturer or supplier should furnish a detailed instruction manual covering the application, operation and maintenance of the tool. The manufacturer’s recommendation for size of charge, and unit or pin, and for specific application, must be followed explicitly by the operator.

3. Information from the manufacturer on the safe use, testing and maintenance of each type of tool should be provided in each tool kit.

4. Only operators who are properly trained and certified shall be allowed to operate powder actuated tools.

5. These tools shall not be used in areas where flammable gases or vapors are present in the atmosphere.

6. Only tools, which are provided with a shield or muzzle guard, should be used. This shield or guard should be of a size, design and material that will effectively confine flying particles and prevent escape of ricocheting studs and pins.

7. Do not use powder actuated tools on very hard or brittle materials including, but not limited to: cast iron, glazed tile, surface-hardened steel, glass block, live rock, face brick, or hollow tile.

8. No tool shall be loaded unless it is being prepared for immediate use, nor shall a loaded tool be left unattended.

9. Each tool should be tested each day before loading, to see that the safety devices are in proper working condition and to assure that the tool is clean and that all moving parts operate freely.

10. At predetermined intervals (depending on manufacturer’s recommendations) the tool shall be completely dismantled and carefully inspected for wear on the safety devices by a qualified person familiar with the tool. Worn parts shall be replaced before the tool is used again.

11. It is recommended that factory authorized service (by a representative or by mailing the tool to the factory) be utilized for the inspection, necessary
repairs and replacement of parts. A dated and signed record of the manufacturer’s most recent inspection, service or repairs should be available with, and identified to, each tool. It is mandatory that only the manufacturer or his authorized services make major repairs of defective tools.

12. All explosive actuated tools shall be inspected, cleaned and stored in a safe place after each day of service. No tool shall be stored loaded. Tools must be stored with barrels removed or breech open.

13. Powder actuated tools shall not be used on materials which are easily penetrated unless such materials are backed by a substance that will prevent the pin, nail or fastener from passing completely through and creating a flying missile hazard on the other side.

14. Easily pierced material, or materials of unknown resistance to piercing, shall be backed, where practical, with a box of sand or wood at least four inches (4”) thick and of adequate area. Precautions must also be taken to prevent exposure to falling or flying fragments. (two inches (2”) of concrete is easily pierced.)

15. The operators and persons working in the area, as necessitated by working conditions, shall utilize adequate eye, head, face and/or other appropriate personal protective equipment.

16. Studs or pins shall be specifically designed for use with the tools.

17. Pins or studs should never be fired into cast iron, high carbon, heat treated steel, or armor plate, thin slate, marble, glass, live rock, glazed brick or tile, terra cotta or other brittle substances, or where the composition is unknown.

18. Studs or pins should not be fired into materials such as brick or concrete, closer than three (3”) from the edge or corner, ; nor into steel surfaces closer than one half inch (1/2) from the edge.

19. Cartridges or shells should be kept in the original containers, in separate metal containers, or in the carrying case provided with the tool.

20. Cartridges, of varied charges or force, shall be kept segregated from each other.

21. Proper precautions shall be taken, as outlined by manufacturer, in the event of a misfire or blank cartridge.

22. Proper signs and barricades shall be provided when shooting into walls or floors with personnel working on the other side.

23. Powder actuated tools must always be handled like firearms, with hands clear of the muzzle, and barrel pointed away from all person, especially when the tool is being closed or assembled after loading.

E. Abrasive Wheels and Tools
1. Wheels shall be stopped when adjusting guards or work rests or when servicing the equipment.

2. Floor stand or bench grinders must be equipped with safety guards, tongue guards and work rests. Both tongue guards and work rests shall be kept at a distance not to exceed 1/8 inch from the face of the wheel.

3. Do not use any grinding wheel, disk, bit, blade, etc. unless it is rated for the RPM of the tool and has been inspected and tested as per manufacturer’s recommendations.

4. All abrasive wheels should be closely inspected and ring-test before mounting to ensure they are free from cracks or defects.

5. Standard guards will be installed and used on grinding wheels in accordance with the manufacturer’s specifications and state and federal codes.

6. Abrasive wheels should be kept well dressed, and excessively worn or damaged wheels shall be replaced prior to use. A badly rutted or out of balance grinding wheel can cause the wheel to explode.

F. Woodworking Tools
1. Cracked or defective saw blades, cutters or knives on power equipment shall not be used.

2. Woodworking tools shall not be left running when unattended.

3. Material being cut should be firmly held against back guide or fence and should be cut with a single, steady pass.

4. The operating table and surrounding area should be kept clean and clear of all debris.

5. When cutting long stock, extension tables and a helper should be provided to assist operator.

6. Band saw blades shall be fully enclosed except at point of operation.

7. Circular cross cut and rip saws shall be provided with a hood guard, splitter and anti-kickback device. The hood should adjust itself automatically to the thickness of and remain in contact with the material being cut. All circular saws should be provided with a hood guard.

8. Exposed parts of the saw blade under the table should be properly guarded.

9. All swing cutoff and radial saws which are drawn across a table shall be equipped with limit stops to prevent the saw from traveling beyond the edge of the table.

10. Swing cut off saws should have a guard completely covering the upper half of the saw.

11. Planers and jointers should be fully guarded.

12. Drills
   a. Care shall be taken to prevent clothing from being wound around drill. Sleeves buttoned at wrist or short-sleeved shirts shall be worn.
b. Material being drilled should be clamped or held down to prevent spinning with drill.
c. Provide against damage and injury if the bit is long enough to pass through the material.
d. Mag drills are to be chained down or otherwise secured to prevent injury should the magnetic seal break loose.

13. Sanders
   a. Sanders should be moved away from the body when used.
   b. Dust may create an explosion hazards and open flames and sparks shall be guarded against.
   c. Respirators and safety goggles should be provided and used whenever needed.

14. Portable drills and saws shall be operated with the switch or trigger locked in an “ON” position.

15. The power control for woodworking equipment should be located to prevent accidental starting and to enable the operator to cut off the power without leaving his operating position.

16. Operators exposed to harmful dust, as when cutting concrete, tile or stone, shall wear an approved type respirator.

17. Saws should not be jammed or crowded into the work. Green or wet material should be cut slowly with caution.

18. All material being cut should be checked for nails, hard knots, etc.

19. Safety goggles and kickback aprons should be provided for and worn by operators.

20. When ripping short stock, the use of pusher stick, block or other safe means shall be used.

20.4 Hydraulic Tools
A. The manufacturer’s safe operating pressures for hoses, valves, pipes, filters, and other fittings shall not be exceeded.
B. The manufacturer’s rated capacity shall be legibly marked on all jacks and shall not be exceeded.
C. Do not break fittings or connections until hydraulic pressure has been released.
D. Employees are not to work under raised loads until proper cribbing or blocking has been installed.
E. Do not try to cover a pinhole leak with your hand; the pressure of the hydraulic fluid can inject the oil into your hand.
F. The fluid used in hydraulic tools and jacks must be manufacturer recommended, fire resistant fluid, approved under NFPA 30 Flammable and Combustible Liquid Code and shall retain its operating characteristics at the most extreme temperatures to which it will be exposed.
21.0 - Signs, Signals, and Barricades

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21.0 SIGNS, SIGNALS AND BARRICADES

21.1 Signs and Signals

A. All signs and symbols shall be visible at all times when work is being performed and shall be removed or covered promptly when the hazard no longer exists.

B. Danger signs shall be used only where an immediate hazard exists.

C. Caution signs shall be used only to warn against potential or to caution against unsafe practices.

D. Safety instructions signs shall be used for general safety information, safety instructions and slogans.

E. Traffic signs shall be posted in construction areas at points of hazard and shall conform to “AMERICAN NATIONAL STANDARDS INSTITUTE” (D6.1) Manual on Uniform Traffic Control Devices for Streets and Highways.

F. Accident prevention tags shall be used as a temporary means of warning employees of an existing hazard, such as defective tools, equipment, which is out of order, etc. They shall not be used in place of, or as a substitute for, accident prevention signs.

G. “Homemade” or job made signs not conforming to OSHA 1926.200 shall be considered temporary signs and should be replaced as soon as possible.

21.2 Barricades

A. Barricades are required around excavations, holes, or openings in floor or roof
areas, at edges of roofs, and elevated work platforms and around every surface that is six feet or move above an adjacent floor or the ground. Barricades must be erected whenever necessary to warn people against falling in, through, or off surfaces or overhead hazards. Barricades are for warning purposes only and shall not be used in lieu of standard handrails.

NOTE: Anyone who makes a hole or opening is responsible for barricading it.

B. Barricades must be 42 inches high, square and level.
C. Keep barricades 5 feet from the edge of the hazard.
D. Barricades are to be constantly maintained.
E. Barricades must be placed around rotating equipment such as crawler cranes, and track hoses to prevent workers from being caught in pinch points or being struck by rotating equipment.

21.3 Wood Guardrails
A. The top rail must be made from a 2- by 4-inch (5 by 10 cm) board arranged such that the top of the board is 42 inches (106.7 cm) from the floor or platform level.
B. A mid-rail made from a 2- by 4-inch board (5 by 10 cm) must be located at the midpoint between top rail and floor or platform level.
C. A toe plate must be used on all guardrails for floor holes, floor openings, or wall openings. It will be made from a 1- by 4-inch or equivalent, and will be installed to prevent material from falling.
D. The vertical support posts for guardrails must be made from 2- by 4-inch boards (5 by 10 cm) with spacing not to exceed 8 feet (3.4 m).

21.4 Metal Guardrails
A. Metal handrail material for a guardrail must be 1½ inches (3.8 cm) nominal size or larger.
B. The top rail must be located 42 inches (106.7 cm) from the top of the rail to the floor or platform level.
C. The mid-rail must be 1½ inches (3.8 cm) nominal size or larger and located midway between the top rail and floor or platform level.
D. A toe board made from ¼ by 4-inch (.64 by 10 cm) flat metal plate must be installed at the floor or platform level.
E. Vertical support posts must be 1½ inches (3.8 cm) nominal size or larger and located at distances not to exceed 8 feet (3.4 m).
# COMPETENT PERSON

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22.0 COMPETENT PERSON

22.1 Purpose

A. The purpose of this procedure is to define and list the areas with 29 CFR – OSHA 1926 Construction Standards, where a Competent Person is required to be part of a particular project activity. Each section deals with a particular part of the 1926 Standards for Construction.

1. OSHA Construction Standards which require competent persons include:
   a. Accident Prevention Responsibility.
   b. Ionizing Radiation.
   c. Asbestos.
   d. Lead.
   e. Hearing Protection.
   f. Welding and Cutting.
   g. Respiratory Protection.
   h. Scaffolding.
   i. Slings
   j. Cranes (Hoisting Equipment).
   k. Electrical.
   l. Material/Personnel Hoists and Elevators.
   m. Fall Protection.
   n. Excavations and Trenching.
   o. Concrete, Concrete Forms and Shoring.
   p. Requirements for Lift Slab Operations.
   q. Tunnels and Shafts, Caissons and Cofferdams.
   r. Bolting, Riveting, and Fitting Up.
   s. Underground Construction.
   t. Compressed Air.
   u. Mechanical Demolition.
   v. Ladders.

B. Qualifications

1. The designated Competent Person must have an immediate knowledge of the subject, either by years of experience in the designated field, formal education or specialized training in the following:
   a. Job or activity being performed.
   b. Potential hazards.
   c. Safety and health standards as applicable.
   d. Current operations.
   e. Technology and controls
C. The **Competent Person** must be identified on the Job Hazard Analysis (JSA) Form and supporting documentation as to qualification of the individual must be kept in the project safety files. If a competent person is not required on a particular task enter N/A on the JSA.

### 22.2 Definition

**A. Competent Person**

1. as defined by OSHA 1926.3(f) AA Competent Person means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

### 22.3 Asbestos (Subpart Z 1926.1101)

**A.** The Project Superintendent, per 126.1101(f)(2), shall designate a Competent person to perform and supervise the following:

1. Conduct an exposure assessment.
2. Set up the enclosure.
3. Ensure the integrity of the enclosure.
4. Control entry to and exit from the enclosure.
5. Supervise all employee exposure monitoring as required by the standard.
6. Ensure that employees working within the enclosure wear protective clothing and respirators are required by the standard.
7. Ensure that employees are trained in the use of engineering control, work practices and personal protective equipment.
8. Ensure that employees use the hygiene facilities and observe the decontamination procedures required by the standards.
9. Ensure that engineering controls are functioning properly.

**B.** In addition to the definition of a Competent Person in 1926.32(f), one who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure per 1926.1101(a).

**C.** The Competent Person, per 1926.1101(o)(2), shall provide for frequent and regular inspection of the project, materials and equipment.

**D.** The Competent Person shall ensure that no unauthorized personnel enter the enclosure and that all employees and other personnel who enter the enclosure have the proper training, protective clothing and equipment. He/ she will also ensure that all employees and other personnel who enter the enclosure use the hygiene facilities and observe the proper decontamination procedures per 1926.1101(o)(3)(G).
22.4 **Lead (Subpart: D 1926.62)**

A. The Competent Person means one who is capable of identifying existing and predictable lead hazards in the surroundings or working conditions and who has authorization to take prompt corrective measures to eliminate them per 1926.62(b).

B. The Competent Person, Per 1926.62I(2)(iii), shall perform frequent and regular inspections on the project, on materials and on equipment.

22.5 **Material Handling – Rigging Equipment for Material Handling (Subpart: D 1926.251 (A)(6))**

A. Each day before being used, the sling and all fastenings and attachments shall be inspected for damage or defects by a Competent Person designated by the Project Superintendent.

22.6 **Welding, Cutting and Heating In Way of Preservative Coatings (Subpart: D 1926.354(A))**

A. Before welding, cutting or heating is commenced on any surface covered by a preservative coating whose flammability is not known, a test shall be made by a Competent Person to determine its flammability and if the coating is toxic.

22.7 **Scaffolding (Subpart: L 1926.451)**

A. Scaffolding shall be erected, moved, dismantled or altered only under the supervision and direction of a Competent Person qualified erection, moving, dismantling or alteration per 1926.451(f)(7).

22.8 **Safety Monitoring System (Subpart: M 1926.502(H)(1))**

A. Safety Monitoring System is a safety system in which a Competent Person monitors the safety of all employees and warns them when it appears to the monitor that they are unaware of a fall hazard or are acting in an unsafe manner. The Competent Person must be on the same level as the workers and within visual sighting distance of the employees and must be close enough to verbally communicate with the employees.

*NOTE: The use of a monitoring system for fall protection must be approved by the Corporate Safety Department.

22.9 **Cranes (Subpart: N 1926.550)**

A. The Project Superintendent shall designate a Competent Person who shall inspect all machinery and equipment prior to each use and during use to ensure it is in safe operating order. Any deficiencies shall be repaired or defective parts replaced before continued use per 1926.550(a)(5).

B. A thorough annual inspection of the hoisting machinery shall be made by a Competent Person or by a government or private agency recognized by the U.S. Department of Labor. The Project Superintendent shall maintain a record of the dates and results of inspections for each hoisting machine and piece of equipment per 1926.550(a)(6).
C. A qualified engineer or a qualified person competent in structural design per 1926.550(g)(4)(I)(A) shall design a personnel platform and suspension system.

D. A visual inspection of the crane, rigging personnel platform and the crane base support or ground shall be conducted by a Competent Person immediately after the trial lift to determine whether the testing has exposed any defect or produced any adverse effect upon any component or structure per 1926.550(g)(5)(iv).

E. On each project, prior to hoisting employees on a personnel platform, and after any repair or modification, the platform and rigging shall be proof tested to 125 percent of the platform’s rated capacity by holding it in a suspended position for five minutes with the test load evenly distributed on the platform (this may be done concurrently with the trial lift). After proof testing, a Competent Person shall inspect the platform rigging. Any deficiencies found shall be corrected and another proof test shall be conducted. Personnel hoisting shall not be conducted until the proof testing requirements are satisfied per 1926.550(g)(5)(vi).

22.10 Material Hoists, Personnel Hoists and Elevators (Subpart: N 1926.552)

A. Following assembly and erection of hoists, and before being put into service, an inspection and test of all functions and safety devices shall be made under the supervision of a Competent Person. A similar inspection and test is required following major alteration of an existing installation. All hoists shall be inspected and tested on three-month intervals. The Project Superintendent shall prepare a certification record, which includes the date the inspection and test of all functions and safety devices were performed; the signature of the person who performed the inspection and test; and a serial number or other identifier, for the hoist that was inspected and test. The most recent certification record shall be maintained on file per 1926.552I(15).

22.11 Excavations

A. Structural ramps that are used solely by employees, as a means of access / egress from excavations shall be designed by a Competent Person. Structural ramps used for access/egress of equipment shall be designed by a Competent Person qualified in structural design and shall be constructed in accordance with the design per 1926.651I(1)(i).

B. If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a Competent Person to ensure proper operation per 1926.651(h)(2).

C. If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require an inspection by a Competent Person and be in compliance per 1926.651(h)(1)(2)(3).
D. Daily inspections of excavations, adjacent areas and protective systems shall be made by a Competent Person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres or other hazardous conditions. An inspection shall be conducted by the Competent Person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazards. These inspections are only required when employee exposure can be reasonably anticipated per 1926.651(k)(1).

E. Where the Competent Person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety per 1926.651(k)(2).

F. Excavations, which are less than 5 feet in depth and the examination of the ground by a Competent Person, provide no indication of a potential cave-in, protective systems will not be required per 1926.652(a)(1)(ii).

G. When material or equipment is used for protective systems is damaged, a Competent Person shall examine the material or equipment and evaluate its suitability for continued use. If the Competent Person cannot assure the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then such material or equipment shall be removed from service and shall be evaluated and approved by a registered professional engineer before being returned to service per 1926.652(d)(3).

H. Classification of soil and rock deposits shall be classified by a Competent Person as Stable Rock, Type A, Type B or Type C in accordance with 1926 App A I(1).

I. The classification of the deposits shall be made based on the result of at least one visual and at least one manual analysis. A Competent Person using recognized methods of soil classification and testing such as those adopted by the American Society for Testing Materials of the U.S. shall conduct such analysis. Department of Agriculture textual classification system per 1926 App A I (2).

J. If after a deposit, the properties, factors or conditions affecting its classification change in any way a Competent Person shall evaluate the changes. The deposit shall be reclassified as necessary to reflect the changed circumstances per 1926 App A I (5).

K. When surcharge loads from stored material or equipment, operation equipment or traffic are present, a Competent Person shall determine the degree to which the actual slope must be reduced below the maximum allowable slope, and shall assure that such reduction is achieved. Surcharge loads from adjacent structures shall be evaluated in accordance with 1926 App B I (3)(iii) and 1926.651 (i).
22.12 Lift Slab Operations

A. If leveling is maintained by manual controls, such controls shall be located in a central location and attended by a Competent Person while lifting is in progress. In addition to meeting the definition in 1926.32(f), the Competent Person must be experience in the lifting operation and with the lifting equipment being used per Subpart: Q 1926.705(i).

22.13 Steel Erection – Bolting, Riveting, Fitting-Up and Plumbing-UP

A. Plumbing-up guys shall be removed only under the supervision of a Competent Person per Subpart: R 1926.752(d)(4).

22.14 Demolition – Preparatory Operations

A. Prior to permitting employees to start demolition operations, an engineering survey shall be made, by a Competent Person, of the structure to determine the condition of the framing, floors, walls and the possibility of unplanned collapse of any portion of the structure. Any adjacent structure where employees may be exposed shall also be similarly checked. The Project Superintendent shall have in writing evidence that such a survey has been performed per Subpart: T 1926.850(a).

22.15 Mechanical Demolition

A. During demolition, continuing inspections by a Competent Person shall be made as the work progresses to detect hazards resulting from weakened or deteriorated floors, walls or loosened material. No employee shall be permitted to work where such hazards exist until they are corrected by shoring, bracing or other effective means per Subpart T 1926.859(g).

22.16 Ladders

A. Ladders shall be inspected by a Competent Person for visible defects on a periodic basis and after any occurrence that could affect their safe use per Subpart: x 1926.1053(b)(15).

**NOTE:** The above are examples and responsibilities of a Competent Person. Any questions about this section must be directed to the Corporate SH&E Department.
## 23.0 EXCAVATION AND TRENCHING

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23.0 EXCAVATION AND TRENCHING

23.1 General

Excavation and trench cave-ins are one of the leading causes of death in the construction industry. Job planning must be done prior to the excavator bucket cutting the ground. Job planning shall include the following:

23.2 Safety

A. The Project Superintendent is responsible for ensuring that all safety procedures are followed and that a competent person is assigned to all excavation and trenching operations.
B. Determine the location of any underground utilities by using the one call system or other appropriate means in your area.
C. Ensure compliance with all OSHA standards and other safe work practices.
D. Investigate the possibility of confined space hazards.
E. Erect signs and barricades to ensure a safe workplace for the employees as well as any vehicular or pedestrian traffic.
F. Evaluate the use of appropriate personal protective equipment.

23.3 Mobilization

A. Give consideration to:
   1. Type and amount of equipment needed.
   2. Where to excavate.
   3. Placement of spoil and backfill material.
   4. Method used to secure excavation.

23.4 Public Relations

A. Evaluate the need for:
   1. Notifications prior to job start up.
   2. Notification of water and utility cut off.
   3. Minimum disturbance to property and maximum restoration efforts.
   4. Excavation and trenching operations shall be in compliance with the OSHA regulations listed in 29 CFR Subpart P-Excavations 1926.650 through 1926.651.

23.5 General Requirements:

A. The estimated location of utility installations, such as sewer, such as sewer, telephone, gas, electric, water lines, or any other underground installations that could reasonably be expected to be encountered during excavation work must be
located prior to starting any excavation.
1. Contact utility companies or owners using a one call system or other appropriate means within established or customary local response times prior to the start of actual excavation so that underground installations may be identified.

2. When excavation operations approach the estimated location of underground installations, the exact location of the installations must be determined by safe and acceptable means, such as hand excavations.

3. During the time the excavation remains open, the underground installations must be protected, supported, such as by hand excavations.

B. Excavations 4 feet or more in depth must have an adequate means of exit such as a stairway, ladder or ramp located so that employee’s lateral travel does not exceed 25 feet.

1. Structural ramps that are used solely by employees to enter or exit an excavation are to be designed by a competent person to prevent slips, trips or displacement. A “competent person” is defined by one who is capable of identifying existing or predictable hazards and has the authority to take prompt corrective action.

2. A competent person qualified in structural design must design structural ramps used by equipment or enter or exit. Ramps are to be built in accordance with the design.

3. Ladders must extend at least 3 feet above grade level.

C. Employees exposed to public vehicular traffic are to be provided with and required to wear warning vests or other suitable reflective clothing.

D. Employees are not allowed underneath loads handled by lifting or digging equipment.

1. Employees are required to stand away from any vehicle being loaded or unloaded to avoid being struck by falling material or spillage.

2. Operators may remain in the cabs of the haulage vehicle being loaded or unloaded if the vehicle equipped with a shield/canopy, which will protect the operator from shifting or falling material.

E. Warning systems such as barricades, hand or mechanical signals or stop logs are to be used when mobile equipment is operated next to an excavation or when the equipment is required to approach the edge of an excavation and the operator does not have a clear or direct view of the excavation. If possible the grade should be sloped away from the excavation.

F. In locations where oxygen deficiencies or concentrations of hazardous or flammable gases or dusts are possible, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmosphere in the excavation must be tested before employees enter the excavation. (Confined Space Entry, Section 27.0.)
1. Precautions must be taken to prevent employee exposure to atmospheres containing less than 19.5% oxygen and other hazardous atmospheres. The precautions include providing proper respiratory protection or ventilation as required.

2. Precautions are to be taken, such as ventilation, to prevent employee exposure to atmospheres containing a concentration of flammable gas in excess of 20% of the lower explosive limit (LEL) of the gas.

3. When controls are used to reduce the level of atmospheric contaminants to acceptable levels, testing must be conducted as required to ensure that the atmosphere remains safe.

G. Emergency rescue equipment such as breathing apparatus, safety harness and lifeline, or a basket and stretcher must be readily available where hazardous atmospheric conditions may exist or develop during work in an excavation. This equipment must be attended when in use.

H. Employees entering bell-bottom pile holes or similar type excavations shall wear a harness with a lifeline attached. The lifeline is to be attached at all times when the employee is in the excavation.

I. Special precautions must be taken when employees are required to work in excavations where there is an accumulation of water or water is freely seeping into the excavation. The precautions may include special support or shield systems, water removal systems or the use of safety harness and lifeline.

1. A competent person must monitor water removal equipment and operations in order to ensure proper operation.

2. Excavations subject to runoff from heavy rains require an inspection by a competent person, following each rainfall event, prior to allowing employees to enter the excavation.

J. Where excavations adjacent to structures could affect the stability of the structures, support systems such as shoring, bracing or underpinning shall be used.

K. Sidewalks, pavements and auxiliary structures are not to be undermined unless a support system or other method of protection is provided to protect employees from a collapse.

L. Any excavation below the level of the base or footing of any foundation or retaining wall which could pose a hazard to employees shall not be permitted except when:

1. A support system is used such as underpinning to ensure the safety of employees and the stability of the structure.

2. The excavation is in stable rock (extremely rare).

3. A registered professional engineer has determined that the structure is of a sufficient distance from the excavation to be unaffected or that the excavation activity will not pose a hazard to employees or undermine the integrity of the building.
M. Adequate protection must be provided from loose rock or soil that could fall or roll from the excavation face. Spoil or other material and equipment which could fall or roll into the excavation must be kept at least 2 feet from the edge of the excavation. Retaining walls or devices, which are sufficient to prevent materials or equipment from falling or rolling into excavations, may be used.

N. Employees shall not be permitted to work on the faces of sloped or benched excavations at levels above other employees without providing adequate protection from the hazards of falling, rolling or sliding material or equipment.

O. A competent person must make daily inspections of the excavation, the adjacent areas and the protective systems for any evidence of possible hazard. A “competent person” is defined as one who is capable of identifying existing and predictable hazards and has the authority to take prompt corrective action. The inspection shall be done prior to the start of work and as needed throughout the shift. Inspections are to be made after every rainstorm or other event, which could reasonably be expected to change the condition of the excavation.

P. If there is any evidence of a situation that could result in a possible cave in, indications of failure of the protective systems, hazardous atmospheres or any other hazardous condition, exposed employees are to be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

Q. Walkways or bridges with standard guardrails are to be provided when employees or equipment are required to permitted to cross over excavations.

R. Adequate barriers must be erected around all open excavations.

S. A competent person must understand and be able to apply the excavation requirements contained in the OSHA regulations of this manual. They must also have the authority to take corrective action for any hazards they may encounter.

T. Field personnel must consult with the Company Safety Department prior to initiating any underground construction (Tunnels, shafts, etc.).

U. Soils are classified using the simplified soil classification system. This consists of four categories: Stable Rock, Type A, Type B and Type C. Stability is greatest in Stable Rock and decreases through Type A & B to Type C, which is the least stable.

1. **Stable Rock** – Defined as: A natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed. Not all rock is stable, and most is not because it is fractured, fissured, faulted or bedded.

2. **Type A** – Defined as: Cohesive soils with an unconfined compressive strength of 1.5 Tons/Sq. Ft. or greater. Examples of cohesive soils are: Clay, Clay Loam and in some cases, Silty Sandy Clay Loam. Cemented soils are also considered Type A. No soil is Type A if:
   a. If it is fissured.
   b. The soil is subject to vibration from heavy traffic, pile driving, etc.
3. **Type B** – Defined as:

a. Cohesive soil with an unconfined compressive strength greater than .5 TSF but less than 1.5 TSF.
b. Granular cohesion less soils which include; Angular gravel, Silt, Silty Loam, Sandy Loam, and in some cases Silty and Sandy Clay Loam.
c. Any previously disturbed soils except those classified as Type C soil.
d. A soil that meets the unconfined compressive strength or cementation requirements of Type A but is fractured or subject to vibration.
e. Any dry rock that is unstable.
f. Material that is part of a sloped, layered system in which the layers dip into the excavation on a slope less than four horizontal to one vertical (4H: 1V), but only if the material would otherwise be classified as Type B.

(Most soils fall into the category of Type B until they become predominantly granular or saturated, at which time the soil should be classified as Type C).

4. **Type C** – Defined as:

a. Cohesive soils with an unconfined compressive strength of .5 TSF or less.
b. Granular soils including gravel, sand, and loamy sand.
c. Submerged soil or soil from which water is freely seeping.
d. Submerged rock that is unstable.
e. Material in a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H: 1V) or steeper.
The classification of soil type must be made based on the results of at least one visual and one manual test. These tests are to be conducted by a competent person. A competent person must know and be able to apply the excavation requirements contained in this manual and the OSHA regulations and have the authority to take corrective action to eliminate hazards.

23.6 Visual Tests

Visual analysis is to be conducted to determine information regarding the excavation site in general, the soil adjacent to excavation, the soil exposed on the sides of the excavation and the spoil material taken from the excavation.

A. Observe samples of the spoil material and the open sides of the excavation; estimate the grain sizes and the relative amounts. Soil that is primarily fine grained (e.g. clay or silt) is cohesive. Soil that is primarily coarse grained sand or gravel is granular material.

B. Observe soil samples as they are excavated. Soil that remains in clumps when it is excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.

C. Observe the side of the open excavation and the surface area adjacent to the excavation for cracks or openings, which could indicate that the soil is fissured. If chunks of material break off of the sides the soil could be fissured. Soil spills are evidence of moving material and are potentially hazardous.

D. Observe the area adjacent to the excavation and the excavation itself for existing utilities or other underground structures, and any previously disturbed soil.

E. Identify any layered system and estimate the amount of dip into the excavation.

F. Observe the area adjacent to the excavation for any evidence of surface water. Visually inspect the excavation for any signs of water seepage.

G. Observe the area adjacent and within the excavation for any sources of vibration which could affect the stability of the excavation face. Adjacent buildings or other structures could cause excessive loading, which leads to failure of the sides of an excavation.

23.7 Manual Tests

Manual tests of the soil samples must be done to determine the qualitative properties of the soil and to provide additional information in order to classify the soil properly.

A. PLASTICITY: Mold a moist or wet sample of soil into a ball and attempt to roll it into thin threads 1/8” in diameter. Cohesive soil can be rolled into threads without crumbling. Take a 2” length of 1/8” thread and hold one end. If it can be held without tearing, the soil is cohesive.

B. DRY STRENGTH If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder then it is granular. If the soil is dry
and breaks into small clumps, which can only be broken up with difficulty, the soil may contain clay in combination with gravel, sand or silt. If the soil stays in large clumps, which can only be broken with difficulty, and there is no indication of fissures, the soil may be considered as unfissured.

C. THUMB PENETRATION: The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. Type A soils with an unconfined compressive strength of 1.5 TSF can be indented by the thumb; however it takes great pressure to penetrate Type A soils. Type C soils with an unconfined compressive strength of 0.5 TSF can easily be penetrated several inches by the thumb with little effort. Type C soil can also be molded by light finger pressure. Type B soil can be penetrated with effort and molded. The thumb penetration test should be conducted on an undisturbed soil sample such as a large clump of spoil material as soon as possible after excavation to minimize the effects of drying. If the excavation is later exposed to rain or flooding, the classification of the soil must be changed accordingly.

D. PENETROMETER: Estimates of the unconfined compressive strength of soils can be measured using a pocket penetrometer.

E. DRYING TEST: Dry a fresh undisturbed spoil sample approximately one inch thick and six inches in diameter until it is thoroughly dry:

1. If the sample cracks as it dries, then the fissures are readily evident.

2. Samples that do not crack while drying are to be broken by hand. If considerable force is needed to break the sample, then the soil has considerable cohesive material content. The soil can be classified as unfissured and the unconfined compressive strength of the soil should be determined.

3. Samples that break easily by hand are either fissured cohesive material or granular. Pulverize the sample to distinguish the difference. If the material does not pulverize the sample to distinguish the difference. If the material does not pulverize easily and stays in small clumps it is cohesive with fissures. If the material will pulverize easily into very small fragments, it is granular.

F. DISPERSION: Disperse a soil sample in water in a clear glass jar. The coarse grained material will settle to the bottom, the finer grains will layer on top. Relative percentages can be determined with a ruler.

Adequate protective systems designed in accordance with OSHA requirements (Section 23.5 – 23.7) must be provided for the protection of employees working in an excavation. Excavations made entirely in stable rock, which is extremely rare, do
not require a protective system. Excavations that are less than 5 feet deep, which have been examined by a competent person and show no indication of potential cave in or other hazard do not require a protective system.

Protective systems shall have the capacity to withstand without failure all loads intended or could reasonably be expected to be applied or transmitted to the system.

23.8 Sloping and Benching Systems

A. The design of sloping and benching configurations must be constructed using one of the following options:

OPTION 1: Excavation to be sloped at an angle not steeper than 1 ½” H: 1V or 34 degrees from horizontal. This conforms to the configuration for Type C soil.

OPTION 2: Maximum allowable slopes and the configurations for sloping and benching are to be determined using the OSHA configuration for the type soil being excavated.

OPTION 3: Designs of sloping or benching systems shall be selected from and be constructed in accordance with tabulated data such as tables and charts. The tabulated data is to be in written form and must include the following:

1) Identification of all parameters, which affect the selection of a sloping or benching system.
2) Identification of the limitations of the data including the magnitude and configuration of slopes determined to be safe.
3) Any explanatory information, which may be necessary to help the user make a correct selection of the sloping or benching system from the data.

At least one copy of the tabulated data in use must be maintained at the jobsite during the construction of the excavation. The data must identify the registered professional engineer who approved the data.

OPTION 4: A registered professional engineer may design sloping and benching systems. The design is to be in written form and must include the following:

1) The magnitude of the slopes and the configurations that were determined to be safe for the particular project.
2) The identity of the registered professional engineer approving the design.
3) At least one copy of the design must be maintained at the jobsite during the construction of the excavation.

*NOTE:* A registered professional engineer must design any excavation greater than 20 feet deep.

23.9 Shoring and Shielding Systems

A. The design of shoring, shielding and other protective systems must be constructed using one of the following options:

OPTION 1: Designs for timber shoring and aluminum hydraulic shoring are to be in accordance with the OSHA tables for the soil type being excavated.

OPTION 2: Designs of shoring, shielding or other protective systems using manufacturer’s tabulated data must be in accordance with all specifications, recommendations, and limitations made by the manufacturer. Any deviations from the manufacturer’s specifications, recommendations and limitations must be approved by the manufacturer in writing. This written approval must be maintained at the jobsite during construction.

OPTION 3: Designs of shoring, shielding or other protective systems shall be selected from and constructed in accordance with tabulated data such as tables and charts. The tabulated data is to be written form and must include the following:

1) Identification of all parameters, which affect the section of a shoring, shielding, or other protective system.
2) Identification of the limitations of the data.
3) Any explanatory information, which may be necessary to help the user make a correct selection of protection system from the data.

At least one copy of the tabulated data in use must be maintained at the jobsite during construction of the excavation. The data must identify the registered professional engineer who approved the data.

OPTION 4: A registered professional engineer may design shoring, shielding, or other protective systems. The design is to be in written form and must include the following:

1) A plan indicating the size, types and configuration of the materials to be used in the protective system.
2) The identity of the registered professional engineer approving the design.
3) At least one copy of the design must be maintained at the jobsite during the construction of the excavation.

**NOTE:** A registered professional engineer must design any excavation greater than 20 feet deep.

B. Materials and equipment used for protective systems shall be free from damage or defects, which might impair their proper function.
   1) Manufactured materials and equipment must be used and maintained as per manufacturer’s recommendations.
   2) A competent person is to examine and evaluate for continued use any damage material or equipment.
   3) If the competent person cannot assure that the material or equipment is able to support the intended loads or is safe for continued use, then the material or equipment is to be taken out of service and evaluated by a registered professional engineer prior to being returned to service.

C. Support systems shall be installed and removed in a manner that protects employees from cave-ins, structural collapses, or from being struck by members of the support system.
   1) Members of the support systems shall be securely connected together to prevent sliding, falling, kick-outs or other predictable failure.
   2) Individual members of support systems shall not be subjected to loads in excess of their designed load capacity.
   3) Backfilling should be immediately after the removal of support systems.
   4) Support systems shall be installed from the top down and removed from the bottom up.

D. Shield systems shall not be subjected to loads in excess of their design.
   1) Shields are to be installed so that lateral or other hazardous movement of the shield does not occur in the event of a cave in.
   2) Employees are to be protected from the hazard of cave-ins when entering or exiting the areas protected by shields.
   3) Employees are not allowed inside the shields during installation, removal or any vertical movement.
SLOPING PRELIMINARY DECISIONS

IS THE EXCAVATION MORE THAN 5 FEET IN DEPTH?

NO

IS THERE POTENTIAL FOR CAVE IN?

NO

THE EXCAVATION MADE WITH VERTICAL SIDES?

YES

THE EXCAVATION MUST BE SLOPED, SHORED, OR SHIELDED?

YES

IF SLOPING IS SELECTED, GO TO FIGURE 2.

NO

IF SHORING/SHIELDING IS SELECTED, GO TO FIGURE 3.

FIGURE 1
FIGURE 2
SHORING / SHIELDING OPTIONS

SHORING OR SHIELDING SELECTED AS THE METHOD OF PROTECTION

SOIL CLASSIFICATION IS REQUIRED WHEN SHORING OR SHIELDING. THE EXCAVATION MUST COMPLY WITH ONE OF THE FOUR FOLLOWING OPTIONS.

OPTION 1:
USE THE OSHA PROVIDED CHARTS FOR TIMBER SHORING FOR DEPTHS UP TO 20 FEET.

OPTION 2:
USE MANUFACTURER'S TABULATED DATA FOR HYDRAULIC SHORES, AIR SHORES, TRENCH JACKS, OR SHIELDS.

OPTION 3:
USE TABULATED DATA PREPARED BY A REGISTERED, PROFESSIONAL ENGINEER.

OPTION 4:
The excavation is to be designed by a registered, professional engineer.

FIGURE 3
23.10 Sloping

Sloping is the oldest method to prevent an excavation from caving in. In sloping an excavation the sides are laid back to a “maximum allowable slope” from which they will not collapse. When deciding which slop to use, there are four options:

A. Slope using the angle required for Type C soil, which is the most unstable soil types.
B. Determine the soil type and use the correct angle for the type soil being excavated.
C. Use tabulated data prepared by a registered professional engineer.
D. Have a registered professional engineer design a slope plan for the specific job.

*NOTE* A registered professional engineer must design any excavation over 20 feet deep.

Using the above chart, a 10-foot deep trench in Type B soil would have to be sloped back to a 45-degree angle (1H:1V) or 10 feet on both sides. In Type C soil the sides would have to be sloped back to an angle or 34 degrees (1½ H:1V) or 15 feet on both sides.

Additional sloping and benching is referenced in the following diagrams or as directed by a registered professional engineer.
SLOPE CONFIGURATIONS
(All slopes stated below are in the horizontal to vertical ratio.)

EXCAVATIONS MADE IN TYPE A SOIL

1. All simple slow excavation 20 feet or less in depth shall have a maximum allowable slope of 3/4:1.

![Simple Slope - General](image)

2. Exception: Simple slope excavations which are open 24 hours or less (short term), and which are 12 feet or less in depth, shall have a maximum allowable slope of 1/2:1.

![Simple Slope - General](image)
3. All excavations, 8 feet or less in depth, which have unsupported vertically sided lower portions, shall have a maximum-vertical side of $3 \frac{1}{2}$ feet.

4. All excavations, more than 8 feet but not more than 12 feet, which have unsupported vertically sided lower portions, shall have a maximum-allowable slope of 1:1 and a maximum-vertical side of 3 feet.
5. All excavations, 20 feet or less in depth, which have vertically-sided lower portions that are supported or shielded, shall have a maximum-allowable slope of $3/4:1$. The support or shield system must extend at least 18 inches above the top of the vertical side.

6. All other simple slope, compound slope, and vertically sided lower-portion excavations shall be in accordance with the other options permitted under 1926.652(b).

**BENCHING TYPE 'A' SOIL**

All benched excavations 20 feet or less in depth shall have a maximum allowable slope of $3/4$ to $1$ and maximum bench dimensions as follows:
EXCAVATING IN TYPE 'B' SOIL

1. All simple slope excavations, 20 feet or less in depth, shall have a maximum-allowable slope of 1:1.
2. All excavations, 20 feet or less in depth, which have vertically-sided lower portions, shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1:1.

3. All other sloped excavations shall be in accordance with the other options permitted in 1926.652(b).

1. All benched excavations, 20 feet or less in depth, shall have a maximum-allowable slope of 1:1 and maximum-bench dimensions as follows:
EXCAVATING "C" SOIL

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 11:12:1.
2. All excavations 20 feet or less in depth which vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1 1/2:1.

3. All other sloped excavations shall be in accordance with the other options permitted in 1926.652(b).

23.11 Shoring And Benching

A. Shoring

Shoring is the second method of providing against cave in. When shoring an excavation, the sides are structurally supported to prevent a cave in. There are numerous methods of shoring. OSHA lists the following: Timber, Screw Jacks, Aluminum Pneumatic, Aluminum Hydraulic and Sheet Pile; After determining the soil type, use one of the options, listed below, when choosing a shoring system:

1. Use the OSHA provided charts for Timber or Aluminum Hydraulic shoring for depths up to 20 feet.

2. Use manufacturers tabulated data (Provided by registered professional engineer).

3. Use tabulated data prepared by a registered professional engineer.
4. Have a plan designed by a registered professional engineer for the specific job.

B. Timber Shoring

Because of the labor-intensive nature of timber shoring and the size and type of timber, which must be used, timber shoring is not cost effective when compared with other approved shoring systems. OSHA does, however, list guidelines for the use of Timber Shoring.

1. The competent person shall inspect all timber prior to its use as well as daily, as required in the standard.
2. The timber used must be full dimension mixed oak (850 PSI Bending strength) or equivalent or nominal dimension Douglas Fir (1500 PSI Bending strength) or equivalent. When conditions are submerged or saturated, tongue and groove boards three inches thick must be used as uprights.
3. Wales are to be installed with the greater dimension horizontal.
4. Plywood is not to be considered as part of the structural component of a shoring system. When used in conjunction with other shoring methods, it serves only to protect the workers against loose material unraveling from the walls. Plywood must be 1 \( \frac{1}{8} \)" CDX or \( \frac{3}{4} \)" 14 ply white Arctic Birch (Finland Form), when used with hydraulic shoring.
5. Timber shoring is built from the top down and pulled from the bottom up to ensure worker safety.
6. Surcharge loads imposed by structures, equipment or spill materials adjacent to the trench are limited to two feet of soil or 20,000 lbs. vertical loads imposed on cross braces are limited to a 240 lbs. gravity load distributed on a one foot span directly into the banks of the excavation with no space between them in order to create a preload on the shoring system so that neither the shoring nor the soil can move. Tightening of the braces is generally done with wedges driven between the cross braces and the walls as part of the daily inspection procedures.
7. Timber shoring is a bracing procedure; the uprights must be pushed directly into the banks of the excavation with no space between them in order to create a preload on the shoring system so that neither the shoring nor the soil can move. Tightening of the braces is generally done with wedges driven between the cross braces and the walls as part of the daily inspection procedures.
8. Several options are provided for the spacing of cross members, walls and uprights. Listed in this section are the OSHA tables for timber shores. A careful determination for the spacing requirements should be made prior to timber selection.
C. Screw Jacks

Screw jacks consist of a static foot, a length of pipe (typically two inch standard or heavy duty pipe not to exceed six feet), and a threaded foot with an adjuster lever nut to vary the length of the jack to create a preload on the shoring system. Manufacturer’s tabulated data, as prescribed by OSHA, can be obtained from the manufacturer to determine the capacity of screw jacks. If the screw jacks meet or exceed the capacity of the timber cross brace for which they are being substituted, then the spacing listed in the timber charts may be used. If not, then manufacturer’s data or the specifications of a registered professional engineer must be used. Some guidelines to remember on screw jacks are:

1. While the feet of screw jacks do provide for some range of motion, 90-degree angles are best to ensure a pure compressional load and to reduce the possibility of kick out.
2. The feet on screw jacks must be nailed to the shoring.
3. Daily inspections of the trench must include an attempt to tighten the screw jacks.
4. Screw jacks may be used instead of cross braces. Wales are still required unless a registered professional engineer dictates otherwise.
5. Screw jacks are to be installed from the top down and pulled from the bottom up. The top jacks should be installed and removed from outside of the excavation. An employee should never install or remove a jack above his waistline.
6. Surcharge loads imposed by structures, equipment, or spoil material adjacent to the trench are limited to two feet of soil, or 20,000 lbs. Vertical loads imposed on cross braces are limited to a 240 lb. gravity load distributed on a one-foot span.

D. Aluminum Pneumatic (Airshores)

Airshores are extendable aluminum cylinders, which are extended by air to create a preload, and then mechanically pinned. The air pressure is then released and the shore becomes a static cross brace. As with the screw jacks, manufacturer’s tabulated data can be used to determine the spacing and use of airshores. The same guidelines applicable to screw jacks also apply to airshores.

E. Aluminum Hydraulic Shores

Aluminum Hydraulic Shores are extendable aluminum cylinders, which are extended by hydraulic fluid pressure to create a preload on the excavation walls. Due to its durability, lightweight, ease of installation, multiple configurations and its ability to better stabilize the excavation than any other shoring method, it is a very cost effective and safe method for use. As with other shoring methods, OSHA tables, manufacturers tabulated data, or the specifications of a registered professional engineer must be used. Some guidelines to remember on Aluminum Hydraulic
Shores are:

1. The fluid used is not a petroleum based hydraulic oil it is a vegetable oil, which is mixed with water.
2. Hydraulic shores should be installed as soon as possible during excavation. This type of shoring can typically be installed and removed from the top of the excavation, eliminating risk to the workers.
3. The OSHA standards provide charts and diagrams for installation.
4. Surcharge and gravity load restrictions apply for the hydraulic systems as well. (100-lb gravity load on a one-foot span, 20,000 lb equipment surcharge.) There is no two-foot of spoil restriction as the hydraulic systems are designed to support the entire spoil pile.
5. Appropriate tools should be used for installation and removal of the systems as per manufacturers specification.
6. Over sleeves are required on two-inch cylinders when used in trenches greater than eight feet wide.

F. Sheet Pile

Sheet pile is used in extremely unstable ground conditions such as saturated soil at considerable depth and in situations with severe vibration or surcharge loading. Sheet pile work is generally engineered after the geotechnical data has identified the soil type and the behavioral characteristics of the soil. For these reasons sheet pile is “off the OSHA charts” and required manufacturers data or the services of a registered professional engineer.
23.12 Shielding

Shielding is the third method of providing for safety when excavating. Shielding does not prevent cave-ins; it protects the workers in the event of a cave-in. A shield is somewhat similar to a bomb shelter in that it has enough structural strength to protect the workers inside should a cave-in occur. Most shields consist of two parallel flat metal walls held apart by metal cross braces placed at the ends of the box to allow for the installation of pipe within the center of the box. The sizes, shapes and applications of shields are endless. If a shield is to be used, the following guidelines must be considered:

A. Shields must be designed by a registered professional engineer, and certified for their application. Do not attempt to fabricate a shield for use without the certification of a registered professional engineer.

B. Any bent or deformed structural member must be repaired or replaced immediately as per manufacturers’ guidelines.

C. Modifications to the shield must be approved by the manufacturer. This includes the addition of tail shields.

D. Shields must be installed in the excavation so that no lateral movement will occur in the event of a cave-in.

E. If the excavation is deeper than the shield, stacker shields of the correct specifications may be used or the excavation may be sloped back to the maximum allowable angle starting at a point 18 inches below the top of the shield.

F. Workers may not remain in the shield during its installation, removal or vertical movement.

G. Workers must enter and exit the shield in a protected manner, such as by use of a ladder within the shield or a properly sloped ramp at the end.

H. At the open ends of the shield, any exposed wall of the excavation must be sloped, shored or shielded off to protect from a cave-in.
### 24.0 SCAFFOLDS AND LADDERS

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24.0 SCAFFOLDING AND LADDERS

24.1 Scaffolds

A. Definition

A scaffold is an elevated, and usually temporary, platform used to support workers, materials and tools during construction work. There are various types of scaffolds and we have described those more commonly used in our type of construction. ANSI Safety Code A 10.8 – 1969 and A92.1 – 1971 and Federal Regulations 1926.451 and 1910.28 describe scaffolds in greater detail.

B. General

1. Scaffolds must be provided for employees engaged in work that cannot be done safely from the ground or from solid construction. Work of a short duration that can be done safely from ladders will be the only exception.

2. The project must have a Scaffold Competent Person who will be available for inspection, medication, etc. (See Exhibit 24-1 for the Scaffold Safety Check List).

3. When space permits, all working levels of scaffolding must be equipped with standard guardrails, midrails and toeboards on all four sides and completely decked with scaffold planks or manufactured scaffold decking.

4. Employees working from any scaffold not equipped with standard guardrails, midrails and complete deck, must wear fall protection.

5. Scaffolding or staging more than ten feet (10’) above the ground or floor, suspended from an overhead support, or erected with stationary supports shall have a safety or guardrail and toeboards properly attached. Scaffolds 4 feet to 10 feet in height having a minimum horizontal dimension in either direction of less than 45 inches shall have standard guardrails and toeboards installed on all open sides.

6. Guardrails shall be two inches by four inches (2” x 4”) wood railing or the equivalent, approximately 42 inches high with a midrail when required. Supports shall be at intervals not to exceed 8 feet. Toeboards shall be a minimum of four inches (4”) in height. The guardrail can be constructed to allow for delivery of material. However, the delivery opening should be temporary and must not weaken the remainder of the safety rail. The removable railing section shall be kept in place when the opening is not in use and should preferably be hinged or otherwise mounted to be conveniently replaceable. A hazardous condition must not exist while material is being delivered.

7. Where persons are required to work or pass under the scaffold, scaffolds shall be provided with a screen between the toeboard and the guardrail extending along the entire opening consisting of No. 18 gauge U.S. Standard wire, one-half inch mesh or the equivalent.
8. All lumber used in the construction of scaffolds must be Spruce, Fir, Longleaf, Yellow Pine, Oregon Pine or wood of equal strength. Hemlock, Shortleaf Yellow Pine or short fiber lumber shall not be used.

9. All scaffolds should be adequately designed to carry, without failure, four (4) times the maximum intended load. At no time shall any scaffold be overloaded.

10. All scaffolds must be maintained in safe condition and scaffolds damaged or weakened from any cause shall be immediately repaired and shall not be used until repairs have been completed.

11. Scaffolds shall not be used for the storage of material except material being currently used.

12. Platform lumber shall be select grade; undressed tested planks sufficient to safely carry the anticipated load over the span being used. These planks should be identified by markings such as painting the ends or a stripe the full length of the plank. The planks should be used for no other purpose.

13. Wood platforms or scaffold boards shall not be covered with opaque finishes. Platform or scaffold board edges may be painted for identification purposes.

<table>
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14. All nails used in the construction of scaffolds, staging and supports must be of ample size and length. Nails must be used in sufficient quantities at each connection to develop the designed strength of the scaffold.

15. No nail shall be subjected to a straight pull in any scaffold. All nails must be driven in full length, except where it will permit the proper use of double-headed nails.

16. When taking down scaffolds, all nails should be immediately withdrawn from the lumber.

17. Barrels, boxes, loose tile blocks, loose piles of bricks or other unstable objects shall not be used for the support of planking intended as scaffolds or working platforms.

18. The poles, or vertical legs, of scaffolds must be securely and rigidly braced to prevent swaying and displacement.

19. When materials are being hoisted up on a scaffold, a tag line must be used to prevent the material striking against the scaffold, unless hoisting equipment is arranged so there is no danger of material striking the scaffold.

20. Scaffolds must be cleared of all tools, loose material and rubbish at the end of each working day.
21. Workers shall not be permitted on scaffolds, which are covered with ice or snow. Clinging ice should be removed from all guardrails and uprights and the planking sanded to prevent slipping.
22. Employees shall not work on scaffolds during storms and high winds.
23. An access ladder or equivalent safe access shall be provided to all work levels.
24. Lean-to scaffolds and makeshift platforms are prohibited.

C. Suspension Scaffolds

1. Employees working from suspension scaffolds or other support type scaffolding must be protected by a personal fall arrest system.
2. Vertical lifelines when used in fall protection systems for suspension scaffolding must be fastened to a fixed anchorage point independent of the scaffolding and be protected from sharp edges or abrasion.
3. Suspended scaffolding or staging shall be fastened or supported to prevent it from swaying.
4. Each suspension scaffold shall be equipped the entire length of the platform on the side away from the building with a standard guardrail, mid rail or safety cable and a toeboard.
5. The supporting ropes of a suspended scaffold shall be constructed of wire, synthetic material or fiber. Each suspension rope and connecting hardware shall be capable of supporting at least six (6) times the maximum intended load.
6. All blocks shall fit the size of rope they carry and shall be constructed to prevent chafing or damage of the rope running through the blocks.
7. The suspension ropes shall run through blocks so the platform can be raised or lowered. The hook on the lower block should be fastened in the loop, or eye, on the upper part of the hanger.
8. When the platform is in position, the suspension rope shall be fastened to the point of the hook by a properly made special hitch, which cannot slip.
9. Suitable padding must be provided at points where ropes are subjected to chafing.
10. Suspension scaffolds shall not be used for the storage of material.
11. When winding drum hoists are used on suspension scaffolds, they shall contain at least four wraps of the suspension rope at the lowest point of scaffold travel.
12. Two or more suspension scaffolds shall not, at any time, be combined into one by bridging the distance between them with planks or any other form of connection.

D. Tubular Welded Frame or Patented Scaffolds, Etc.

1. Check and follow local, state and federal codes, ordinances and regulations pertaining to scaffolds.
2. Inspect all scaffold parts before using. Never use scaffold parts that have been damaged or destroyed.
3. Keep all equipment in good repair. Avoid using rusted equipment. The strength of rusted equipment is not known.
4. Inspect erected scaffolds regularly to be sure they are maintained in safe condition.
5. Inspect erected scaffold posts and use base plates.
6. Use adjusting screws instead of blocking to adjust the scaffold if uneven grade conditions exist.
7. Plumb and level all scaffolds as the erection proceeds. Do not force braces to fit. Level the scaffold until proper fit can be made easily.
8. Fasten all braces securely. Do not climb braces.
9. On wall scaffolds, place and maintain anchors securely between structures and scaffold at least every thirty feet (30’) of length and twenty-five (25’) of height.
10. Equip all planked or staged areas with proper guardrails and toeboards when required.
11. Power lines near scaffolds are dangerous. Exceptional care must be taken and no scaffold should be within ten feet (10’) of a bare or un-insulated power line.
12. Access to all built-up scaffolds must be provided by one or more of the following means:
   a. Manufactured portable wood ladders.
   b. Access ladders positioned so that their use will not have the tendency to tip the scaffold.
   c. “Hook-on” or attachable metal ladders specifically designed for use in conjunction with patented types of scaffolds.
   d. Step or stair type accessories specifically designed for use with patented types of scaffolds. Cross braces shall not be used as a means of access.
13. Do not use ladders or makeshift devices on top of scaffolds to increase height.
14. Do not overload scaffolds.
15. All sections must be pinned and secured against uplift.
16. Drawings and specifications of all frame scaffolds over 125 feet in height above the base plates shall be designed by a registered professional engineer and copies made available to the employer and for inspection purposes.

E. Rolling Scaffolds
1. Do not ride rolling scaffold.
2. Remove all material and equipment from platform before moving scaffold.
3. Caster brakes must be applied at all times when scaffolds are not being moved.
4. Do not in any manner whatsoever attempt to move a rolling scaffold from the top. Watch out for holes in the floor and overhead structures.
5. Do not extend adjusting screws on rolling scaffolds more than twelve inches (12”).
6. Use horizontal diagonal bracing near the bottom, top and at intermediate levels of twenty-five feet (25’).
7. Do not use brackets on rolling scaffolds without consideration of overturning effect.
8. The working platform height of a rolling scaffold must not exceed four (4) times the smallest base dimension unless guyed or otherwise stabilized.

9. A ladder or stairway shall be provided for proper access and exit and shall be affixed or built into the scaffold and so located that when it is used it will not have a tendency to tip the scaffold. A landing platform must be provided at intervals not to exceed 35 feet (35’).

F. Scaffold Inspection and Tagging

a. The Scaffold Competent Person responsible for the erection of all scaffolds is to inspect the scaffold or work platforms daily to assure that all applicable safety measures such as handrails, toe boards, ladders, etc., have been provided.

b. The use of scaffold tagging is mandatory. No one shall work from an untagged scaffold. Untagged scaffold shall be “off limits” to all personnel not authorized to erect, dismantle or make repairs to scaffolds.

c. Scaffolds that are damaged, defective, being constructed or dismantled shall be RED tagged “DO NOT USE”.

d. Scaffolds that are not safe for use are to be tagged at a visible location with a RED “UNSAFE FOR USE” tag.

e. In the event a scaffold or platform cannot be erected in accordance with the applicable codes, i.e., scaffolds that are structurally sound, but an accessory such as a handrail cannot be installed due to the location of the scaffold, or an incomplete deck, a YELLOW tag is to be utilized. This YELLOW tag will have a warning message, “SAFETY HARNESSSES SHALL BE WORN, 100% TIE OFF REQUIRED”.

f. Employees observed working on a YELLOW tagged scaffold that are not using safety harnesses are subject to disciplinary action.

g. The Scaffold Competent Person will place a GREEN “SAFE FOR USE” tag on all scaffoldings meeting Preferred Industrial Contractors, Inc. and OSHA Scaffolding Guidelines (complete). This tag is to be attached at some point near the access ladder where it is visible to anyone climbing the ladder. This tag is also to be signed and dated by the Scaffold Competent Person.

h. Alternate or equivalent tagging systems (i.e. Scafftag, Client dictated, or other proprietary systems) are allowed provided they meet the intent and requirements of this procedure.

i. Alterations or modifications, which must be made to a Green tagged scaffold, are to be re-inspected and re-tagged by the Scaffold Competent Person who is responsible for the modification. A new tag is to be placed on the scaffold or platform.

j. Employees are not permitted to work on a RED tagged scaffold. Any scaffold that is not tagged, regardless of reason, shall be assumed to be “UNSAFE FOR USE.”
G. Training

a. Scaffold User Training will be provided by a qualified person, to all employees that perform work while on a scaffold to recognize the hazards associated with the type of scaffolds being used on the project and to understand the procedures to eliminate or control the hazards.

b. Information must be provided to all employees in a manner understandable to them (audio-visual aids, hands-on, graphics, etc.). and include the following:
   1. The nature of any electrical hazards that may be present in the work areas and the correct procedure dealing with electrical hazards when working in an elevated area while on scaffolds.
   2. Fall hazards and the installation, use and disassembly of the fall protection systems used.
   3. Falling object hazards and the procedures used to prevent falling objects.
   4. The proper use of the scaffold, including access on and off the scaffold and proper handling of materials while on the scaffold.
   5. The maximum intended load capacity of the scaffolds being used.
   6. The requirements and use of the scaffold tagging system in place.
   7. Scaffold users are prohibited from modifying or removing any scaffold component.

c. In addition to the above, employees involved in the erection, disassembly, moving, operating, modifying, repairing, maintaining or inspecting a scaffold must be trained by a competent person to recognize any hazards associated with this type work. The training shall consist with the following:

   1. The nature of scaffold hazards
   2. The correct procedures for erecting, disassembling, moving, operating, repairing, inspecting and maintaining the type scaffold in use.
   3. The design criteria, maximum intended load capacity, and the intended use of the scaffold.

d. Preferred Industrial Contractors, Inc. will retrain any employee when there is an indication that the employee lacks the skill or understanding needed for safe work during the erection, use or dismantling of scaffolds. Retraining is required in at least the following situations:

   1. Where changes at the worksite present a hazard about which an employee has not been previously trained.
   2. Where changes in the types of scaffolds, fall protection, falling object protection, or other equipment present a hazard about which an employee has not been previously trained.
   3. Where inadequacies in an affected employee’s work involving scaffolds indicate that the employee has not retained the requisite proficiency.
H. Scaffolding Specific Procedures

Suspension scaffolds, outrigger scaffolds, boatswain’s chairs, floats, outrigger, needle beam, and centenary scaffolds each require specific procedures and special personal protective equipment and must be reviewed with the safety department prior to use.

24.1.1 Forms

SAF-24.1-1 – Scaffold Safety Check List and Examples

SAF-24.1-2 – Examples of Tags

SAF- 24.1-3 – Examples of Scaffolds
Examples of Tags

![Examples of Tags](image-url)
Examples of Scaffolds
24.2 – Ladders

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1.0 Scope

This procedure outlines general information on specifications, inspections, care, and use of portable ladders.

2.0 Definitions

A. Extension Ladder – A portable ladder, adjustable in length, consisting of a base section and an adjustable extension section, with a suitable means of locking the sections together.

B. Step Ladder – A portable ladder with a hinged frame for steadying

C. Ladder, Type I – Portable ladder that supports at least 250 pounds (113 kilograms) of weight.

D. Ladder, Type IA – Portable ladder that supports at least 300 pounds (135 kilograms) of weight.

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

3.0 Equipment

A. Except where permanent stairways, temporary stairways, suitable ramps or runways are provided, ladders must be provided to give safe access to all elevations.
B. A stairway or ladder shall be provided at all personnel access points where there is a break in elevation of 19 inches or more and no ramp, runway or other means of access is provided.

C. There are many different types of ladders available for use. There is no excuse for using a makeshift means to access the work area.

D. Self-supporting (stepladder) and non-self-supporting (extension) portable ladders must be able to support at least four times the maximum intended load, except extra-heavy-duty metal or plastic ladders, which must be able to sustain 3.3 times the maximum intended load. Ladders shall not be loaded beyond the manufacturer’s rated capacity or the maximum intended load.

E. Never use boxes, crates, wire spools, chairs, equipment, etc. as a substitute for ladders.

F. Ladder rungs, cleats, or steps must be parallel, level, and uniformly spaced when the ladder is in position for use. Rungs must be spaced between 10 and 14 inches apart.

G. Rungs must be so shaped that an employee’s foot cannot slide off, and must be skid-resistant.

H. Foldout or stepladders must have a metal spreader or locking device to hold the front and back sections in an open position when in use.

I. When two or more ladders are used to reach a work area, they must be offset with a landing or platform between the ladders.

J. The area around the top and bottom of ladder must be kept clear.

K. Ladders must not be tied or fastened together to provide longer sections, unless they are specifically designed for such use.

L. Type IA ladders are recommended.

M. No ladder rated less than Type 1 (250 pounds capacity) is allowed.

N. Do not use metal ladders around electrical services or welding. (see also ANSI Standard A14.2). Only non-conductive ladders (wood, fiberglass) may be used near energized electrical lines or equipment.

O. The use of job-made ladders is discouraged. However, if there is a need for a job-made ladder, follow the provisions of OSHA CFR 1926.450. Use of a job-made ladder, requires approval from Project Management.

P. Ladders (or their equivalent) are the only acceptable means of access to elevated areas. Accessing elevated location with a step ladders should be discouraged and additional precautions shall be considered.

Q. Ladders & ladder sections shall never be tied or fastened together to provide additional length unless designed to do so. Do not splice together short ladders to make a longer ladder.

R. Sections of extension ladders shall not be taken apart and used separately.

S. All straight and extension must be equipped with non-skid safety feet. Where ladders are to be used on grating (decks), the ladders shall be equipped with extra-wide non-skid safety feet that cannot slip through the spaces in the grating.
T. Stepladders must be fully opened to permit the spreader to lock (not folded up and used like a straight ladder).

U. Ladders shall not be used horizontally or as makeshift scaffolds.
V. Never use a ladder for any purpose other than the one for which it was designed.
W. Wood ladders shall not be painted in such a manner as to hide the grain structure, deterioration, or defects. Wood ladders may be kept coated with a suitable transparent preservative material. (Cross-grain in rungs, cleats, and steps are not permitted.)

4.0 Inspection

A. Periodic
1. Ladders shall be inspected quarterly by a qualified person.
2. This inspection shall be indicated by an attached color-coded tape system or its equivalent.
3. Employees using ladders must ensure the marking system remains legible between inspections. The ladder will be marked with the company name to distinguish ownership.
4. Ladders with illegible marking systems shall be considered unsafe and shall be removed from service.

B. Daily
1. Ladders shall be inspected daily and prior to each use by the user to ensure that they are in proper working order.
2. Damaged or defective ladders must be tagged (do not use) and returned to the tool room immediately.
3. Under no circumstances may ladders in need of inspection or repair remain in service.
4. Ladders with broken or missing rungs and steps, broken or split side rails or other faulty and defective parts must not be used. When discovered with such defects, ladders shall be immediately withdrawn from service and marked for destruction or repair.

5.0 Usage

A. Ladders should not be used for working except for limited periods of time. Ladders are primarily for ascending or descending from one level to another. Where work requires the use of tools and material, or the job is of considerable duration, it is advisable to use a platform stepladder, scaffold, or some other acceptable working base.

B. Two or more employees shall not work from the same ladder unless it is specifically designed for that purpose.

C. All straight and extension ladders must be secured (tied off to a secure anchorage) to prevent displacement during use.

D. Ladders must not be placed against insecure or movable objects. Straight and extension ladders must extend at least 36 inches (3 feet) beyond the supporting object or landing.
   1. Straight and extension ladders are to be equipped with a section of rope to adequately “tie off” the ladder to prevent displacement when in use.
2. Another employee must hold the ladder secure whenever an employee is ascending or descending a ladder that is not tied off.

E. Portable ladders should be placed so the horizontal distance at the bottom of the ladders is not less than one quarter (1/4) of the vertical distance to the top support. Ladders shall not be used in a horizontal position as platforms, runways, and scaffolds or as support for other materials.

F. Ladders shall be placed on stable and level footing.

G. Ladders used for access to a floor or platform must extend at least three feet above the landing.

H. The areas around the top and base of ladders must be free of tripping hazards such as loose materials, trash, and electric cords.

I. Ladders shall not be placed in passageways, doorways, driveways or any location where they may be displaced by other work activities, unless protected by barricades or guards.

J. Employees shall be instructed and required to ascend/descend ladders in the proper manner; facing the ladders and holding on the side rails with both hands, maintaining three points of contact (i.e. two hands + one foot or two feet + one hand). Material shall be raised or lowered with lines or hoisting equipment and not carried in one hand while ascending or descending.

K. When working from a ladder, one hand should be free at all times to allow a firm grip on the ladder. Exception – both hands may be used when working through the rungs of a ladder.

L. Never lean from side to side or away from the ladder. Always keep both feet and at least one shoulder within the rails of the ladder.

M. Always move the ladder to avoid overreaching.

N. Keep both feet on the ladder rungs or steps.

6.0 Storing And Transporting

A. When not in use, ladders will be stored on racks in locations protected from the elements, with good ventilation, away from excessive heat.

B. Storage racks will have sufficient supporting points to avoid sagging. Long ladders need support every 6 feet (1.8 meters).

C. Other materials are not to be stored on ladders.

D. Ladders being transported by motor vehicles will be properly supported. Supporting points will be made of material such as wood or rubber-covered iron pipe to minimize chafing and the effects of vibration and movement during transport.

E. Ladders over 12 feet (3.7 meters) long will be carried by two employees.

F. Ladders will be carried with the front portion lower than the rear to minimize impairment of the carriers’ vision and reduce the risk of injury to others.

7.0 Training

Each employee who uses ladders will be trained in the following areas, as applicable:

A. The nature of fall hazards in the work area;

B. The proper construction, use, placement, and care in handling of ladders;

C. The maximum intended load-carrying capacities of ladders used;

D. The Portable Ladder Inspection Procedure.
Never climb on back side of a step ladder unless designed for this use.

Read and follow all labels and markings.

Always inspect ladders prior to use. Tag and remove damaged ladders.

Never exceed the maximum load rating of the ladder.

Never climb on the top 2 steps.

Always open step ladders and lock spreader bars prior to use.

Center your body between the side rails at all times.

Always use a ladder on a stable and level surface.
Ladder Training Cont’d

8.0 Ladder Definitions
These are some of the terms associated with ladders.

A. Cleat - A ladder crosspiece made of a rectangular cross section placed on edge upon which a person may step while ascending or descending a ladder.

B. Double-Cleat Ladder - A ladder that is similar in construction to a single-cleat ladder but that has a center rail to allow simultaneous 2-way traffic of employees ascending or descending.

C. Equivalent - Alternative designs, materials, or methods that can demonstrate will provide an equal or greater degree of safety than the method or item specified in the standard.

D. Extension Trestle Ladder - A self-supporting portable ladder, adjustable in length, consisting of a trestle ladder base and a vertically adjustable extension section, with a suitable means for locking the ladders together. The length of the trestle base designates its size.

E. Failure - The occurrence of load refusal, breakage, or separation of component parts. Load refusal is the point where the structural members lose their ability to carry the loads.

F. Job Made Ladder - A ladder that is not commercially manufactured and is typically fabricated by employees at a construction site.

G. Lower Levels - Those areas to which an employee can fall from a ladder. Such areas include ground levels, floors, roofs, ramps, runways, excavations, pits, tanks, and similar surfaces. Lower levels do not include the surface from which the employee falls from.

H. Maximum Intended Load - The total of all loads applied to a ladder component at any one time, including the load of all employees, equipment, tools and materials, transmitted loads and other anticipated loads.

I. Point of Access - All open areas used by employees for work related passage from one area or level to another. Such areas include doorways, passageways, stairway opening, studded walls, and various other permanent or temporary openings used for travel.

J. Portable Ladder - A ladder that can be readily moved or carried.

K. Riser Height - The vertical distance from the top of a tread to the top of the next higher tread, platform or landing or the distance from the top of a platform or landing to the top of the next higher tread, platform or landing.

L. Single-Cleat Ladder - A ladder consisting of a pair of side rails that are usually parallel (although flared side rails are permissible) and that are connected together with cleats, rungs or steps that are joined to the side rails at the regular intervals (that is, a ladder consisting of a pair of side rails connected to cleats, rungs or steps).
M. **Single-Rail Ladder** - A portable ladder with rungs, cleats—or steps mounted on a single Rail instead of the two rails used on most other ladders.

N. **Step Stool (Ladder Type)** - A self-supporting, foldable, portable ladder, nonadjustable in length that is 32 inches or less in overall size and that has flat steps but no pail shelf. Step stools are designed so that the top cap of the ladder may be climbed on as well as all steps. The side rails may continue above the top cap.

O. **Tread Depth** - The horizontal distance from the front to back of a tread (excluding nosing, if any).

### 9.0 Ladders - General Requirements

A. Ladders must be provided at construction sites in accordance with certain requirements.

B. A ladder must be provided at all points of access where there is a break in elevation of 19 inches or more and where no ramp, sloped embankment, or personnel hoist is provided.

*CNOTE: In situations where non-routine access is required, such as climbing vertical steel to make initial connections and where fall protection systems are used, then the concern of fall injury is addressed and ladders are not required. However, frequent access to the same location or access by 2 or more employees will negate the finding that the access requirements are non-routine and a ladder may be required.*

C. Verify that a double-cleat ladder, or 2 or more separate ladders, are provided in either of the following circumstances:
   1. Ladders are the only means of access or exit from a working area for 25 or more employees.
   2. A ladder serves simultaneous 2-way traffic.

D. Verify that when a building has only one point of access between levels, that point of access is kept clear to permit free passage of employees. If work must be performed or equipment must be used such that free passage at that point of access is restricted, a second point of access must be provided and used.

E. Verify that when a building has 2 or more points of access between levels, at least one point of access is kept clear to permit the free passage of employees.

### 10.0 Ladder’s Rule Book

A. Ladders must be capable of supporting specified loads.
   1. Verify that the following types of ladders are capable of supporting the specified Loads without failure:
      a. Self-supporting portable ladders - At least 4 times the maximum intended load, as applied in a downward vertical direction, except that each extra-heavy-duty type 1A metal or plastic ladder must sustain at least 3.3 times the maximum intended load.
b. Portable ladders that are not self-supporting - At least 4 times the maximum—intended load, as applied in a downward vertical direction when the ladder is placed at an angle of 75 ½ degrees from the horizontal, except that each extra-heavy-duty type 1A or plastic ladder must sustain at least 3.3 times the maximum intended load.

c. Fixed ladders - At least loads of 250 pounds each, concentrated between any 2 consecutive attachments, plus anticipated loads caused by ice buildup, winds, rigging and impact loads resulting from the use of ladder safety devices. In addition, if anticipated use of the fixed ladder will involve additional loads, these additional concentrated loads (of 250 lbs. each) must be included in determining if the loads can be supported. Each step or rung must be capable of supporting a single concentrated load of at least 250 lbs. applied in the middle of the step or rung.

*NOTE: Ladders built and tested in conformance with the applicable provisions of 29 CFR1926 Subpart X Appendix A meet the above requirements.

2. Verify that ladders are not loaded beyond their maximum intended load or beyond their manufacturer’s rated capacity.
3. Rungs, cleats, and steps ladders must be spaced according to specific requirements.
4. Inspect ladder rungs, cleats, and steps to ensure they are parallel, level and uniformly spaced when the ladder is positioned for use.
5. Inspect rungs, cleats and steps of portable ladders (except step stools and extension trestle ladders) and fixed ladders (including individual-rung/step ladders) to ensure they are spaced not less than 10 inches apart, nor more than 14 inches apart, as measured between centerlines of the rungs, cleats and steps.
6. Inspect rungs, cleats and steps of step stools to ensure they are not less than 8 inches or more than 12 inches apart as measured between centerlines of the rungs, cleats and steps.
7. Inspect rungs, cleats and steps of the base section of extension trestle ladders to ensure they are not less than 8 inches or more than 18 inches apart as measured between centerlines of the rungs, cleats and steps. The rung spacing on the extension section of the extension trestle ladder must not be less than 6 inches nor more than 12 inches apart as measured between centerlines of the rungs, cleats, and steps.
8. Measure the minimum clear distance between the sides of individual rung/step ladders and the minimum clear distance between the side rails of other fixed ladders to ensure it is 16 inches.
9. Measure the minimum clear distance between side rails for all portable ladders to ensure it is 11 ½ inches.
10. Rungs and steps on ladders must be constructed and maintained to minimize slipping.
11. Verify that rungs of individual rung/step ladders are shaped to prevent employee’s feet from sliding off the end of the rungs.
12. Inspect the rungs and steps of fixed metal ladders manufactured after March 15, 1991, to ensure they are corrugated, knurled, dimpled and coated with skid resistant material or otherwise treated to minimize slipping.

13. Inspect the rungs and steps of portable metal ladders to ensure they are corrugated, knurled, dimpled and coated with skid resistant material or otherwise treated to minimize slipping.

14. Verify that all ladders are maintained free of oil, grease and other slipping hazards.

15. If more than one ladder is used to provide longer sections, the following requirements must be met.

   a. Verify that ladders are not tied or fastened together to provide longer sections unless they are specifically designed for such use.

   b. Verify that when splicing is required to obtain a given length of side rail, the resulting side rail is at least equivalent in strength to a one-piece side rail made of the same material.

   c. Except when portable ladders are used to gain access to fixed ladders (such as those on utility towers, billboards and other structures where the bottom of the fixed ladder is elevated to limit access), verify that when 2 or more separate ladders are used to reach an elevated work area, the ladders are offset with a platform or landing between the ladders.

   *NOTE: Platforms and landings must have guardrails, toe boards, and overhead protections.

B. Stepladders must be equipped with spreaders or locking devices.

   1. Verify that a metal spreader or locking device is provided on each stepladder to hold the front and back sections in an open position when the ladder is being used.

C. Surface coatings on ladders must meet the following specific requirements:

   1. Inspect ladder components to ensure they are surfaced to prevent injury to an employee from punctures or lacerations and to prevent snagging of clothing.

   2. Verify that wood ladders are not coated with any opaque covering except for identification or warning labels, which may be placed on 1 face only of a side rail.

D. Minimum perpendicular clearance must be maintained between a ladder and any obstruction.

   1. Measure the minimum perpendicular clearance between fixed ladder rungs, cleats and steps, and any obstruction behind the ladder to ensure it is 7 inches.

   *NOTE: An elevator pit ladder must have a minimum perpendicular clearance of 4 ½ inches.

   2. Verify that the minimum perpendicular clearance from the centerline of fixed ladder rungs, cleats, and steps to any obstruction on the climbing side of the
ladder is 30 inches. When unavoidable obstructions are encountered, the minimum perpendicular clearance from the centerline of fixed ladder rungs, cleats, and steps to the obstruction on the climbing side of the ladder may be reduced to 24 inches, provided that a deflection device is installed to guide employees around the obstruction.

F. All ladders, including job-made ladders, must be positioned at specific angles.

1. Inspect the work area to verify that non-self-supporting ladders are used at an angle such that the horizontal distance from the top support to the foot of the ladder is approximately 1/4 of the working length of the ladder (i.e., the distance between the foot of the ladder and the top support).
2. Verify that wood job-made ladders with spliced side rails are used at an angle such that the horizontal distance is 1/8 the working length of the ladder.
3. Verify that fixed ladders are used at a pitch no greater than 90 degrees from the horizontal, as measured to the backside of the ladder.

F. Through fixed ladders must have the following specific step-across distances:

1. At their point of access/egress, verify that through fixed ladders have step-across distances of not less than 7 inches or more than 12 inches as measured from the centerline of the steps or rungs to the nearest edge of the landing area. If the normal step-across distance exceeds 12 inches, a landing platform must be provided to reduce the distance to the specified limit.

G. In certain circumstances, ladders must be provided with cages, wells or other safety devices.

1. Verify that fixed ladders without cages or wells have a clear width to the nearest permanent object of at least 15 inches on each side of the centerline of the ladder.
2. Verify that fixed ladders are provided with cages, and/or wells. Also with ladder safety devices or self-retracting lifelines where the length of climb is less than 24 feet but the top of the ladder is greater than 24 feet above lower levels.
3. Where the total length of a climb equals or exceeds 24 feet, verify that fixed ladders are equipped with one of the following:
   a. Ladder safety devices
   b. Self-retracting lifelines and rest platforms at intervals not to exceed 150 feet
   c. A cage or well and multiple ladder sections where each ladder section does not exceed 50 feet in length. Ladder sections must be offset from adjacent sections and landing platforms must be provided at maximum intervals of 50 feet.

H. Cages for fixed ladders must meet certain requirements.

1. Verify that cages for fixed ladders conform to all of the following requirements:
   a. Horizontal bands must be fastened to the side rails of ladders or directly to the structure, building, or equipment for individual-rung ladders.
b. Vertical bars must be on the inside of the horizontal bands and must be fastened to them.
c. Cages must extend not less than 27 inches or more than 30 inches from the centerline of the step or rung (excluding the flare at the bottom of the cage) and must not be less than 27 inches in width.
d. The inside of the cage must be clear of projections.
e. Horizontal bands must be spaced not more than 4 feet on center vertically.
f. Vertical bars must be spaced not more than 9 ½ inches on center horizontally.
g. The bottom of the cage must be not less than 7 feet or more than 8 feet above the point of access to the bottom of the ladder.
h. The bottom of the cage between the bottom horizontal band and the next higher band must be flared not less than 4 inches all around.
i. The top of the cage must be a minimum of 42 inches above the top of the platform or the point of access at the top of the ladder, with provision for access to the platform or other point of access.

H. Wells for fixed ladders must meet certain requirements.

1. Verify that wells from fixed ladders conform to all of the following requirements:
   a. Wells must completely encircle the ladder.
   b. Wells must be free of projections.
   c. The inside face on the climbing side of the ladder must extend not less than 27 inches or more than 30 inches from the centerline of the step or rung.
   d. The inside clear width must be at least 30 inches.
   e. The bottom of the wall on the access side must start not less than 7 feet or more than 8 feet above the point of access to the bottom of the ladder.

I. Safety devices and related support systems for fixed ladders must meet certain requirements.

1. Verify that ladder safety devices and related support systems for fixed ladders conform to all of the following requirements:
   a. They must be capable of withstanding without failure a drop test consisting of an 18-inch drop of a 500-pound weight.
   b. They must permit the employee using the device to ascend or descend without continually having to hold, push, or pull any part of the device, leaving both hands free for climbing.
   c. They must be activated within 2 feet after a fall occurs and limit the descending velocity of an employee to 7ft/sec or less.

K. Ladder safety devices must be properly mounted.

1. Verify that the mounting of ladder safety devices for fixed ladders conforms to all of the following requirements:
a. Mountings for rigid carriers must be attached at each end of the carrier, with intermediate mountings, as necessary, spaced along the entire length of the carrier to provide the strength necessary to stop employee’s falls.

b. Mountings for flexible carriers must be attached at each end of the carrier. When the system is exposed to wind, cable guides for flexible carriers must be installed not less than 25 feet and no more than 40 feet apart along the entire length of the carrier to prevent wind damage to the system.

c. The design and installation of mountings and cable guides must not reduce the design strength of the ladder.

L. Extensions above access points must meet specific requirements.

1. Verify that the side rails of through or side step fixed ladders extend 42 inches above the top of the access level or landing platform served by the ladder. For a parapet ladder, the access level must be the roof if the parapet is cut to permit passage through the parapet; if the parapet is continuous, the access level must be the top of the parapet.

2. Verify that for extensions of through fixed ladders, the steps or rungs are omitted from the extension and the extension of the side rails are flared to provide not less than 24 inches or more than 30 inches clearance between side rails. Where ladder safety devices are provided, the maximum clearance between side rails of the extensions must not exceed 36 inches.

3. Verify that for side step fixed ladders, the side rails and the steps or rungs are continuous in the extension.

4. Verify that individual step/rung ladders, except those with access openings covered by manhole covers or hatches, extend at least 42 inches above an access level or landing platform either by continuing the rung spacing as horizontal grab bars or by providing vertical grab bars that have the same lateral spacing as the vertical legs of the rungs.

5. When portable ladders, including job made ladders, are used for access to an upper landing surface, verify that the ladder side rails extend at least 3 feet above the upper landing surface to which the ladder is used to gain access. When such an extension is not possible because of the ladder’s length, the ladder must be secured at its top to a rigid support that will not deflect, and a grasping device (such as a grab rail) must be provided to assist the employees in mounting and dismounting the ladder. In no case may the extension be such that ladder deflection under a load would, by itself, cause the ladder to slip off its support.

M. Employees must adhere to certain work practices when using ladders.

1. Verify that employees understand that ladders are to be used only for the purpose for which they were designed.

2. Review employee work practices to verify that the top or top step of a stepladder is not used as a step.
3. Review employee work practices to verify that cross-bracing on the rear section of stepladders is not used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections.

4. Verify that employees do not use single-rail ladders.

5. Verify that the user faces the ladder when ascending and descending.

6. Review employee work practices to verify that each employee uses at least one hand to grasp the ladder when progressing up and/or down the ladder.

7. Review employee work practices to verify that an employee does not carry any object or load that could cause the employee to lose balance and fall.

*NOTE: Employees may carry small items (i.e., hammers, pliers, measuring tapes, nails, paint brushes, and similar items) so long as the items do not impede the employee's ability to maintain full control while ascending or descending the ladder. An employee who needs to take a large or heavy object to a different level may pull the object up or lower it with a hand line.*

N. All ladders, including job-made ladders, must be placed and used in a manner that will prevent slipping or other types of displacement.

1. Verify that ladders are used only on stable and level surfaces unless they are secured to prevent accidental displacement.

2. Verify that ladders are not used on slippery surfaces (including but not limited to flat metal or concrete surfaces that are constructed so they cannot be prevented from becoming slippery) unless secured or provided with slip-resistant feet to prevent accidental displacement. Slip resistant feet must not be used as a substitute for carefully placing, lashing, or holding a ladder that is used upon slippery surfaces.

3. Verify that ladders placed in any location where they can be displaced by workplace activities or traffic (such as passageways, doorways or driveways) are secured to prevent accidental displacement or that barricades are used to keep the activities or traffic away from the ladder.

4. Verify that the area around the top and bottom of ladders is kept clear.

5. Verify that the top of a non-self-supporting ladder is placed with the two rails supported equally unless it is equipped with a single support attachment.

6. Verify that ladders are not moved, shifted, or extended while occupied.

O. Certain requirements must be met when using ladders near exposed energized electrical equipment.

1. If ladders are used where the employee or the ladder could contact exposed Energized electrical equipment, verify that the ladders have non-conductive side rails, except as provided in the “Electrical Power Transmission and Distribution Regulations”.

P. All ladders, including job-made ladders, must be inspected for defects and repaired as necessary.
1. Verify that a system is in place so that ladders are inspected for visible defects periodically by a competent person and after any occurrence that could affect their safe use.

2. Verify that portable ladders with structural defects (including but not limited to broken or missing rungs, cleats or steps; broken or split rails; corroded components; or other faulty or defective components) are either immediately marked in a manner that readily identifies them as defective or are tagged with a sign reading “Do Not Use” or similar language and that they are withdrawn from service until repaired.

3. Verify that fixed ladders with structural defects (including but not limited to broken or missing rungs, cleats, or steps; broken or split rails; or corroded components) are withdrawn from service until repaired. A defective ladder is considered withdrawn from service if the ladder is either:

   a. Immediately tagged with a sign reading “Do Not Use” or similar language.
   b. Marked in a manner that readily identifies it as defective or
   c. Blocked (such as with a plywood attachment that spans several rungs).

Q. Training Requirements

1. Training must be done with any employee that uses ladders.

2. The program must teach each employee to recognize hazards related to ladders and to follow procedures to minimize certain hazards.

3. Verify that each employee who will use a ladder has been trained by a competent person in the following areas:

   a. The nature of fall hazards in the work area.
   b. The correct procedures for erecting, maintaining, and disassembling the fall protection system to be used.
   c. The proper construction, use, placement, care, and handling of all ladders.
   d. The maximum intended load-carrying capacities of the ladders to be used.

R. Verify that retraining is provided for each employee as necessary so that the employee maintains the understanding and knowledge acquired through compliance of this program and OSHA regulations.
Ladder Questionnaire

Date: ____________________________  Project: ____________________________  Employee Name ____________________________

1. Ladders: General Requirement

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<tr>
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<td>1.1</td>
<td>Ladders must be provided at construction sites in accordance with certain requirements</td>
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<td>□</td>
<td>□</td>
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<td>1.2</td>
<td>All ladder fall protection systems must be installed before employees begin work</td>
<td>□</td>
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<td>1.3</td>
<td>Ladders must be capable of supporting specific loads.</td>
<td>□</td>
<td>□</td>
<td>□</td>
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<td>1.4</td>
<td>Rungs, cleats, and steps on ladders must be spaced according to specific requirements.</td>
<td>□</td>
<td>□</td>
<td>□</td>
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<td>1.5</td>
<td>Rungs and steps on ladders must be constructed and maintained to minimize slipping.</td>
<td>□</td>
<td>□</td>
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<td>1.6</td>
<td>Employees must inspect the ladder they are going to use prior to the start of work.</td>
<td>□</td>
<td>□</td>
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<td>1.7</td>
<td>Ladders need not be equipped with spreaders or locking devices to keep the ladder in the open position</td>
<td>□</td>
<td>□</td>
<td>□</td>
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<td>1.8</td>
<td>Wooden ladders must have an opaque coating to prevent getting splinters or other wood type injury.</td>
<td>□</td>
<td>□</td>
<td>□</td>
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<td>1.9</td>
<td>When extensions ladders are being used the top of the ladder must extend 36 inches above the landing.</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>1.10</td>
<td>Employees need not know the load capacity of the ladder they are using.</td>
<td>□</td>
<td>□</td>
<td>□</td>
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<tr>
<td>1.11</td>
<td>When an extension ladder is being used it is not necessary to secure the ladder by tying it off to the structure it is leaning against.</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
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Instructor’s Name __________________________________________________ Signature ____________________________
25.0 – Electrical Safety and Ground Assurance Program

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1.0 General Requirements
A. All temporary and permanent electrical work, installation, and wire capacities shall conform to the National Electrical Code and other applicable federal, state, and local codes.
B. Only “Qualified Electricians” shall work on electric circuits or parts, which have not been de-energized. Such persons shall have been trained and be capable of working safely on energized circuits and shall be familiar with the proper use of precautionary techniques, personal protective equipment, insulating and shielding equipment and insulating tools.
C. When “Qualified Persons” are working in the vicinity of overhead power lines, whether on the ground or in an elevated position, approved insulating tools, gloves and isolation methods shall be used in addition to the minimum approach distances listed in CFR 1910.333I.
D. Any vehicle or mobile equipment operating in the vicinity of energized overhead power lines shall maintain a minimum safe distance of 10 feet. For voltages over 50 KV the clearance shall be increased 4 inches for every 10 KV over 50 KV (see section 28.0)
E. Vehicles in transit, with the boom, bed, or structure lowered, the clearance distance may be reduced to four (4) feet. For voltages over 50 KV the clearance distance shall be increased 4 inches for every 10 KV over 50 KV.
F. Work in confined or enclosed spaces, such as a manhole or vault, that contain exposed energized parts require the use of protective shields, barriers or mats to avoid inadvertent contact by employees. All doors, hinged panels, and similar covers shall be secured to prevent their swinging into an employee and causing contact with energized circuits.
G. Conductive objects such as pipes, conduits, ducts, etc. are to be handled in such a manner to prevent accidental contact with energized circuits or parts. Effective methods of insulation, guarding, and material handling techniques shall be used.
H. Portable ladders with metal or conductive siderails are not to be used near electrical hazards (see Section 24.2)
I. “Unqualified Person”, those persons with little or no training working near electrical hazards shall be trained in and familiar with hazard recognition and safety related...
work practices respective to their job assignments. When a “Unqualified Person” is working in an area where overhead lines are located the minimum safe distance that the employee and / or any conductive object that the employee may contact, shall be no closer than 10 feet from the overhead power lines of 50 KV or less. For voltages over 50 KV the minimum safe distance must increase 4 inches for every 10 KV over 50 KV.

J. If work is to be performed near overhead lines, the lines are to be de-energized and grounded or other protective measures taken such as guarding, isolating or insulating to prevent employee contact, prior to the start of work.

K. All electrical equipment and conductors shall be approved for use and shall be free from defects or hazards, which could cause electrical shock, injury, or death.

L. All electrical equipment shall be installed and used in accordance to the listing, labeling or certification

M. Electrical circuits shall have circuit interrupters (circuit breakers or fuses) installed, which are sufficient for the current to be interrupted.

N. No employee shall be permitted to work close enough to an unprotected electrical power circuit so that he or she may contact the same in the course of his or her work unless the employee is protected against electrical shock by de-energizing the circuit and grounding it or guarding it by effective insulation or other means.

O. All circuit breakers and disconnects are to be labeled as to which circuits or equipment they control.

P. Electrical rooms and areas around electrical panels are not to be used as storage areas. Sufficient access and working space must be provided and maintained around all electrical equipment and electrical panels.

Q. Electrical equipment or machinery shall be de-energized and rendered inoperative by locking out supply switches prior to performing work on such equipment or machinery unless power must be applied for the purpose of adjustment or electrical troubleshooting. If lockout devices are not feasible, a tagout system shall be used at all points where the equipment may be energized. A qualified electrician should assist other crafts to lock out or tag out electrical machinery or equipment if those workers do not understand the lockout/tagout procedure. (See section 26.0).

R. Controls of equipment or circuits to be deactivated during the course of work shall be tagged out.

S. Equipment or circuits that are de-energized shall be locked out, or tagged out where locks are not feasible, at all points where such equipment or circuits can be energized.

T. Locks and tags shall be placed and marked to identify the equipment or circuit being worked on.

U. Extension cords used with portable electrical tools and appliances shall be of the three-wire type. Cords with the ground probe removed or rendered ineffective shall be removed from service.

V. Electrical cords and trailing cables shall be covered, elevated, or otherwise protected from damage, which could create a hazard to employees or other persons in the area.

W. All 120-volt, single-phase, 15 and 20 ampere receptacle outlets on construction sites which are not a part of the permanent wiring of the building or structure and which are in use by employees shall have approved ground-fault circuit interrupters for
personnel protection. Receptacles on a two-wire, single-phase portable or vehicle-mounted generator rated not more than 5kW, where the circuit conductors of the generator are insulated from the generator frame and all other grounded surfaces, need not be protected with ground-fault circuit interrupters. IN LIEU OF GROUND-FAULT CIRCUIT INTERRUPTERS, AN ASSURED EQUIPMENT GROUNDING CONDUCTOR PROGRAM (See Subsection 4.0 of this Chapter) IN ACCORDANCE WITH OSHA REGULATIONS (1926-400 – Subpart K) SHALL BE UTILIZED. The Project Superintendent is responsible for implementing the Assured Grounding Program and also the Ground Fault Protection.

X. All temporary electrical wiring shall be installed so that the wiring cannot be damaged when materials are moved as construction progresses.

Y. Suitable barriers or other means shall be provided to ensure that the workspace for electrical equipment will not be used as a passageway during periods when energized parts of electrical equipment are exposed.

Z. Each temporary disconnect box shall be legibly marked to indicate its purpose unless located and arranged so the purpose is evident.

AA. Persons working on or near exposed energized parts shall not wear conductive articles of jewelry or clothing such as but not limited to; watches, bracelets, rings, necklaces, metalized belts, cloth with conductive thread or metal headgear, unless they are rendered non-conductive by covering, wrapping or other insulating means.

2.0 Lighting and Illumination

A. Where the use of artificial light is required, it shall be maintained while workers are entering or leaving the area.

B. Areas requiring the continuous use of artificial light shall be inspected regularly and defective lamps replaced.

C. Temporary lights shall be equipped with guards to prevent accidental contact with the bulb. Guards are not required when the construction of the reflector is such that the bulb is deeply recessed.

D. Approved explosion proof electrical lighting shall be the only means used for artificial illumination in areas where flammable liquids, vapors, fumes, dust, or gases are present and are creating a potential explosion hazard.

E. In addition to providing the required illumination intensities, consideration should be given to the selection and placement of lights, which will provide minimum glare, eliminate harsh shadows, and provide adequate illumination to work efficiently and safely.

F. Exposed or empty light sockets, and broken bulbs shall not be permitted.

G. Adequate light shall be provided throughout the building and in all work areas throughout the project, particularly passageways and stairways, and wherever necessary to avoid a hazard due to lack of light. Low voltage (12V) lighting shall be used in moist and/or other hazardous locations such as drums, tanks, and vessels. However, 120-volt lights may be used if protected by a ground-fault circuit interrupter.

3.0 Temporary Installation and Maintenance

A. Clearances for open conductors shall conform to the requirements in the National Electrical Code.
B. All temporary wiring and circuits shall be installed to meet the most recent National Electric Code in force at the time.

C. All portable extension cords shall be three wire type, 12 AWG or larger and rated for hard or extra hard usage. Flexible cords used with temporary lights shall be rated for hard or extra hard usage. Hard or extra hard cords have one or more of the following designations on the outer insulation: S, ST, SO, STO, SJ, SJO, SJT, SJTO. Worn or frayed electric cords shall not be used.

D. Flexible cords and cables shall be protected from damage. Sharp corners and projections must be avoided. Do not run an extension cord or cable through a doorway unless adequate protective measures have been taken to prevent pinch points. Always protect electrical cords from sparks or slag when welding or burning.

E. Electrical cords and cables are not to be placed in areas where they can be driven over by mobile equipment or where they can become a tripping hazard for workers.

F. While Ground Fault Circuit Interrupters are recommended, all portable extension cord sets and plug-connected equipment must be checked on a quarterly basis as part of the Company Ground Assurance Program. (Refer to section 25.4)

G. Electrical cords, cables, welding leads etc., are to be routed where they do not create a tripping hazard. Where possible they are to be routed and hung 7 feet above the work area.

H. Extension cords shall not be fastened with staples, hung from nails, or suspended by wire or welding rods.

I. Nonmetallic-sheathed cable (romex) shall not be used for temporary power and lighting circuits where such use would expose the wiring to physical damage.

J. The use of metal “knockout” boxes on extension cords or cables is prohibited.

K. Lamp holders shall have no live parts, which are exposed to contact. All lamps used for illumination shall be guarded against accidental contact or breakage. Metal guards shall be grounded. Metal shell, paper-lined lamp holders, or receptacles shall not be used.

L. Receptacles on construction sites shall not be installed on circuits that supply temporary lighting.

M. Portable generators and other power sources must be tested and maintained as part of the Company Ground Assurance Program. (Refer to section 25.4)

N. Entrances to rooms and other guarded locations containing exposed live parts shall be marked with conspicuous warning signs forbidding unqualified person to enter.

O. See Section 23 for authorized clearances for equipment such as cranes operating around overhead power lines.

P. Overhead transmission and distribution power lines shall be installed on poles and/or towers, which provide required clearances over work areas and structures.

Q. High voltage power lines should have at least 25 feet of clearance above roadways, tracks, and work areas. For voltages over 750 volts and for specific hazardous situations, refer to the National Electrical Safety Code.

R. Warning signs should be posted where overhead power lines pass over the roadways.

S. Each disconnecting means for motors and appliances, and each service feeder or branch circuit at the point where it originates, should be legibly marked to indicate its purpose. On circuits exceeding 600 volts, “Danger – High Voltage” signs shall be posted where unauthorized persons might come in contact with live parts.
T. No employee shall be permitted to work in any location where there is a possibility of contact with an electric power circuit unless proper protective measures such as de-energizing and grounding the circuit or by effectively guarding or insulating the exposed parts.

4.0 Assured Grounding Program

A. Each cord set, attachment cap, plug and receptacle of cords sets, and any equipment connected by cord and plug, except those fixed and not exposed to damage, shall be visually inspected before each day’s use for external damage, missing or loose pins, insulation damage and possible internal damage. Equipment found to be damaged or defective is not to be used until it has been repaired and tested.

B. The following tests shall be done on all non-permanent cord sets, receptacles, generators and other equipment, which is required to be grounded:

1. All equipment grounding conductors shall be tested for continuity and shall be electrically continuous.
2. Test each receptacle and plug for correct attachment of the equipment-grounding conductor to the proper terminal.

C. These tests are to be performed and documented:

1. Before first use on the construction site.
2. When there is evidence of damage.
3. Before equipment is returned to service after repairs.
4. At intervals not to exceed 3 months.

D. Inspections of all power cords, tools, and non-permanent cord sets for continuity and ground assurance are to be performed and either a log kept on file with description of outlets, tools and cords, date checked, polarity and ground check, or use the color code system below to mark the cord following each quarterly test.

<table>
<thead>
<tr>
<th>Month or Quarter</th>
<th>Color Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan., Feb., Mar.</td>
<td>White</td>
</tr>
<tr>
<td>Apr., May, June</td>
<td>Green</td>
</tr>
<tr>
<td>July, Aug., Sept.</td>
<td>Red</td>
</tr>
<tr>
<td>Oct., Nov., Dec.</td>
<td>Orange</td>
</tr>
<tr>
<td>Repair or Incident</td>
<td>Brown</td>
</tr>
</tbody>
</table>

E. This program is readily available to the project employees, Federal, State, Local agencies and to the client.

F. The Project Superintendent is responsible for the implementation of this program and he will designate one or more supervisory personnel that are competent to oversee the program.

G. Should a client, plant or facility have a different ground assurance program, Preferred Industrial Contractors, Inc. will comply with the more stringent of the two programs.
5.0 References

A. National Electrical Code
B. OSHA 1910 Subpart S
C. OSHA 1910/1926 Subpart K
26.0 – Energy Isolation – Lock / Tag / Verify Procedure

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1.0 Policy
The purpose of this procedure is to establish the minimum requirements for the Lock / Tag / Verify of energy isolating devices to safeguard employees from injury and death by requiring precautions be taken before installing, servicing, repairing equipment or working on any systems, electrical circuits, associated controls, or any work that must be performed which could expose an employee to any type of energy that could produce injury or death.
It shall be used to insure that a machine or piece of equipment is isolated from all potentially
hazardous energy, and locked out / tagged out before employees perform any servicing or maintenance activities where the unexpected energize, start-up or release of stored energy could cause injury. Due to the serious risk to life, the Lock/Tag/Verify procedures must be considered as one of the most essential safety control measures on any project. Proper shutdown and isolation procedures must be implemented prior to performing any installation, commissioning, repair, maintenance, or other work on equipment or energized systems. Due to the variations in individual plant and facility LTV procedures, it is essential that employees be trained in and be aware of the specific plant or facility LTV requirements. It is each individual’s responsibility to have a working knowledge of the LTV rules. **No one shall violate these rules. Failure to attach or remove a lock and personal danger tag is considered a serious violation of the LOTO/Try procedures.** The types of energy systems that the LOTO/Try program is meant to guard against include, but are not limited to: Electric Hydraulic Steam Pneumatic Mechanical Gas Water Steam Chemical Thermal Kinetic This includes deactivating and locking out all energy sources, input and output, as well as latent or residual energy. In addition, a “Danger Do Not Operate” tag will be placed at the lock-out point with the lock.

2.0 Scope

A. This procedure shall include all employees whose duties require them to service, repair adjust, lubricate or perform work on any power driven equipment, or electrical circuits and/or associated controls or equipment and processes and whenever working on or around any machine employees could be injured by:
   1. Unexpected start-up of the equipment
   2. Release of stored energy
   3. Work on or around any energized electrical circuits or devices where contact or arcing is possible.

B. Two situations that most likely need Lock / Tag / Verify:
   1. When you must remove or bypass a guard or other safety device.
   2. When you must place any part of your body where you could be caught by moving machinery.

C. Some jobs for which lock / tag / verify should be used are:
   1. Repairing electrical circuits.
   2. Cleaning or oiling machinery with moving parts.
   3. Clearing jammed mechanisms.
   4. Replacing a control unit or valve
   5. Performing preventative maintenance.
   6. Confined space entry
   7. Performing tie ins or first breaks

D. Locks and tags by themselves do not de-energize equipment. Attach them only after the machinery has been isolated from its energy sources. All energy, whether real or potential, must be at a zero mechanical state.
3.0 Definitions

A. **Authorized Person** – Authorized persons are those contractor employees that are authorized to work under the contractor’s competent person Lock and Tag. Authorized persons will be required to place their own lock onto the lockbox. However, they are not allowed to work in an area without their direct supervisor locked out on the designated lockout box. Each authorized person must put their own lock and personal Danger Tag in place on their supervisor’s lock.

B. **Competent Person** – One who is capable of identifying existing and predictable hazards in the surroundings or working conditions, and who has authorization to take prompt corrective measures to eliminate them. For the purposes of this program, a competent person shall be authorized to identify isolation points, lock, tag and verify equipment and/or systems where work will be performed. Contractor competent persons will be responsible for coordinating their work activities, and providing the proper locking and tagging requirements for the lockout box.

C. **Isolation Device** – An Isolation Device is an electric circuit breaker, a disconnect switch, a manually operated switch or valve, slide gate, figure 8 blind or slip blind for blanking off piping, etc. used to totally separate or cut off the energy source from the operating system to be worked on or serviced. Control circuit devices such as push buttons, toggle switches, pressure switches, solenoids valves and similar devices are not to be considered as isolating devices. In some cases it may be necessary to isolate multiple devices or energy sources.

D. **Lockout** – A Lockout is defined as the act of placing a lock on a switch, lever, valve, gate or other isolating device, which has been placed in a SAFE or neutral position that will prevent the equipment or system from being set in motion, or releasing energy which could endanger workers.

1. Locks are to remain in place until the authorized work has been completed and all conditions are safe to re-energize the equipment or system. Locks and tags are to be removed only by the person who placed them.

2. Locks used for this program are to be checked out from Preferred Industrial Contractors, Inc., and are to be individually keyed and numbered. Each person working on the equipment or system must be locked out and have their personal danger tag in place on the lock. When the work is completed and the locks have been removed, they are to be returned to Preferred Industrial Contractors, Inc.

E. **Lockout Box** – A designated point where each key used to secure the isolation points are placed. The competent person will place a control lock and tag onto the lock box and attach the permit. The contractor’s designated competent person, in charge of the work to be performed will be required to lock and tag onto this box. The Lockout Box is also the locking point for all Authorized Persons working for the contractor. Contractor Authorized Persons are to place their locks and personal danger tags on the contractor’s Competent Person lock prior to beginning work.

F. **Tagout** – When placing a lock onto an isolation device or the lockout box, an identification tag must also be used to identify the person who has placed the lock. Tags attached to locks used for this purpose are to be individually assigned and will be
dated, signed with employee or badge number, equipment identification, and be attached securely to the lock. Employees will print their name beside or under the signature. These tags are to be attached to the worker’s lock located at the designated isolation point or Lockout Box any time the employee is working on the equipment or system under this program.

G. **Verify** – When all isolating devices have been locked and tagged out, the Competent Persons will verify the isolation of the equipment or energy source by trying to operate the equipment or system by normal means of push button controls or other start up procedures to ensure that the equipment or system is at a “zero energy state”, and cannot be placed into service while locked out and tagged. Other methods such as visual verification or the use of test instruments may be used to insure that isolation devices are working properly.

### 4.0 Type of Protective Engineering

A. Machine guards.
B. Electrical disconnects.
C. Mechanical stops, such as pins, valves, breaking flanges or cutting the line, place blanks, blinds and blocks and demonstrate that system is empty and clean.
D. Engineering lockouts (fail safe equipment), which provide automatic protection against human error.
E. Physical and photoelectric interrupt systems.
   Never defeat or bypass a safety feature, nor allow co-workers to do so. Never rely blindly on any safety feature. The person(s) who is / are working on the equipment must check it out completely and adhere to the Lock / Tag / Verify procedures.

### 5.0 Planning

A. Specify which machines or equipment need Lock/Tag /Verify procedures. Many times this will require coordination of plant or facility operators and may involve multi-craft or area supervisors.
B. Make a list of the types and magnitude of energy and hazards in the work area.
C. Locate and identify all isolating devices to the machine or equipment to be locked or tagged out. A list of the types and locations of all energy isolating means must be made.
D. More than one energy source may be involved, such as electrical and mechanical. A list should be made of the types and locations of all energy isolating means for employees to check.

### 6.0 Training

A. All contractor employees required to work under this LOTO/Try program are to be trained in the following:
   1. Purpose and Overview of the LOTO/Try Program. Notify all affected employees of the requirements, sequence of steps and procedures of the Lock / Tag / Verify system utilized on the project.
2. Placement and Removal of Locks and/or Tags
3. Authorization for Lock and Tag placement and Removal
4. Disciplinary Action for Non-Compliance
5. Maintain a list of the names and job titles of all employees who are authorized to lockout / tagout the specified machine or equipment.
6. A written record must be maintained of all employees who have been educated in the company or projects Lock / Tag / Verify program.
7. Re-training of all affected employees will be conducted and documented when there is a change in:
   a. Assignments
   b. Machines
   c. Equipment
   d. Processes
   e. When lockout / tagout inspections reveal a need or supervision sees a need.
   f. Or any change that represents new hazards or changes in the energy control procedure.

B. Use of training aids is strongly suggested. Check with the Corporate SH&E Department for assistance.

7.0 Enforcement
A. Enforcement is necessary to make sure employees do their part in practicing their own safety and follow the procedures taught to them by their employer.
B. No device shall be operated with tag or lock attached regardless of circumstances.
C. An inspection is to be conducted at least once a shift to make sure energy control procedures are being carried out, when applicable.
D. No one shall attempt to operate any switch, valve, or other energy-isolating device where it is locked and tagged out.
E. Any unauthorized person found tampering with or removing lockout / tagout equipment shall be terminated.
F. Any employee who fails to follow the Lock / Tag / Verify procedures shall be terminated.
G. All enforcement guidelines and procedures must be communicated to the employees with their attendance documented in writing.

8.0 Elements Of A Lock / Tag / Verify Program

Depending upon the plant, facility type, owner and operator requirements, specific Lockout / Tag / Verify procedures may vary from one plant or facility to the next. Individual departments within the same plant may have differences in Lockout procedures. It is critical for worker safety as well as complying with owner / operator requirements that all persons working within the plant of facility are knowledgeable in the specific Lock/Tag/Verify procedures. The basic elements of a Lock / Tag / Verify program consist of the following;
A. Determine what energy sources will be locked out.
B. Determine if locks can be applied.
C. Determine who will apply locks and / or tags.
D. Determine if more than one shift, crew or employee will be working on the equipment.

E. Determine the sequence to follow, such as:
   1. Preparations for shutdown – including notifying the operator.
   2. Equipment shutdown.
   3. Equipment isolation.
   5. Control of stored energy.
   6. Verify isolation of equipment.
F. Perform the work.
G. Prepare to remove locks / tags, but first be sure that:
   1. All safety guards are back in place.
   2. Work is complete and tools are put away.
   3. Workers are positioned safely for start-up.
   4. Controls are positioned correctly for start-up and machine is operation ready.
H. Removal of the lock / tag by the person who applied it.
I. Notify the operator when all of the locks / tags are removed, the safeguards replaced and that the equipment is ready for operation.
J. Special situations include but are not limited to:
   1. Maintenance by outside contractors.
   2. Temporary re-activation of equipment being worked on.
   3. Servicing that lasts more than one work shift.
   4. When the worker who applied a lock is not there to remove it.
   5. Procedures must be established to assure that special situations are corrected in a safe manner.
K. Re-emphasize to all employees that locks and tags do not de-energize machines or equipment, people do.

9.0 General Requirements
A. All equipment shall be locked and tagged out to protect against accidental or inadvertent operation when such operation could cause injury to personnel.
B. Only the designated construction “Danger Do Not Operate Tag” will be used.
C. All tags will be dated, signed, equipment identified, and attached securely to the lock. Employees will print their name beside or under the signature.
D. No device shall be operated with tag and lock attached regardless of circumstances.
E. No person shall remove another’s tag or lock unless the owner is off the site; then the Project Manager or his designated Competent Person may remove the tag and lock if it will not create an unsafe condition. (See section 26.12 for lock removal process)
This employee must not be allowed on site until he is advised his lock has been removed and the status of the system.

F. It is the responsibility of the Foreman to assure that no work is performed beyond the protection of locks and tags on energized equipment.

G. Locks and tags are not a substitute for the responsibility of breaking flanges, placing blanks, draining and other-wise decontaminating equipment or systems.

H. Electrical Supervision will make available “multi-lock” hasps or similar devices for lockout situations where multiple employees are involved on electrical equipment.

I. Every employee working behind a foreman’s lock must have their own lock and danger tag on the lockout device. Foremen’s tags and locks and employee’s tags must be removed at the end of each shift – refer to Lock-Out Procedure.

J. When locks and tags are required beyond one shift, a written lockout plan must be submitted to the Project Manager and Safety Supervisor for approval.

K. On complex lockouts where many crafts are involved and the lock out may take place over extended periods of time, the Project Superintendent may, with the written approval of the Project Manager and Site Safety Manager, use a Group Lock Out procedure, jointly place tags and locks on behalf of all workers involved. Unlocking and restarting of the equipment or systems must also be done jointly. Each employee involved in the work must be shown the lockout points and be satisfied that their safety is protected. The employee will always have the option to place their own lock. The request for written Project Management approval must include the following:

1. A complete list of lockout points.
2. Anticipated start and completion dates for work to be performed.
3. Listing by name of all Superintendents and there designates who will participate in the lockout.
4. Letter of approval containing the above.
5. All employees working under the Group Lock system must be absolutely comfortable with lockout before task begins.

10.0 Responsibilities

A. Contractor’s and / or subcontractor’s supervisor representative will administer the lockout program. All locks and applicable tags will be issued to their foreman, general foreman, superintendents and employees as they are requested by the contractor’s and / or subcontractor’s supervisor representative. The safety representative will maintain a lock and tag log. The safety representative will also monitor and audit the Lockout Program.

B. The assigned superintendent and foreman in charge of the site, facility or department where the work is to be performed must:
   1. Make a survey to locate and identify all energy isolating devices to be certain which switch(s), valve(s) or other devices apply to the equipment to be locked out / tagged out. More than one energy source (electrical, mechanical or other) may be involved.
   2. A written record will be made including date, project site, locations and types of devices, people making survey.
3. Prior to the start of any work on operating equipment or systems the Project Superintendent in conjunction with plant operations shall develop specific Lock / Tag / Verify Procedures to prevent the unexpected start up or operation of equipment or system which have been intentionally shutdown for repairs or unintentionally goes down due to mechanical failure.

11.0 Procedure

A. All energy sources shall be locked out and a “Danger” tag affixed to the equipment or system indicating who installed the lock, craft, contractor’s name, and the reason the system was locked out. Employees shall be responsible for hanging their own lock and tag on the proper piece of equipment before starting work.

B. No employee or other contractor may work on a lock and tag belonging to another employee. The Supervisor / Foreman shall be responsible for assisting each employee in locating the proper piece of equipment to be locked out and tagged. Each employee involved with lockouts shall have a lock with an individual key. No locks with duplicate or master keys shall be used. Locks shall be identified by either paint, die markings, etc.

C. Lockout or tagout devices shall be affixed to each energy isolating device by authorized employees.

D. Lockout devices, where used, shall be affixed in a manner to that will hold the energy isolating devices in a “safe” or “off” position.

E. Tagout devices, where used, shall be affixed in such a manner to clearly indicate that the operation or movement of energy isolating devices from the “safe” or “off” position is prohibited.

F. Where tagout devices are used with energy isolating devices designed with the capability of being locked, the tag attachment shall be fastened at the same point at which the lock would have been attached.

G. Where a tag cannot be affixed directly to the energy isolating device, the tag shall be located as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device.

H. Following the application of lockout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, and otherwise rendered safe.

I. If there is a possibility of stored energy recurring to a hazardous level in the system, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.

J. Prior to starting work on machines or equipment that have been locked out or tagged out, the authorized employee shall verify that isolation and de-energize of the machine or equipment have been accomplished.

K. If more than one employee is required to lockout and tag a circuit or piece of equipment, a multiple padlock device shall be used.

L. Any employee who removes a tag or lock belonging to another employee or person, or overrides a tag or lock in anyway, shall be terminated immediately. Written authorization has to be obtained from the foreman, general foreman, superintendent and Project Manager of the responsible contractor when a lock has been left on a piece of equipment and the originator is not available for removal.
M. When locks and tags are required, the craft personnel working on that circuit shall notify their appropriate supervisor. The supervisor, or his designee, shall see that appropriate locks and tags are provided. When work is completed, the appropriate supervisor is also to be notified when the lock(s) and tag(s) are removed.

N. Any of the following steps may be taken to guard against energy left in the equipment after it has been isolated from its energy sources.

1. Inspect the system to make sure all parts have stopped moving.
2. Install ground wires.
3. Relieve trapped pressure.
4. Release the tension on springs, or block the movement of spring-driven parts.
5. Block or brace parts that could fall because of gravity.
6. Block parts in hydraulic and pneumatic systems that could move from loss of pressure. Bleed the lines and leave vent valves open.
7. Drain process piping systems and close valves to prevent the flow of hazardous materials.
8. If a line must be blocked where there is no valve, use a blank flange.
9. Purge reactor tanks and process lines.
10. Dissipate extreme cold or heat, or wear protective clothing.
11. If stored energy can re-accumulate, monitor it to make sure it stays below hazardous levels.

O. Electrical systems as they are energized will be locked out by the responsible electrical subcontractor until they are released to the owner’s representative. Anytime repairs or modifications are made to electrical systems, either temporary or permanent, they shall be locked out. Locks shall be applied to the main disconnect switch whenever possible. A tag must accompany all locks.

P. In cases where fuses are used to sub feed branch circuits (more than one circuit) being supplied from one main breaker and the panel will not accept a padlock with a buddy device, the panel may be locked with the door key, the key then may be locked in a (Key Lock Box) which will accept a padlock and a buddy lock device. The fuses removed will be listed in the logbook as if they were a main breaker.

Q. The person doing the work shall lockout the equipment he/she is working on. This lock must be logged out to the person using the lock in the logbook. In the event the lock should be required overnight, or off shift, then the equipment shall be locked and logged out in accordance with the Lockout Procedure.

R. Pipelines, valves and other such sources that could be inadvertently activated, causing a hazardous condition, shall be locked out, blanked off or otherwise secured to prevent accidental activation.

S. Lines, valves and similar systems that are being tested pneumatically or with other gases such as nitrogen, shall be tagged and/or locked out to prevent an accidental discharge of the pressure within the line. In addition, areas affected by the pneumatic test shall be barricaded against entry and inspected by the contractor’s safety representative prior to commencement of the test.

T. Verify that the equipment is isolated by the lockout/tagout procedure. Steps to take include, but may not be limited to:
1. Make sure all danger areas are clear of personnel
2. Verify that the main disconnect switch or circuit breaker can’t be moved to the on position.
3. Use a voltmeter or other equipment to check the switch.
4. Press all start buttons and other activating controls on the equipment itself.
5. Shut off all machine controls when the testing is finished.

12.0 Restoring Machine or Equipment To Normal Operations

A. After the servicing and / or maintenance are complete and equipment is ready for normal production operations, the assigned employee(s) shall check the area around the machine or equipment to ensure that none is exposed.
B. The employee(s) shall remove all tools from the machine or equipment, reinstall all guards, recheck for absence of other people, and then remove all lockout / tagout devices, which were installed.
C. The employee(s) will then operate the energy isolating devices to restore energy to the machine or equipment.
D. In the event lockout or tagout devices must be temporarily removed from the energy isolation points and the machine or equipment energized to test or position the machine, equipment or a component, the following sequence of actions shall be performed and documented as to performance and verification.

   1. Clear the machine or equipment of tools and materials of all nonessential items and ensure that the equipment components are operationally intact.
   2. Ensure that the work area has been checked and that all employees have been safely positioned or removed.
   3. Lockout or tagout devices are to be removed by the person that installed them.
   4. Energize and proceed with testing or positioning.

E. Workers must remove their own locks and tags. If a worker has not removed their lock or tag, it may be removed by the worker’s direct supervisor having authority over that person, and having sufficient knowledge of the equipment and the work being performed, after completing the following steps: (Complete Form Appendix 3 of this section)

   1. Every effort must be made to contact the employee; either locates the employee on the project or at home. (The preferred method would be for the employee to return and remove their tag and/or lock.) If circumstances make this impractical, the employee’s direct supervisor may determine that they will assume responsibility for removal and inform the employee.
   2. If the employee cannot be located, check with the employee’s direct supervisor, other co-workers or security to determine the employee’s whereabouts.
   3. Thoroughly inspect the equipment and work areas to assure that the employee is absent and the equipment or system is safe to operate.
4. Remove tags and/or locks and present these to the employee upon their return to work.
5. A Lock and Tag Removal form (Appendix 2) must be completed any time a lock and tag is removed by anyone other than the person who placed them.

13.0 Lock / Tag / Verify Equipment

A. The safety supervisor shall keep a set of special, uncommon pad locks specifically reserved for lockout service and a supply of reusable plastic “Danger – Do Not Operate – This tag and lock to be removed only by person shown on back” tags.
B. All lockout locks shall be keyed differently.
C. The locks shall be designed such that there is no “Master Key”
D. The safety supervisor shall maintain a log of issuance and return of locks by date issued, stock number, to whom issued, date returned.
E. When an employee returns a lock, he/she shall also return a tag with the writing cleaned off.
F. Once signed out, a lock is not transferable to another person until it has been returned to the safety supervisor.
G. At shift end, if the assigned task is not completed and there will be no intervening shift of workers, the original lockout / tagout gear shall remain in place.
H. If there is to be a change in shifts and work continues, the on-coming shift employees will secure their own locks and tags and the off-going shift employees shall remove theirs.
I. In the event that an employee’s lock must be removed and the employee cannot be found on site, every effort must be made to determine if the employee has left the site. Check with the employee’s direct supervisor, other co-workers or security to determine the employee’s whereabouts. Document all attempts made to locate the employee. (See Appendix 3 of this section)
J. If the employee cannot be located, the contractor competent person, in charge of the work, must thoroughly inspect the equipment and work areas to assure that the employee is absent and the equipment or system is safe to operate.
K. Preferred Industrial Contractors, Inc. and contractor’s/owners competent person shall cut and remove the lock and tag and complete Lock and Tag Removal form. Retain the lock and tag.

14.0 Project / Plant Specific Requirements

A. Equipment isolation and Lockout / Tagout by itself may be a simple concept, however, is important to understand that each plant is responsible for developing the Lock / Tag / Verify procedures for their facility. For that reason there may be variations on the procedures for equipment isolation and verification, the actual isolation points themselves, permits, lock out procedures, lock requirements, and the number or type of tags used to identify equipment and system isolation. It is essential that employees be trained in and be aware of the specific plant or facility LTV requirements.
B. This Lock / Tag / Verify Procedure shall be reviewed at least on an annual basis and the review must be documented, signed and dated by the competent person.
15.0 Forms

A. SAF-26.0-1 – Lockout/Tagout/Verify Permit to Work
B. SAF-26.0-2 – Lock and Tag Removal Form
Lockout/Tagout/Verify Permit to Work

Contractor(s) ________________________________
This Permit to Work is Only Valid

From: 
Hours
Date:

To: 
Hours
Date:

Location / Area and /or System ________________________________
Permit Number ________________________________

Part 1: Description of Work to be Performed

Type Lockout Required: 
- Electrical
- Mechanical

Person in Charge of Work: 

Part 2: Precautions to be Taken Before Work Commences:

<table>
<thead>
<tr>
<th>Precaution</th>
<th>Yes</th>
<th>N/A</th>
<th>Supervisor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Permission to be Obtained From PIC to Enter Area</td>
<td></td>
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<tr>
<td>2. A Safe Means of Access and Egress to be Established</td>
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<tr>
<td>3. Caution / Warning Notices to be Posted</td>
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<tr>
<td>4. Barricades to be Erected Around the Area</td>
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<tr>
<td>5. White Personal Danger Tags in Place</td>
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<tr>
<td>6. Equipment Lockout Tags in Place (placed on or at equipment controls)</td>
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<tr>
<td>7. Lockbox in Place</td>
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<td></td>
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</tr>
</tbody>
</table>

Part 3: Lockout/Tagout/Try Point Identification

<table>
<thead>
<tr>
<th>Isolation Device</th>
<th>Location of Isolation Device</th>
<th>“Verify” Procedure (assure in zero-energy state)</th>
<th>Verified</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Part 4: Additional / Other Permits Required

- Confined Space [ ]
- Hot Work [ ]
- Other [ ]
- Other [ ]

Authorized By: ________________________________ Date: ________________________________ Person Requesting Permit Date:

Signature ________________________________ Signature ________________________________
Lock and Tag Removal Form

Contractor: ___________________________ Date: ___________________________
Employee Name: ___________________________ ID# ___________________________
Lock Number: ___________________________ Location: ___________________________
Reason for Removal: ___________________________

If necessary to remove a contractor employee’s lock and tag, follow and complete the procedure listed below:

1. Attempt to locate employee on site – check with supervisor, co-workers and security.
2. If employee is found on site, the employee must remove their own lock and tag. The employee is to be reminded of the requirements of the LOTO/Verify procedures and the consequences of noncompliance including the disciplinary action to be taken.
3. If employee cannot be found on site, every effort must be made to determine if the employee has left the site. Check with the employee’s direct supervisor, other co-workers or security to determine the employee’s whereabouts. Document all attempts made to locate the employee.
4. If the employee cannot be located, the contractor competent person, in charge of the work, must thoroughly inspect the equipment and work areas to assure that the employee is absent and the equipment or system is safe to operate.
5. Preferred Industrial Contractors and contractor’s / owners competent person shall cut and remove the lock and tag and complete Lock and Tag Removal form. Retain the lock and tag.
6. The employee is not allowed to return to work without resulting disciplinary action for noncompliance of the LOTO/Verify procedure and retraining as needed.

PIC Employee Supervisor Date Safety Supervisor Date

__________________________________________  __________________________________________
Signature                                      Signature
27.0 – Temporary Floors, Stairs, And Railings

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1.0 Temporary Floors

A. In buildings or structures of skeleton steels construction, the permanent floor filling or the floor filling forms, except for temporary shaft way openings, shall be installed as the erection progresses.
B. There shall be no more than one (1) open floor under the floor where work is progressing. Either a permanent or temporary floor must be installed.
C. The temporary floor shall cover the entire area except the required places for access to ladders and stairways and for hoisting purposes.
D. Planks shall be not less than two inches (2”) thick, full size and undressed. The planks shall be laid close together, supported on a solid bearing and securely fastened to the framework of the structure.
E. All loose objects lying on the planks must be removed before the planks are dismantled to prevent such objects from falling on persons below.
F. There shall be frequent and careful inspections of all temporary flooring and other false work to be sure it is always maintained in safe working condition.
G. All defective materials or unsafe conditions discovered by the workers shall be immediately reported and corrected.
H. A safety railing of ½ inch wire rope or equivalent shall be installed approximately 42 inches high around the periphery of all temporary planked or temporary metal-decked floor or tier buildings and other multi-floored structures during structural steel assembly.
I. On buildings or structures not adaptable to temporary floors and where scaffolds are not used, safety nets shall be installed and maintained wherever the potential fall distance exceeds two stories or twenty-five feet (25’).

2.0 Stairs and Stairwells

A. All temporary stairs must be constructed to safely support a load of one hundred pounds per square foot (100 lbs. / sq. ft.) of tread and landing surface.
B. Temporary stairs shall be constructed so that the treads and risers are of uniform width and height in any one flight.
C. Temporary stairs shall have a landing not less than thirty inches (30”) in the direction of travel at every twelve feet (12’) of vertical rise.
D. All temporary stairs shall be adequately lighted with a minimum illumination of five-foot candles.
E. Stairway landings, which are not enclosed, shall be considered as platforms and must be guarded with standard railings and toeboards.
F. Whenever temporary railings or enclosures are removed for the purpose of handling materials or installation of other work, they shall be immediately replaced upon completion of such work.
G. On permanent stairways designed and installed with steel treads and landings to receive concrete or other filling material, temporary wooden treads shall be laid in full width of the tread and landing to the height of the nosing, firmly fitted in and secured in place.
H. Where doors or gates open directly on the stairway, a platform shall be provided and the swing of the door shall not reduce the effective width of the platform to less than 20 inches.
I. The wooden tread shall be free from protruding nails and splinters and shall be replaced when any part of the same is worn below the height of the nosing.
J. Every flight of stairs having four (4) or more risers must be equipped with a stair railing.
K. All open sides of stairways should have handrails.
L. A stair railing shall be constructed similar to a standard railing, but the vertical height shall be not more than thirty-four inches (34”) nor less than thirty inches (30”) from the tread at the face of the riser to the top surface of the rail.

*NOTE: See “Platforms and Stairways” at end of document.

3.0 Railings
A. Standard Railings

1. A standard railing or guardrail shall consist of a top rail, an intermediate rail, upright supports and toeboards.
2. A standard railing shall have a vertical height of forty-two inches (42”) from the floor or platform to the upper surface of the top rail. The intermediate railing shall be midway between the floor or platform and the underside of the top rail.
3. All railings shall be constructed in a substantial manner of wood, metal pipe, angle iron or other metal shapes.
4. Post or uprights shall be spaced not more than eight feet (8’) apart.

B. Wood Railings
1. The minimum the top rail can be of is two-by-four inch (2” x 4”) stock, the intermediate rail of one-by-six-inch (1” x 6”) stock and the upright of two-by-four inch (2” x 4”) stock. The top rail shall be a smooth surface throughout its entire length and free of splinters.
2. Light wood rails or scantlings resting on barrels, boxes or other makeshift supports shall not be set up or used as guardrails.
3. All railings shall be constructed of good, sound material free from large or loose knots and all stock smooth surfaced.

C. Pipe Railings
1. The post or upright support, top rail and intermediate rail shall be of metal pipe at least one and one-half inches (1 ½”) inside diameter.

D. Structural Metal Supports
1. The post or upright support, top rail and intermediate rail shall be of angle iron at least two-by-two by three-eighths inches (2” x 2” x ⅜”) or other metal shapes of equivalent bending strength.
2. The spacing of posts or uprights shall not exceed eight feet (8’).

4.0 Toeboards

A. A strand toeboard shall be a minimum of four inches (4”) in vertical height from the floor, platform, ramp or runway to the top edge of the board.
B. Wherever material is piled to such a height that a standard toeboard does not provide protection, paneling or screening not greater than two-inch (2”) wire mesh from floor to intermediate rail or to top rail shall be provided.

5.0 Floor and Wall Openings

A. Every floor opening, temporary or permanent shall be guarded either by a standard railing and toeboard on all exposed sides except at entrances to stairways or by a cover of sufficient strength to safely support any load. Said covering shall be secured in place to prevent accidental removal or displacement. While the cover is not in place, such openings shall be constantly attended by someone and shall be protected by a portable closing rail or by other effective means.
B. Wall openings from which there is a drop of more than four feet, (4’) and the bottom of the opening is less than three feet (3’) above the working surface, shall be guarded.
C. The guard shall be either a standard railing or toeboard or standard railing with an enclosing screen of solid construction, grills or slat work with openings of not more than four inches (4”) in width.
6.0 Open-Sided Floors, Platforms and Runways

A. Every open-sided floor of four feet (4’) or more above the adjacent floor or ground level except for entrances to a ramp, stairway or fixed ladder shall be guarded on all open sides by standard railing and toeboard.
B. Wherever materials have to be regularly passed over edges of the floor, a section of the railing may be made removable.
C. A standard railing on all open sides will guard every runway four feet (4’) or more above the floor or ground level. Whenever tool, machine parts or materials are likely to be used on the runway, a toeboard shall be provided on each exposed side.
D. Every inclined runway, where erected for the use of workers, shall be provided with cleats not more than sixteen inches (16”) apart to prevent slipping and aid workers in maneuvering the incline.

7.0 Miscellaneous

A. Regardless of height, open-sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment, plating or galvanizing tanks, degreasing units and similar hazards, shall be guarded with a standard railing and toeboard.
B. See the following diagram for additional details on construction and guarding of platforms, stairways, ramps, and floor openings.

8.0 References

A. OSHA 1926.500 and 1910.21 -.24-

B. Platforms and Stairways – Section 27.0
Platforms And Stairways

**Standard Specifications**

1. **Handrails**
   (a) Two by four inches (2” x 4’) nailed at right angles.
   (b) Platform hand rails to be forty-two (42”) inches above platform.
   Stairway handrails to be thirty inches (30”) above nose of tread.

2. **Posts**
   (a) Two by four inches (2” x 4”) or heavier.
   (b) Posts spaced not over eight (8’) feet apart.

3. **Mid rails**
   One by six inches (1” x 6”) or wider, spaced midway between platform and top rail on platforms or midway between nose of tread and top rail on stairway; mid rails to be nailed to inside of posts.

4. **Toe board**
   One by four inches (1” x 4”) or wider placed along floor platform and nailed to inside of posts.

**Stairs, Ladders, Ramps, or Inclines**

<table>
<thead>
<tr>
<th>Recommended Angles of Inclination</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Diagram of Recommended Angles of Inclination" /></td>
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</table>

**Table of Risers and Treads for Stairs**

<table>
<thead>
<tr>
<th>Angle with Horizontal</th>
<th>Rise in Inches</th>
<th>Tread in Inches</th>
</tr>
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<tbody>
<tr>
<td>22° – 00’</td>
<td>5</td>
<td>12 ½</td>
</tr>
<tr>
<td>23° – 14’</td>
<td>5 ¼</td>
<td>12 ¼</td>
</tr>
<tr>
<td>24° – 38’</td>
<td>5 ½</td>
<td>12</td>
</tr>
<tr>
<td>26° – 00’</td>
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<td>11 ¾</td>
</tr>
<tr>
<td>27° – 33’</td>
<td>6</td>
<td>11 ½</td>
</tr>
<tr>
<td>29° – 03’</td>
<td>6 ¼</td>
<td>11 ¼</td>
</tr>
<tr>
<td>30° – 35’</td>
<td>6 ½</td>
<td>11</td>
</tr>
<tr>
<td>32° – 08’</td>
<td>6 ¼</td>
<td>10 ¼</td>
</tr>
<tr>
<td>33° – 41’</td>
<td>7</td>
<td>10 ½</td>
</tr>
<tr>
<td>35° – 16’</td>
<td>7 ¼</td>
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</tr>
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<td>36° – 52’</td>
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</tr>
<tr>
<td>38° – 29’</td>
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<td>40° – 08’</td>
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<td>41° – 44’</td>
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<td>45° – 00’</td>
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<td>46° – 38’</td>
<td>9</td>
<td>8 ½</td>
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<tr>
<td>48° – 16’</td>
<td>9 ¼</td>
<td>8 ¼</td>
</tr>
<tr>
<td>49° – 54’</td>
<td>9 ½</td>
<td>8</td>
</tr>
</tbody>
</table>
1.0 General Requirements

A. The U.S. Department of Transportation has issued certain regulations involving safety requirements, including Title 49, Parts 390-397 of Motor Carrier Safety Regulations, that are placed upon any person or entity engaged in interstate commerce as a common carrier, contract carrier, or private carrier. Basically the DOT safety regulations apply to commercial motor vehicles having a gross vehicle weight rating (GVWR) of 10,001 pounds or more or any vehicle designed to carry 15 or more passengers including the driver. If there is a question as to the applicability of these regulations, contact the nearest federal or state DOT office.

B. All vehicles in use shall be checked at the beginning of each shift to assure that equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use.

1. It will be the operator’s responsibility to report unsafe conditions.
2. Vehicles or equipment unsafe to operate shall be taken out of service until repaired.

C. All safety items on vehicles and equipment will be inspected and serviced regularly by a qualified mechanic, either on or off the project. These items include:

1. Vehicles:
   a. Adequate vision (mirrors, windshield, etc.), windshield wipers and blades
   b. Brakes - including emergency brakes
   c. Fan belts
   d. Headlights
   e. Taillights
   f. Brake lights
   g. Signal lights
   h. Hydraulic lifts
   i. Power steering
   j. Tires - including pare
   k. Adequate jacks and lug wrench
   l. Horn
   m. Air equipment
   n. Seat belts

2. Equipment
   a. Adequate vision (mirrors, windshields, etc.)
   b. Windshield wipers and blades
   c. Horn or warning bell (as required)
   d. Air equipment
   e. Lights - front, rear, stop, boom, etc.
   f. Emergency brakes
   g. Brakes, including disc brakes, etc.
   h. Generator, starter, etc.
   i. Booms, welds, bolts, etc.

PIC  Rev 12/12/11
j. Hydraulic hoses, couplings, pumps
k. Fan belts

D. Motors and engines shall be shut off during fueling or maintenance operations. Electric-driven equipment shall be installed with provision for tagging and/or locking out the controls while under repair.

E. Fire extinguishers will be placed on all vehicles or equipment and inspected weekly. Monthly inspection and service records will be maintained in the project office.

F. All cab glass shall be safety glass, or equivalent, that introduces no visible distortion affecting the safe operation of any vehicle or equipment covered by this part.

G. A safety tire rack, cage, or equivalent protection shall be provided and used when inflating, mounting, or dismounting tires installed on split rims, or rims equipped with locking rings or similar devices.

H. Heavy machinery, equipment, or parts thereof, which are suspended or held aloft by use of slings, hoists, or jacks shall be substantially blocked or cribbed to prevent falling or shifting before employees are permitted to work under or between them. Bulldozer and scraper blades, end-loader buckets, dump bodies, and similar equipment shall be either fully lowered or blocked when being repaired or when not in use. All controls shall be in a neutral position, with the engines stopped and brakes set, unless work being performed requires otherwise.

I. All haulage vehicles, whose payload is loaded by means of cranes, power shovels, loaders, or similar equipment, shall have a cable shield and/or canopy adequate to protect the operator from shifting or falling material.

J. A locking device shall be provided on every fifth wheel mechanism and two bar arrangement, which will prevent the accidental separation of towed and towing vehicles.

K. Conductors rated 440 volts and generator cables shall not be laid on the ground unless they are heavy duty armored or shielded type.

L. Trucks with dump bodies should be equipped with positive means of support, permanently attached, and capable of being locked in position to prevent accidental lowering of the body while maintenance or inspection work is being done.

M. Operating levers, controlling hoisting or dumping devices on haulage bodies, should be equipped with a latch or other device, which will prevent accidental starting or tripping of the mechanism.

N. Trip handles for tailgates of dump trucks and heavy equipment shall be so arranged that, in dumping, the operator will be in the clear.

O. Except when temporarily removed for the purpose of testing or repairing the machinery, all guards and other safety devices shall be securely in place while machinery is being operated.

P. Mobile and stationary equipment shall be maintained in safe operating condition.

Q. Machinery or equipment in unsafe condition shall be tagged out and removed from service immediately.

R. Repairs or maintenance shall not be performed on machinery until the power is off and the machinery is blocked against motion, except where machinery motion is necessary to make adjustments.
S. Machinery shall not be lubricated while in motion, unless equipped with extended fittings or cups.

T. Drive belts shall not be shifted while in motion unless the machines are provided with mechanical shifters. Belt dressing shall not be applied while belts are in motion except where it can be applied without endangering a person.

U. Belts, chains, and ropes shall not be guided onto power driven moving pulleys, sprockets, or drums with the hands except on slow moving equipment especially designed for hand feeding. Pulleys of conveyors shall not be cleaned manually while conveyor is in motion.

V. Do not operate mobile equipment, such as forklifts, trucks, tractors, front-end loaders, and graders, unless the automatic warning device, which gives an audible alarm when such equipment is put into reverse gear, is functioning.

W. Mobile equipment shall not be operated in the presence of any person exposed to a hazard from its operation. All operators of such equipment shall give adequate warning prior to starting operation.

X. When any equipment or loads are required to pass under or by any energized high voltage power line and the clearance between such equipment and the power line is less than that specified in 1926.550 and ANSI B30.5, (10 foot minimum for voltages less than (50 KV) such power lines shall be de-energized and/or other safety precautions taken.

Y. A safety tire rack, cage, or equivalent protection shall be used when inflating, mounting or dismounting tires installed on split rims, locking rings, or similar type wheel rims.

Z. No employee is to work on top of, under, or from mobile equipment in a raised position until the equipment has been blocked or mechanically secured from movement.

AA. Company owned motor vehicles and personal vehicles used to perform company business are to be equipped with seat belts meeting Department of Transportation requirements. Employees are required to wear seat belts.

BB. Mobile equipment equipped with rollover protection must be equipped with seat belts and employees must wear seat belts during operation of this equipment.

CC. All bi-directional equipment must be equipped with a horn, which is distinguishable from the surrounding noise level.

2.0 Safe Operation of Vehicles and Equipment

A. Only qualified, licensed operators may operate Company owned, leased or rented vehicles. Prior to assigning a vehicle to an employee, a check shall be made to determine the employee has a current, valid driver’s license. A copy of this license must be made and placed in the employee’s personnel file. Company equipment is to be operated only by authorized persons who currently hold a valid Driver’s License and an Operator’s Training certification card for the specific type of equipment. The Project Superintendent, Foreman, Project SH&E Supervisor or other persons qualified to perform task training may perform this training.

B. All vehicles transporting material must comply with city, county or state laws pertaining to weight, height, length, and width. If permits are required for these loads, they shall be obtained.
C. Operating Company owned leased or rented vehicles or equipment while under the influence of alcohol or drugs shall be prohibited. (See Section 2 for details regarding the Corporate Substance Abuse Prevention Program)

D. Seat belts are required for all operators, drivers and passengers for company owned or leased vehicles and equipment.

E. City, county or state safety inspection of vehicles, when required, will be obtained and decals posted on vehicle.

F. Company owned or leased vehicles will not be used off the project except for Company business. However, there are cases where certain individuals are assigned a vehicle with permission to drive the vehicle between the project and their residence. This permission will be granted on a project-by-project basis and the use of vehicles other than described above will not be tolerated.

G. Persons not employed by the Company will not operate or ride as passengers in Company owned, leased, or rented vehicles unless authorized by the Project Superintendent.

H. Vehicles are not to be driven into an unsafe area. This will include areas of construction where unnecessary tire, steering, or body damage could result.

I. Vehicles used to transport explosives, gasoline, fuel oils or other flammable material will not be allowed to haul passengers other than those authorized by project supervision.

J. Smoking will not be allowed on, in or within 50 feet of vehicles hauling fuel oils, gasoline, or explosives.

K. No person shall be permitted to ride with arms or legs outside of the truck body, in a standing position on the body, or on running boards or seated on side fenders, cabs, cab shields, rear of truck bed, or on the load.

L. No vehicle shall be driven at a speed greater than is reasonable and proper, with due regard for weather, traffic, intersections, width and character of the roadway, type of motor vehicles, and any other existing condition.

M. Project management should not use any motor vehicle or equipment having an obstructed view to the rear unless:
   1. The vehicle or equipment has a backup alarm audible above the surrounding noise level.
   2. The vehicle or equipment is backed up only when an observer signals that it is safe to do so.
   3. No personnel shall be permitted to get off or on moving vehicles or equipment.
   4. Oilers, apprentices and other operators will not be allowed to operate equipment unless authorized by the Project Superintendent.
   5. The operator is personally responsible for the safe movement and/or operation of equipment.
   6. No equipment will be operated beyond its safe load or operational limits.
   7. No unauthorized personnel will be allowed to ride on equipment. This will include the riding of loads, headache ball, fenders, etc.
   8. Operators using signal persons should make sure that the signal persons can be seen, that they understand signals prior to moving equipment and that they are aware of overhead structures, electrical lines, etc.
3.0 Additional Operation Safety Requirements

A. Traffic rules, signals, and warning signs as posted must be obeyed.

B. No person shall be permitted to ride or be otherwise transported on or in the following equipment whether loaded or empty: Dippers, shovels, buckets, forks, outside the cabs and beds of mobile equipment, chain, belt or the bucket of conveyors, except where such conveyors are specifically designed to transport personnel.

C. Vehicles shall follow at a safe distance. Passing shall be limited to areas of adequate clearance and visibility.

D. Mobile equipment operators must maintain full control of the equipment while it is in motion.

E. Equipment operating speeds shall be prudent, within the posted limits, and consistent with conditions of the roadway, grades, clearance, visibility, traffic, and the type of equipment used.

F. Cabs of mobile equipment shall be kept free of unnecessary materials.

G. When working around mobile equipment, notify the operator before getting on or off his equipment.

H. Equipment operators shall be certain, by signal or other means that all persons are clear before starting or moving equipment.

I. Dippers, buckets, loading booms, or heavy suspended loads shall not be swung over the cabs of haulage vehicles until the drivers are out of the cabs and in a safe location, unless the cabs are specifically designed to protect the drivers from falling material.

J. Men shall not work or pass under the buckets of loader or booms of cranes in operation.

K. Tires shall be deflated before repairs on them are started and adequate means shall be provided to prevent split rim wheels from creating a hazard during tire inflation.

L. Mobile equipment shall not be left unattended unless the master switch is in the off position, all operating controls are in the neutral position, and the brakes are set or other equivalent precautions taken against rolling. The wheels shall be turned into a bank, berm or shall be blocked.

M. Lights, flares, or other warning devices shall be posted when parked equipment creates a hazard to vehicle traffic.

N. Hydraulic lines can fail. Forks, buckets, scraper blades, and similar movable parts shall be secured or lowered to the ground when not in use.

O. Equipment and materials to be hauled shall be loaded and protected so as to prevent sliding or spillage.

P. When moving between work areas, the equipment shall be secured in the travel position.

Q. Any load extending more than four (4) feet beyond the rear of the vehicle body must be marked clearly with a red flag by day and a red light at night.

R. No work is to be performed on any raised component of equipment without first blocking or otherwise securing the raised portion against movement.

S. Equipment operators are responsible for maintaining control of the equipment at all times.

T. Manufacturer’s requirements are to be followed at all times.
4.0 Subcontractor Vehicles and Equipment
   A. No unsafe vehicles or equipment will be allowed on the project site. Where compliance is refused, the Project Superintendent or his/her designate should be notified immediately.
   B. Subcontractor employees shall follow established safety procedures in operation, inspection, and maintenance of vehicles and equipment.
   C. It will be the duty of the project supervisors to visually observe the vehicles and equipment of subcontractors and report any unsafe condition or practices to the Project Superintendent. Equipment not in compliance with applicable safety standards shall not be put in operation.

5.0 Material Handling Equipment
   A. No one shall be permitted in the cab with the operator unless a seat for the rider is provided.
   B. When not in operation, the clam or bucket should be either blocked or grounded. The master clutch must be disengaged when the operator leaves the cab.
   C. Operators loading and/or unloading equipment or material from vehicles with drivers must also be responsible to see that drivers are safe in a protected cab or that they step out of vehicles to a safe area.
   D. The equipment must be on solid foundation such as solid ground, mats or heavy planking and the outriggers are to be fully extended.
   E. When coupling a tractor to other equipment, everyone must be clear of the space between the units. The machine units need to be stopped, transmission in neutral and brakes set.
   F. When equipment is unattended, power must be shut off, brakes set, blade landed (grounded) and shift lever in neutral.
   G. Equipment must remain in gear to control speed and the brakes then applied. If the brakes fail, the bowl, blade, or bucket should be dragged or dropped.
   H. The scraper bowl or dozer/grader blades shall always be securely blocked when cutting edges are being replaced.

6.0 Site Clearing
   A. Employees engaged in site clearing should be warned about the hazards of irritant or toxic plants and harmful animals and instructed in first aid treatment procedures.
   B. Rider-operator equipment should be equipped with an overhead and rear canopy guard meeting the following requirements:
      1. The overhead covering on this canopy structure should be of not less than 1/8-inch steel plate or 1/4-inch wire mesh with openings no greater than 1 inch or equivalent.
      2. The opening in the rear of the canopy structure should be covered with not less than 1/4-inch wire mesh with openings no greater than 1 inch.

7.0 Safe Operating Procedures for Cranes and Derricks
   A. General Requirements
      1. Only approved standard hand signals for crane, derrick and boom equipment shall be used. A copy of these hand signals shall be posted at the operating position of each piece of equipment.
2. The manufacturer’s specifications and limitations applicable to the operation of any and all cranes and derricks must be complied with. Where manufacturer’s specifications are not available, the limitations assigned to the equipment shall be based on the determinations of a qualified expert competent in this field and such determinations will be appropriately documented and recorded. Attachments used with cranes shall not exceed the capacity, rating, or scope recommended by the manufacturer.

3. Rated load capacities, recommended operating speeds, special hazard warnings should be conspicuously posted on all equipment. Instruction or warnings shall be visible to the operator while he or she is at the control station.

4. A competent person prior to each use should inspect all machinery and equipment. Any deficiencies shall be repaired, or defective parts replaced, before continued use.

5. A competent person shall make a thorough annual inspection of the hoisting machinery. A record of the dates and results of inspections for each hoisting machine and piece of equipment must be maintained. A similar inspection shall be made before being put into operation when equipment is moved from one project to another.

6. Wire rope safety factors shall be in accordance with ANSI B30.5.

7. Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating, or other moving parts of equipment shall be guarded if such parts are exposed to contact by employees, or otherwise create a hazard.

8. Accessible areas within the swing radius of the rear of the rotating superstructure of the crane, either permanently or temporarily mounted, shall be barricaded in such a manner as to prevent an employee from being struck or crushed by the crane.

9. All exhaust pipes shall be guarded or insulated in areas where contact by employees is possible in the performance of normal duties.

10. All windows in cabs shall be of safety glass, or equivalent, that introduces no visible distortion.

11. Where necessary for rigging or service requirements, a ladder, or steps, shall be provided to give access to a cab roof.

12. Guardrails, handholds, and steps shall be provided on cranes for easy access to the car and cab.

13. Platforms and walkways should have anti-skid surfaces.

14. Fuel tank filler pipes shall be located in such a position, or protected in such manner, as to not allow spill or overflow to run onto the engine, exhaust, or electrical equipment of any machine being fueled.

15. An accessible fire extinguisher of 5BC rating, or higher, shall be available at all operator stations or cabs of equipment.

16. Except where electrical distribution and transmission lines have been de-energized and visibly grounded at point of work or where insulating barriers, not a part of or an attachment to the equipment or machinery, have been
erected to prevent physical contact with the lines, equipment or machines shall be operated proximate to power lines only in accordance with the following:
   a. For lines rated 50 KV, or below, minimum clearance between the lines and any part of the crane or load shall be 10 feet.
   b. For lines rated over 50 KV, minimum clearance between the lines and any part of the crane must be 10 feet plus one foot for each additional 30 KV.
*NOTE: See “Responsibilities for Crane Operators” #9-Required Clearance for High Voltage Lines.
17. All jibs shall have positive stops to prevent their movement of more than 5 degrees above the straight line of the jib and boom on conventional type crane booms. The use of cable type belly slings does not constitute compliance with this rule.
18. Crawler, truck, or locomotive cranes in use shall meet the applicable requirements for design, inspection, construction, testing, maintenance, and operation as prescribed in the ANSI B30.5, Safety Code for Crawler, Locomotive, and Truck Cranes.
19. Cranes mounted on rail tracks shall be equipped with limit switches limiting the travel of the crane on the track and stops or buffers at each end of the tracks.
20. Except for floor-operated cranes, a gong or other effective audible warning signal shall be provided for each crane equipped with a power traveling mechanism.
21. It is the responsibility of the Project Superintendent to insure that equipment is in serviceable condition and competently manned so as to afford safe operation at all times.

B. Operator and Employee Rules (“Responsibilities for Crane Operators” Outlines Crane Operator and Project Supervisor Responsibilities)
   1. Always work crane on firm level ground or cribbing.
   2. Know the weight of the load to be lifted and make allowance for safety factor in rigging.
   3. Signals:
      a. Only authorized personnel are to act as flaggers.
      b. Make sure operator and flagger understand the approved hand signals to be used. (See “Responsibilities for Crane Operators” - #18)
      c. Give clear signals to operator.
      d. Make sure operator can see flagger at all times.
      e. Only one person is to give signals to the operator at any one time.
   4. The capacity of the crane varies with the boom radius. Check the boom charts in crane cab for correct boom radius and measure if in doubt. (Boom radius is measured from crane center pin out to the load being lifted)
   5. Set all outriggers on motor crane when making a heavy lift.
   6. Never pick near capacity loads on the strong side of a crane and then attempt to swing to the weak side.
7. Check brakes before making a heavy lift by picking load and checking it close to the ground.
8. Use sufficient tag lines of adequate size and length on all loads.
9. Before lifting, check to see that no one is in a position to be struck or crushed by the motion of the load as it is picked. Anticipate the outward motion of the boom as it takes up the load.
10. Always lift with a balanced load.
11. Always watch crane closely when booming out with a load.
12. Keep the load and all parts of the crane 15 feet from all electric lines.
13. Provide barricades and warning signs to prevent exposure of passersby to the hazards of crane work.
14. Employees working with crane are to stay out from under boom whenever possible. Never hoist or swing loads over other workers.
15. Extend guardrails on crane or barricade the swing radius when crane is spotted. Stay clear of crane. (Anticipate hazard of the swinging crane cab)
16. Keep the boom directly over the load while making a lift. Do Not Allow boom to lean or strike against other objects. If objects must be moved from the side of the crane, use snatch blocks and rollers to get them into proper lifting position.
17. Keep hands out of pinch points when holding hook or slings while slack is being taken up.
18. Check all loads to be sure they are properly hooked on before they are picked up.
19. When walking a crane with the boom down, keep blocks up to the boom, and keep rigging off the hooks.
20. Cables, chokers, and accessories should be inspected before each use to insure their safe working condition.
21. The operator is not to leave the controls while a load is suspended.
22. No oiling or repairs are to be permitted while the equipment is in operation.
23. Riding the hook or load is forbidden.
24. In cases where the operator is not satisfied that the job is being performed safely, the crane is to be stopped and the operator is to notify the supervisor immediately.
25. The moving of tandem/multiple loads is allowed under the following conditions:
   a. Each load is rigged individually and attached to the crane hook.
   b. No less than seven (7) feet must be maintained between loads.
   c. Each load must have individual tag lines.
   d. Depending on the crane and the size of the crane hook, no more than five (5) multiple picks is allowed at one time.

*NOTE: Christmas Treeing with single rigging off the crane hook is Prohibited!*

26. Critical Lift Criteria
   a. Load exceeds 75% of load chart for the crane - (For Tipping & Structure).
b. Two or more cranes required for one pick.
c. Close proximity to power lines.
d. Unstable soil conditions.
e. Large or awkward loads.
f. Unique hoisting or rigging equipment that is to be used.
g. Strong winds and weather conditions.
h. Operators making lifts in blind areas.
i. Critical Lift meeting documentation containing the date and signature of attendees must be retained and placed in the project safety files.

*NOTE: The Critical / Multiple Lift Plan, must be completed and signed by the Project Superintendent prior to a making a Critical / Multiple Lift.

8.0 Cranes

A. General Requirements

1. Operators prior to use on each shift must inspect all cranes, hoists, forklifts, and heavy equipment. All deficiencies must be repaired before the equipment is used.
   
a. Make a walk around inspection to check the condition of the machine and that everyone is clear, prior to start-up. If pinch points or swing hazards exist, ensure that adequate barricades are in place to keep personnel from coming into contact with such hazards.
   
b. Check all engine fluid levels prior to engine start-up each day.
   
c. Allow sufficient time for warm-up period after engine is started before working the machine.
   
d. All controls are to be tested by the operator at the start of a new shift. If any controls do not operate properly, they shall be adjusted or repaired before working the machine. Check brakes before moving the machine.
   
e. Inspection is to include a check of all critical items on the equipment.
   
f. Records of these inspections are to be kept on site for review. (Safety Department will supply inspection checklist).

2. All operators are required to review and be familiar with the crane's operator’s manual and the company Inspection, Maintenance and Operation Manual Appendix and be qualified to operate the specific type of machine they are using. Operators must have training certification cards for each piece of equipment, which they will operate. These equipment operator training certification cards may be completed by the job superintendent following a review of the operator's manual an' company safety requirements including observation of the operator’s skill level and ability to safely operate the equipment.

3. All cranes, hoists, and lifts shall be operated within manufacturer's specifications and limitations. Attachments used with cranes shall not exceed the capacity rating or scope recommended by the manufacturer.
4. Rated load capacity charts, recommended operating speeds, special hazard warnings and other essential information shall be visible to the operator while he is at his control station.

5. Operator must take signals from only one person; however, in an emergency, a STOP signal can be given by anyone.

6. Working safety latches are required on all hooks on lifting and pulling devices.

7. There shall be an accessible 10 ABC fire extinguisher at all operator cabs or stations.

8. Cranes are not to be operated without a working boom angle indicator visible to the operator at all times.

9. No one but the operator is allowed in or on any crane while it is operating.

10. Routine maintenance, refueling and repairs are not to be performed while crane is in use or power is on.

11. All windows shall be of safety glass or equivalent and free of distortion.

12. All belts, pulleys, shafts, sprockets, drums, flywheels, or chains shall be properly guarded.

13. The crane and its components must be inspected frequently, periodically and yearly. Written, signed, and dated records of these inspections shall be readily available. These records must include dated and detailed information regarding the crane's service and maintenance. (Refer to the Crane Inspection, Maintenance and Operation Manual)

14. Employees are prohibited from riding the hook or the load.

15. Crane-suspended personnel baskets require specific safety equipment and procedures and are not to be used unless the crane is properly equipped and all required safety procedures are performed (refer to the Crane Inspection, Maintenance, and Operation Manual for requirements. Personnel Basket Inspection Form, and Personnel Basket Approval Form (Reviewed by Corporate SH&E Department and Approved by the Division Director) must be completed prior to the use of a crane suspended personnel basket.

16. When cranes or loads are required to pass under or by any energized high voltage power line and the clearance between such equipment and the power line is less than that specified in 1926.550 and ANSI B30.5, (10-foot minimum for voltages less than (50 KV) such power lines shall be de-energized and / or other safety precautions taken.

17. Always consider overhead lines to be energized unless a utility or client representative is present and certifies that the lines are not energized.

18. Loads must not be suspended on an unattended crane.

B. Crane Operations

1. Cranes shall be operated only by the following personnel:
   a. A designated operator holding a training certification card for the specific crane being operated.
   b. Trainees under the direct supervision of a designated operator.
   c. Maintenance and test personnel when it is necessary to perform their duties.
   d. No one other than the personnel specified above shall enter an
operator station or crane cab, with the possible exception of persons such as oilers and supervisory personnel, and then only in the performance of their duties and with the knowledge of the operator.

2. The job superintendent or his designee shall indoctrinate the crane operator regarding the company operating rules.

3. The operator shall be responsible for those operations under his direct control. When there is any doubt as to safety, the operator shall stop and refuse to handle the load until SAFETY has been assured.

4. The operator shall familiarize himself with the equipment and its proper care. If adjustments or repairs are necessary, or any defects known, he shall report this to his supervisor and shall also notify the next operator of the defects upon changing shifts. The operator must not operate the equipment if he is not confident of its safety and integrity.

5. The operator / signal person shall not swing loads over people.

6. The Project Superintendent shall have barricades erected and warning signs posted for overhead hazards and if necessary post a watch person to keep other personnel from entering work area. The operator is responsible for ensuring these actions have taken place during his / her pre-lift inspection.

7. Weights of loads shall be determined prior to the lift, and the operator made aware of the weight, especially on loads, which may approach the lifting capacity of the crane.

8. All loads to be lifted must be within the rated capacity of the crane in its existing configuration.

9. No crane is to be loaded beyond the manufacturer's specifications except for authorized test purposes, which may be required after certain repairs or prior to certain lifts.

10. The operator shall not attempt any lift he feels is unsafe.

11. The operator shall not leave his position at the controls while the load is suspended. Before leaving crane unattended the operator shall:
   a. Land any attached load, bucket, or other device.
   b. Disengage clutch.
   c. Set travel, swing, boom brakes, and other locking devices.
   d. Put controls in the "off" position.
   e. Stop engine.
   f. Secure crane against accidental travel.

C. Hydraulic Cranes

1. All hydraulic cranes greater than 20-ton capacity shall be equipped with a positive acting anti-two-block or LMI system.

2. The crane shall be level, with all outriggers fully extended and set on firm ground or footing prior to lifting loads or swinging boom over the side. Without the outriggers down in place and even with no load, it is possible to tip the crane over simply by swinging the boom over the side.

3. Traveling with a load is not recommended; however, if traveling is required, the following procedures shall be adhered to:
   a. Load must be positioned over the front of the machine in the direction of travel.
b. All traveled loads must be tied off to the crane by a tag line.
c. Some loads may require the positioning of the outriggers close to the ground.
d. Route of travel shall be level, compacted and free of obstacles.
e. Air pressure of the tires shall be checked and the chart capacity for lift on rubber shall not be exceeded.
f. Loads shall be lowered as close to the ground as possible.
g. Boom height for travel is not to exceed the manufacture’s specifications.

4. No one shall be allowed to ride on any crane or picker except the operator or driver.

5. No crane shall be loaded beyond its rated capacity.

6. Know the weight of the load and where it has to go.

7. A back-up alarm is required to warn people when machine is put into reverse gear.

8. Operator must wear seat belt at all times.

9. Do not extend or lower the boom without sufficient line payout.

D. Crane Inspection

1. A periodic Inspection Report Form is to be used to verify the condition of all hoisting equipment used on the jobsite. This form is to be used to verify the condition of incoming construction equipment to assure that it is free of mechanical defects and/or safety deficiencies. Equipment will be accepted for use only if in good condition requiring no repair and/or safety devices.

2. The supervisor or his designee will be responsible for making accurate inspections of all cranes on a monthly basis as well as when they arrive or are to be returned.

3. A daily inspection is to be performed and documented on all critical items for all mobile equipment used on the jobsite.

4. Should the equipment not meet the safety requirements, it shall not be used until all deficiencies are corrected.

5. An additional inspection must be made on each crane prior to any lift exceeding more than 80% of the cranes rated capacity.

6. Records of all equipment inspections, tests, repairs, and certifications are to be maintained at the jobsite.

7. Wire rope shall be taken out of service if any of the following conditions exits:
   a. In running ropes, 6 randomly distributed broken wires in one lay or 3 broken wires in one strand of one lay.
   b. Wear of one-third (1/3) the original diameter of outside individual wires.
   c. Evidence of any heat damage.
   d. Kinking, crushing, bird caging or any other type of damage, which results in distortion of the rope structure.
e. Noticeable reductions in nominal rope diameters. (ANSI B 30.5 -
   Company Inspection, Maintenance and Operation Manual.)

f. In standing ropes, more than 2 broken wires in one lay in sections
   beyond end connections, or more than one broken wire at end
   connections.

E. For additional information concerning crane inspection requirements, refer to Crane
   Inspection, Maintenance and Operation Manual.

9.0 References
   A. OSHA 1926 Subparts N and O
   B. OSHA 1910 Subpart N
   C. ANSI B 30.5
   D. Responsibilities for Crane Operators
   E. Responsibilities of Project Management

Responsibilities For Crane Operators
The issue of responsibility for the various aspects of a crane operation is too often unclear until a
serious accident occurs and a court of law decides where the responsibility belongs.
Safe crane operations require attention from both site supervision and the crane operator. Certain
responsibilities are solely the operator's and are under his/her direct control. THEREFORE, THE
OPERATOR SHALL HAVE THE DUTY TO REFUSE TO HANDLE THE LOAD UNTIL SAFETY HAS BEEN
ASSURED. Because crane operations are complex and differ from one job to the next, it is unlikely
a single set of guidelines can cover all the parameters involved. However, the following list can be
applied to most situations. The operator is generally responsible for:

1. Being in a physical, mental and emotional condition to have full control of the
   machine; and shall be available for a physical exam to meet minimal DOT standards
   involving drug and alcohol testing.
2. Knowing the particular crane model and configuration well enough to safely
   perform the work, to understand its functions and limitations, as well as its
   operating characteristics.
3. Being familiar with the content of the crane's operating manual.
4. Knowing to use the crane's load chart and applying it to all configurations. The
   operator must understand the correct application of all notes and warnings.
5. Informing supervision and/or the owner of problems when they develop.
6. Inspecting the crane and performing routine maintenance regularly, as prescribed
   by the owner and/or manufacturer; keeping appropriate records of inspections,
   maintenance and work done on the crane in the field.
7. Supervising the oiler and / or apprentice in their duties.
8. Being aware of any site condition that could affect the crane operation and check
   that the site is adequately prepared for the crane.
9. Being aware of the presence of power lines or other electrical hazards and operating
   the crane in such a manner as to assure that the crane, hoist rope or load will not
   come closer to a power line than allowed in .29 CFR 1926.550 (OSHA).
10. Reviewing the planned operation and lift requirements with site supervision.
11. Knowing how to identify the load and rigging weight, and determine where the load is to be placed and verify the radius.
12. Using the load chart to ensure the crane has sufficient net capacity for the lift.
13. Determining the number of parts of line required to make the lift.
14. Ensuring the selected boom, jib and crane configuration will safely handle the load within the site and lift conditions.
15. Knowing the procedures and techniques for proper assembling, setting up and rigging the crane within the manufacturer’s approved configuration.
16. Considering the factors that might reduce the crane's capacity and inform supervision of the need to make appropriate adjustments.
17. Understanding load rigging procedures and advising the responsible person if a doubt exists as to the adequacy of the rigging.
18. Signals and Signaling
19. Knowing who the signalperson is and how to communicate with them for the lift.
21. Operating the crane in a smooth, controlled and safe manner.
22. Knowing how to move the crane safely under its own power.
23. Shutting down and securing the crane when it is to be unattended.
24. Maintaining the skills and knowledge necessary to safely operate the crane by attending and participating in prescribed training programs.

Responsibilities Of Project Management

The issue of responsibility for the various aspects of a crane operation is too often unclear until a serious accident occurs and a court of law decides where the responsibility belongs. Safe crane operations require attention from both site supervision and the crane operator. Certain responsibilities are solely the operator’s and are under their direct control. THEREFORE, THE OPERATOR SHALL HAVE THE DUTY TO REFUSE TO HANDLE THE LOAD UNTIL SAFETY HAS BEEN ASSURED. Because crane operations are complex and differ from one job to the next, it is unlikely a single set of guidelines can cover all the parameters involved. However, the following list can be applied to most situations. Project management/supervision is responsible for:

1. Knowing the "Responsibilities of the Crane Operator;" and, the "Responsibilities of General Management."
2. Ensuring the operator is physically qualified, well trained, experienced and competent to operate the crane to which they are assigned, and for the task involved.
   a. Ensuring the operator knows how to use the load chart and is capable of determining the crane’s net capacity for all permissible operating configurations.
   b. Ensuring the operator is aware of their responsibilities.
   c. Ensuring the operator is capable of carrying out their responsibilities.
3. Providing a well-prepared working area for the crane before it arrives on the job. This may involve ensuring that:
   a. There is adequate site access and usability.
   b. There is room to erect and/or extend the boom.
   c. Blocking is, or will be made, available to support the boom while it is being assembled and dismantled.
d. Operating locations are level and compacted.
e. Blocking is, or will be made, available for outrigger support.
f. Supporting surfaces are suitable to handle the expected loads.
g. Suitable slats or cribbing are available if the ground is soft.
h. Ensuring there is adequate room for extension of crawlers, outriggers, counterweights and attachments.
i. Barricade material is available to barricade the tail swing radius.

4. Determining the correct load weight and operating radius and informing the operator.

5. Ensuring the crane is appropriate for the task to be completed.
a. Providing a crane in proper condition and properly maintained.
b. Providing a crane including necessary parts/components to satisfy the configuration and capacity requirements.
c. Providing a crane complete with applicable rating chart, operator's manual, control identification labels, hand-signal placard, electrical hazard warning placard and warning labels.

6. Ensuring a thorough crane maintenance and inspection program is established and maintained. This will involve developing records that facilitate the reporting of repair and maintenance work needed and completed on the crane.

7. Knowing which local, state and federal rules and regulations apply to the safe operation of the crane.

8. Locating and communicating site hazards and restrictions to the operator, such as electric power lines and piping (above and below ground).

9. Restricting access to a work area.

10. Reviewing planned operations. The review should include such conditions as working height, boom length, load radius, quadrant of operation, load weight, load dimensions and center of gravity.

11. Ensuring the signal person is competent and capable of directing the crane operator.

12. Communicating at the site with operator, crew and signal person.

13. Knowing the preparation of the crane for loading or unloading onto trailers, railcars, and barges, as needed.

14. Knowing load rigging requirements and procedures.

15. Ensuring the load is properly rigged.

16. Knowing the unique differences in operations when working under various operating conditions, such as:
a. Multi-crane lift
b. Suspended personnel platforms
c. Clamshell/dragline operations
d. Pile driving and extraction
e. Concrete operations
f. Demolition operations
g. Barge/Marine operations
h. Magnet operations
i. Multiple drum operations

17. Knowing how to verify weight and center of gravity of the load.
18. Providing ongoing training and upgrading programs.
19. Knowing limitations of protective measures against electrical hazards such as:
   a. Grounding
   b. Proximity warning devices
   c. Insulated links
   d. Boom cages
   e. Proximity to electric power lines, radio and microwave structures.
28.1 AERIAL LIFTS (BOOM AND SCISSOR LIFTS)

EQUIPMENT OPERATOR TRAINING

COURSE OUTLINE

• Overview of OSHA 1926.450 Regulations
• ANSI / SIA A92.5 – 1992
• Video: Manufacturer’s Training Tape
• Review of Mobile Equipment Accidents
• Manufacturer’s Safety Precautions
• Boom Lift Safety Operators Exam
• Hands On Operators Qualifications
# 28.1 - Aerial Lifts  
(Boom And Scissor Lifts)

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28.1 AERIAL LIFTS

(BOOM AND SCISSOR LIFTS)

1.0 General

Aerial Lifts (Boom and Scissor Lifts) come in a variety of sizes and designs and may operate on battery power, propane, gasoline or diesel fuel. Operators must be trained and understand the design and performance of the Aerial Lifts in order to safely operate under a variety of conditions and environments. Aerial Lifts are to be operated only by authorized persons who currently hold a valid Operators Training certification card for the specific type of Aerial Lift. The Project Superintendent, Foreman, Project SH&E Supervisor, or other persons qualified to perform task training may perform this training.

While the basic design of Aerial Lifts are the same, different Aerial Lifts will have different controls, weight capacities and restrictions on where they can operate. The basic parts of an Aerial Lifts are:

- **Chassis** – The integral part of the Aerial Lift, which provides mobility and support for the elevating assembly.
- **Turntable (Boom Lift)** – A revolvable platform with a rotating load bearing gear and hydraulic powered drive motor.
- **Boom (Boom Lift)** – A cantilever beam, which supports the platform.
- **Scissor Arms** – Provide raising and lowering of the platform.
- **Platform** – The portion of an aerial platform intended for occupation by personnel with their necessary tools and materials.

2.0 Equipment Specific Training

A. The operator shall be trained on the same make and model of the Aerial Lift that he/she will be required to operate on the project. As part of the operator qualification, the employee shall be required to demonstrate that they have the necessary skill levels needed to safely operate the equipment under a variety of work conditions. The hands-on operation of the equipment will be performed in a designated area with minimal hazards, under the direct supervision of a competent person. In compliance with current regulations, only properly trained and authorized persons will be allowed to operate an Aerial Lift.

Prior to operation of an Aerial Lift, employees are to have completed the following:

1. Will have read and understood the manufacturer’s operation and safety manual for the specific type of equipment, or reviewed the manufacturer’s safety rules and requirements as part of a formal training program.
2. Demonstrated knowledge of the function of each control.
3. Demonstrated knowledge of all decals, charts, and placards.
4. Demonstrated a knowledge proficiency of the equipment load capacity under any possible configuration.

3.0 Training Records

A copy of the operator’s training records including classroom and hands-on task training shall be maintained onsite for the length of employment plus one year.

4.0 Inspection and Maintenance

Each Aerial Lift shall be inspected and maintained as required to ensure proper and safe operation. Inspections and routine maintenance are to be performed by field personnel and are compatible with the manufacturer’s guidelines for the severity of the operating conditions and environment. Any Aerial Lift that is not in proper working condition shall be removed from service until repairs can be made. All repairs made to the unit shall be made by a qualified person and shall be in conformance with the manufacturer’s recommendations. A qualified mechanic shall perform repairs beyond the capabilities of jobsite personnel. All rotating equipment must have annual inspections.

5.0 Pre-Shift Inspections

A. At the beginning of each shift the operator will check all Aerial Lifts in use in order to ensure that equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use.

   1. It will be the operator’s responsibility to report unsafe conditions.
   2. Any Aerial Lift that is unsafe to operate shall be taken out of service until repaired.
   3. When repairs are made, the parts and components used shall meet manufacturer’s specifications.
   4. No modifications or additions including welding or cutting on the boom, scissor arms or basket shall be made that could affect the safe operation or stability of the Aerial Lift without written approval from the manufacturer.

A. Prior to operation, an Operators Safety Check List report (Exhibit 28.1-5) shall be completed. When the Aerial Lift is operated for more than one shift, the inspection form shall be completed for each shift the equipment is used. Items to be checked during the inspections include:

   1. Control placards are in place and legible.
   2. Manuals are in place.
   3. Battery level (DC equipment).
   4. Check for installation and condition of lights and other electrical components.
   5. Hydraulic hoses, fittings and manifolds.
7. Drive motors and torque hubs.
8. Boom cables, chains and pads.
9. Scissor arm pins, pivots, washers, etc.
10. Dents or damage to boom.
11. Tires and wheels.
13. Limit switches, alarms and beacons.
15. Platform entry.
16. Welds and structural components.
17. Compartments, covers and latches.

6.0 Operational Checks

If all items on the Pre-Shift Inspection check out, start the Aerial Lift. Check all gauges, indicators and warning lights. Put the Aerial Lift through its normal maneuvers; check the steering, boom extension or scissor arms, retraction, elevation and lowering. Check the turntable rotation on the boom lift in both directions and check the drive in both directions on the scissor lift. The operator shall immediately report any problem or malfunction that may occur during the operation of the Aerial Lift. **Problems, which occur during the shift that affect the safety of the vehicle shall be repaired immediately, or the vehicle shall be removed from the service until proper repairs can be made.**

7.0 Maintenance / Repair Precautions

A. Prior to performing any maintenance or repairs on mobile equipment, the following safety precautions are to be taken:

1. The engine is to be turned off, the key removed and tagged out “Do Not Operate” or other means taken to prevent unauthorized starting of the Aerial Lift.
2. The boom on the boom lift or the basket on the scissor lift shall be lowered to the lowest possible position or otherwise securely supported to prevent dropping.
3. All operating controls are to be placed in the “OFF” or “NEUTRAL” position. The wheels blocked to prevent accidental motion.
4. Pressurized systems such as but not limited to: hydraulic, air, cooling, etc. are to be relieved of pressure prior to any maintenance or repairs.
5. Disconnect the batteries before working on the electrical system.
6. Guards, safety latches or supports are to be installed and used as per the manufacturer’s instructions.
8.0 Capacities

Each boom lift shall have control placards, clearly posted on the machine, visible to the operator, indicating potential hazards and load limitations of the machine. Operators must understand that boom lifts have certain load and operating limitations, which can affect the stability of the machine on different surfaces. No modifications or additions, which can affect the safe operation of the equipment, shall be made.

9.0 Visibility

Aerial work platforms are designed to lift personnel. Stacking material in the basket will greatly reduce the operator’s visibility, and the ability to safely operate the controls. Traveling up and down grades, slopes and ramps are another hazard and extreme caution is to be used to assist the operator.

10.0 Stability

A. Boom Lifts

The length of the boom directly affects the boom lifts capacity and it’s angle. Boom lifts must be operated on a smooth, firm, and level supporting surface, and within the load limits as displaced on the machine and listed in the operator’s manual. Several factors that will affect a boom lift’s stability include:

1. Height of the platform.
2. Improper loadings on platform using planks, ladders or other devices to achieve a greater working height.
3. Failure to properly position the machine or stabilizing devices.
4. Traveling down/up, grades/slopes.
5. Weather conditions.
6. Over loading personnel basket.
7. Surface conditions.

B. The scissor lift’s capacity and stability are set by the manufacturer and are displaced on the machine and is listed in the Operator’s Manual. Several factors that will affect a scissor lift’s stability and capacity include:

1. Height of the platform.
2. Improper loadings on platform using planks, ladders or other devices to achieve a greater working height.
3. Failure to properly position the machine or stabilizing devices.
4. Traveling down/up, grades/slopes.
5. Weather conditions.
6. Over loading personnel platform.
7. Surface conditions.
8. All systems are functioning properly.
C. Improper operation of an Aerial Lift can cause it to tip over resulting in serious injury or death. In all cases, the stability of an Aerial Lift can be affected by the surface on which it is operated, by turning especially at high speeds, and by running over objects or into overhead structures. The operator must maintain the unit’s stability by keeping within the rated capacity of the boom lift. Speed and a sharp, quick turn can cause the operator to lose control of the machine.

11.0 Aerial Lift Operation

The operator is responsible for the safe movement and operation of the Aerial Lift. Since the operator is in direct control of the equipment, complying with recognize safe operating practices is the responsibility of the operator. The operator shall make decisions on the safe use and operation of the Aerial Lift based on surrounding hazards and operating conditions.

12.0 Inspection of the Work Area

A. When an Aerial Lift is to be used, the employee and supervisor shall inspect the area where the equipment is to operate for hazards such as but not limited to:

1. Overhead obstructions such as pipes and overhead high voltage lines.
2. Smooth and level operating surfaces, check for load capacity, holes, rough terrain, mud, ice, loose or un-compacted soil, bumps and floor obstructions, or other hazards, which may affect operating safety.
3. Unauthorized persons or vehicles in work area.
4. Debris or housekeeping hazards.
5. Adverse weather conditions.
6. Hazardous locations.
7. The ability of the operating surface to support the equipment and the load.
8. Any other possible hazards or conditions, which can adversely affect the safe operation of the equipment.

13.0 General Operating Safety

A. It is important that employees understand the safe working requirements limitations of the Aerial Lift. The operator shall abide by the following safety precautions during the use and operation of the boom lift.

1. A full body harness with the lanyard securely hooked on the proper attachment point is required when operating a boom lift and the scissor lift when equipped. **Never hook off outside the work platform while working from the basket.**
2. Aerial Lifts are not to be operated when wind conditions exceed 30 MPH.
3. When the Aerial Lift is left unattended, the emergency stop shall be set. The boom / platform lowered to the lowest possible position and the engine shut off. The wheels shall be chocked or turned into a berm to prevent movement.
4. When parking the Aerial Lift ensure that it is out of the way and visible to other traffic in the area. Use of cones, barricades or other warning devices may be necessary.

5. Never exceed the manufacturer’s rated platform capacity. Refer to the capacity decal on the Aerial Lift. Distribute the load evenly on the platform floor.

6. Avoid travel ways where standing water, sand, gravel, or loose material may cause loss of traction or unstable support for the weight of the Aerial Lift, which could result in tipping of the machine or loss of control.

7. Aerial Lifts are not to be driven into unsafe areas. This will include, but not be limited to areas of construction where unnecessary tire, steering or boom damage could result.

8. While there may be more than one person in the basket at any one time, only a trained and qualified person is permitted to operate the controls.

9. Aerial Lifts shall not be used as material hoists or cranes. Only employees and their tools and equipment are to be lifted.

10. Do not push or pull objects into place with the platform. Do not attach ropes, cables, slings, etc. and pull the machine or other objects by retracting the platform.

11. All posted traffic regulations shall be followed. No Aerial Lift shall be driven at a speed greater than is reasonable and proper, with due regard for weather, traffic, intersections, width and character of the roadway, load size and typed, and any other existing condition. Do not use high speed in restricted or close areas.

12. Ensure proper orientation of the turntable on a boom lift for the intended direction of travel. Check the directional arrows on the machine.

13. Always keep non-operating personnel at least 6 feet away from the Aerial Lift during driving operations.

14. Extreme care shall be taken when driving on inclines, slopes, or grades that could cause tipping or loss of control. Do not drive the machine on grades or slide slopes exceeding those specified on placards at the platform controls.

15. Do not turn on ramps or grades. Always ascend or descend ramps or grades with the boom/ basket upgrade.

16. Always position the boom in line with the direction of travel or lower the platform on the scissor lift to the lowest position when traveling. When making a turn, slow down; keep the basket as low to the ground as possible. Always secure the turntable won the boom lift for extended traveling. Do not drive the Aerial Lift with the platform elevated unless the Aerial Lift is on a level, smooth and firm surface.

17. Striking a raised, fixed object such as a curb or concrete footer can result in a tip-over or sudden whipping of the platform, which can result in injury. Watch for bumps and potholes in the road that can cause you to lose control of the Aerial Lift.
18. The operator must check for clearances above, below, and on the sides when raising, lowering, swinging and telescoping the boom or scissor lift platform. Ensure that operators of other overhead and floor level equipment are aware of your presence. Disconnect power to overhead cranes or use crane stops to prevent contact. Barricade floor areas if necessary.

19. Check for tail-swing (counterweight) clearances before swinging the turntable on the boom lift.

20. Use extreme caution when crossing railroad tracks. Hooking the bottom of the platform on the tracks can cause a sudden stop that can result in an accident or injury. Rough uneven tracks can result in tipping over in a scissor lift.

21. No Aerial Lift shall be parked closer than eight feet from the centerline of a railroad track.

22. The operator must maintain safe clearances from electrical lines and other energized equipment (Minimum 10 feet). Allow for platform movement and electrical line swaying.

23. Disabling or altering the foot switch / safety switches, interlocks or other safety devices is prohibited.

24. Personnel shall always stand on the floor of the platform. Never use boxes, planks, ladders, etc. or stand on the rails to work.

25. When crossing aisles and other areas where vision is obstructed, the operator shall stop, honk the horn and proceed with caution. If vision is totally obstructed, post a lookout before proceeding.

26. When fueling the Aerial Lift, the engine shall be turned off and precautions taken to prevent spillage of fuel. Fueling of Aerial Lifts shall be done in an area that is well-ventilated and free from flame, sparks or other hazards that may cause fire or explosion.

27. Smoking will not be allowed on, in or within 50 feet of fueling operations.

28. A minimum of a 2 ½ ABC fire extinguisher shall be placed in the platform, and inspected daily.

29. When welding, cutting or burning, areas below the operations shall be inspected for flammable or combustible materials and barricaded prior to the start of work. A fire watch may be required for this type of work.

30. Aerial Lifts shall be equipped with a backup alarm that is audible above the surrounding noise level and have a strobe type beacon.

31. Markings, including capacity charts, placards and tags shall not be removed or defaced. Missing, or illegible markings shall be replaced immediately.

32. When other moving equipment, vehicles or pedestrians are present in the work areas, the operator must exercise caution to ensure safety. Never allow ground personnel in areas around and under a raised platform. Do not telescope the boom, on a boom lift, over roadways without taking adequate measures to prevent traffic...
from striking the boom.

33. Never walk or “shimmy” the boom or climb the scissor lift arms to gain access or leave the platform. Manual descent controls located adjacent to the ground control station, allow for retracing and lowering the platform in the event of a total power failure. Under no circumstances are these controls to be used unless the platform cannot be lowered by normal means, and then only with the knowledge and permission of persons in the platform.

34. Keep mud, grease and other slippery substances cleaned from footwear and platform deck. Keep extraneous material out of platform to prevent tripping hazards.

35. Safe courteous operation of an Aerial Lift is expected of all employees because it prevents injury to you and others, saves damage or loss of valuable equipment and improved public relations. Safe operation of company equipment is a responsibility not a privilege.

36. When transporting Aerial Lifts on trailers, the equipment shall be adequately secured against movement.

14.0 Operator Controls and Instruments

A. Depending on the make and model of the Aerial Lift, the operator controls and instrument gauges may vary depending on the manufacturer of the boom lift and its design and rating. Warning lights and gauges can signal that something is wrong or indicate that there is a problem with the vehicle before it becomes a serious problem or a safety concern. The operator must be familiar with the location and function of the following items:

1. Ground controls.
2. Auxiliary Power.
3. Hazard warning flasher system.
4. Platform Control Station.
5. Outrigger interlock and alarm system.
6. Foot safety switch.
7. Extending outriggers.
8. Extendable axle controls.
10. Ground Control Station.
11. Emergency stop controls.
15.0 Safe Operating Requirements:

Only qualified operators may operate Company owned, leased or rented Aerial Lifts. Aerial Lifts are to be operated only by authorized persons who currently hold a valid Operators Training Certification Card for the specific type of Aerial Lift. This training may be performed by the Project Superintendent, Foreman, Project SH&E Supervisor, or other persons qualified to perform task training.

16.0 Electrocution Hazard

At no time shall an Aerial Lift work inside the minimum safe distance allowed from overhead electrical lines and other energized components. The minimum safe distances that shall be maintained to exposed energized overhead power lines and energized parts are:

<table>
<thead>
<tr>
<th>Voltage Range (Phase to Phase)</th>
<th>Minimum Safe Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>From 0 KV to 50 KV</td>
<td>10 FT.</td>
</tr>
<tr>
<td>Over 50 KV to 200 KV</td>
<td>15 FT.</td>
</tr>
<tr>
<td>Over 200 KV to 350 KV</td>
<td>20 FT.</td>
</tr>
<tr>
<td>Over 350 KV to 500 KV</td>
<td>25 FT.</td>
</tr>
<tr>
<td>Over 500 KV to 750 KV</td>
<td>35 FT.</td>
</tr>
<tr>
<td>Over 750 KV to 1000 KV</td>
<td>45 FT.</td>
</tr>
</tbody>
</table>

17.0 Pedestrian And Other Traffic

A. In many areas it may not be possible to completely separate Aerial Lift Operations from pedestrian, bicycle, and other vehicular traffic. Operators shall be aware of pedestrians and other traffic in the area and watch for potential hazards. The following safety precautions must be adhered to by equipment operators when working in areas with pedestrians or other vehicular traffic:
   1. Watch where you are going; always face the direction of travel. Pedestrians and other vehicles use the same roadway as you. Sound the horn at intersections and blind spots. Use a spotter if vision is blocked.
   2. Watch for people in and around the work area, they may not be watching you, even though the Aerial Lift has warning lights and alarms. If you think they may not see you, do not move until you have made eye-to-eye contact. Make people stand back, even if you’re stopped.
   3. Watch for employees working around you. Don’t let anyone walk under the boom or platform. Barricade the area around your work area.
   4. Keep your body inside and on the platform. Do not lean out or climb the rails to reach a higher level.
18.0 **Carbon Monoxide and Fumes**

Aerial Lifts and other mobile equipment powered by internal combustion engines can generate carbon monoxide and exhaust fumes. Carbon monoxide acts as an asphyxiate and can affects the operators ability to safety operate the equipment, and in high enough concentration, it can kill in a matter of minutes. When working in enclosed areas such as buildings or warehouses, be aware of possible carbon monoxide buildup and take protective measures, if required.

19.0 **Accident / Incident Investigation**

In the event of an accident or incident involving a man lift, scissor lift or other mobile equipment workers are to immediately notify their supervisor, secure the area and not to move the effected equipment until the accident investigation is complete or at such time it is determined by Preferred Industrial Contractors, Inc. and /or the plant or facility owner that the equipment can be moved. PIC will investigate all mobile equipment accidents / incidents as per our company Safety, health and Environmental Manual (section 9.0 Incident Investigation Procedures) these procedures will require drug testing of operators involved in mobile equipment accidents / incidents.

20.0 **Retraining of Operators**

A. Operators of Aerial Lifts will be retrained when the company has reason to believe that the employee’s knowledge or skill level lacks the proficiency to safely operate the Aerial Lift. In addition, retraining will be required in the following circumstances.

1. Changes in the job site which present hazards that the employee has not been previously trained.
2. Changes in the type of equipment the employee will be required to operate.
3. When inadequacies are noted in an employees’ operation of an Aerial Lift, which indicate the employee needs re-training.

21.0 **Observational Checklist**

In addition to the classroom training program and written tests used to evaluate operator knowledge, each operator will be required to demonstrate that they have the necessary skill levels needed to safely operate the Aerial Lifts under a variety of work condition. The hands-on operation of the Aerial Lift will be performed in a designated area with minimal hazards.

22.0 **Exhibit(s)**

A. 28.1-1 Boom Lift Test
   • Boom Lift Test Answers
B. 28.1-2 Boom Lift Operator Observational Checklist
C. 28.1-3 Scissor Lift Test
   • Scissor Lift Test Answers
D. 28.1-4 Scissor Lift Operator Observational Checklist
E. 28.1-5 Operators Daily Equipment Inspection Report
BOOM LIFT TEST

Name: ______________________________________  Date: __ __/ __ __/ __ __
(Print)

SS# __ __- __ __- __ __

Multiple Choice. Select the answer, which is the most correct

1. Where can the maximum platform capacity rating always be found on a boom lift?
   a. Unit serial number
   b. On the chassis
   c. In the equipment operation and safety manual
   d. At the ground control station

2. You should not accept responsibility for operation of any mobile equipment until:
   a. You are given the keys
   b. You have been properly trained and qualified on the equipment
   c. You check that the fuel tank is full
   d. You have five years experience on the equipment

3. What is the minimum clearance distance to be maintained between a boom lift and an energized power line?
   a. 10 feet up to 5000 volts
   b. 50 feet up to 10,000 volts
   c. 5 feet up to 5000 volts
   d. 10 feet up to 50,000 volts

4. What can be used to extend the maximum reach of a boom lift?
   a. Scaffolding
   b. Nothing
   c. A step ladder, if properly secured
   d. A spruce 2X10 and two 5 gallon buckets

5. When wearing a harness on a boom lift, one end of the lanyard is attached to the back D-ring and the other end is attached to:
   a. Around the hand rail of the platform
   b. To a designated attachment point on the platform
   c. Around the nearest structure
   d. Don’t need to attach it anywhere unless you are standing on the midrail

6. If you put too much weight in the basket of a boom lift, you may:
   a. Tip the unit over
   b. Cause the boom to bend
   c. Lose your job
   d. All the above

7. How close can mobile equipment be parked to the centerline of a railroad track?
   a. 3 feet
   b. 6 feet
   c. 12 feet
   d. 8 feet

8. It is ok to climb up on the mid rail to reach higher as long as I have my harness on and am attached to the basket.
   a. True
   b. False

9. What is the first thing to be done if a malfunction of the boom lift occurs?
   a. Check the hydraulic oil
   b. Park the unit
   c. Yell for help
   d. Stop the unit
10. The ground control station should be used to lower the platform
   a. When the platform controls need repaired
   b. To scare the ----- out of the guys in the basket
   c. Anytime
   d. In an emergency

11. Boom lifts are not to be operated when wind conditions exceed:
   a. 5 mph
   b. 10 mph
   c. 20 mph
   d. 30 mph

12. What factors affect the stability of a boom lift?
   a. Length of the boom
   b. Platform loading
   c. Ground conditions
   d. Boom angle
   e. All the above

13. When inspecting the work area prior to operation, what hazards should be identified?
   a. Overhead obstructions
   b. Holes, rough terrain, uncompacted soil, unstable operating surfaces
   c. Debris or housekeeping hazards
   d. Unauthorized persons or vehicles
   e. All the above

14. Which of the following may not be hoisted in a boom lift?
   a. Hand tools
   b. Personnel
   c. Cutting Torch
   d. Piece of 6" pipe 3 foot long

15. Where must an operator check for clearances prior to raising, lowering, swinging or extending the boom?
   a. Above
   b. Below
   c. To the side
   d. All the above

16. Smoking is not allowed within feet of fueling operations.
   a. 5
   b. 10
   c. 25
   d. 50

17. Who is responsible for the safe operation of the equipment?
   a. The company
   b. My supervisor
   c. I am

18. When must the pre-shift inspection be performed?
   a. Daily
   b. Weekly
   c. At the beginning of each shift
   d. Prior to use during each shift
19. A boom lift will travel either direction so the travel arrows are of no concern.
   a. True
   b. False

20. The control placards and warning decals are generally an accessory and are of no concern to a good operator.
   a. True
   b. False

**Respond to the following statements as being either True (T) or False (F)**

1. _____ Your tires should be checked weekly.
2. _____ When parking your boom lift, make sure the platform is left high enough to clear obstructions.
3. _____ Keep the engine oil level at the full mark on the dipstick.
4. _____ It is ok to work under the platform as long as there are no hydraulic leaks.
5. _____ It’s ok to smoke when refueling as long as you are in a restricted area.
6. _____ Stay in low gear when traveling on slopes.
7. _____ When the platform is lifted, you must be within 10% of level.
8. _____ As long as you are in the platform, it is ok to let an unauthorized person operate a boom lift.
9. _____ If you take special care, it’s ok to let bystanders walk beneath the platform and boom.
10. ____ A careful driver follows the rules of the road.
11. ____ A careful driver sticks his head and arms outside the platform.
12. ____ A careful operator watches above, below and to the sides when operating a boom lift.
13. ____ A good operator can lift all sorts of stuff with the platform.
14. ____ As long as you use proper rigging, it’s ok to lift light loads with the boom lift.
15. ____ Electrical lines are of no concern because the boom lift has rubber tires.
16. _____ The pre-shift inspection is just for inexperienced operators.
17. ____ A good operator always keeps the steps and his shoes clean of mud and grease.
18. _____ It’s OK to use a ladder in the platform for additional reach, as long as I hook off with my lanyard.
19. _____ Although the basic controls may be the same, the exact controls and instruments vary from one boom lift to another.
20. ____ Any good welder can add an extension to the boom or platform.
### BOOM LIFT TEST ANSWERS

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<tr>
<td>20. b</td>
<td>20. False</td>
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</tbody>
</table>
BOOM LIFT OPERATOR OBSERVATIONAL CHECKLIST

Operator Name: ____________________________ Date: ____________________________
(Print)

Equipment: ____________________________ Observer: ____________________________
(Print)

Yes  No  1. Employee has on the appropriate personal protective equipment.

Yes  No  2. Employee completed a pre-shift inspection of the equipment prior to operating the equipment.

Yes  No  3. Any covers, guards, caps or safety devices removed for purposes of inspection have been replaced.

Yes  No  4. Employee can identify and understands the operation of each control.

Yes  No  5. Employee performed a functional test of each control.

Yes  No  6. Employee can identify and understands all placards, decals, warnings and instructions for the equipment.

Yes  No  7. Employee inspected the area for hazards prior to operation.

Yes  No  8. Employee appears comfortable operating the equipment and operates the equipment smoothly without any jerking or other unsafe movements.

Yes  No  9. Employee appears to have the proper eye, hand, and foot coordination to safely operate the equipment.

Yes  No  10. Employee demonstrates a working knowledge of the equipment.

Yes  No  11. Employee knows the procedures for reporting defects, malfunctions or other problems with the equipment.

______________________________  ________________________________
Operator’s Signature             Observer’s Signature
SCISSOR LIFT TEST

Name: ___________________________ Date: ____ / ____ / ____
(Print)

SS# _________-________-________

Multiple Choice. Select the answer, which is the most correct

1. The platform may be raised when the chassis is on a:
   a. 5 degree slope
   b. Firm level surface
   c. 10 degree slope
   d. Soft or uneven ground
   e. a & c

2. Prior to operating a scissor lift, you must:
   a. Perform a walk around inspection
   b. Be properly trained
   c. Read and understand the operators manual
   d. Perform a functional check of all controls
   e. All of the above

3. What is the minimum safe approach distance to be maintained between a scissor lift and an energized power line?
   a. 10 feet up to and including 5000 volts
   b. 20 feet up to and including 50,000 volts
   c. 10 feet up to and including 50,000 volts
   d. 15 feet up to and including 50,000 volts
   e. Do not make contact

4. Where can the maximum platform capacity always be found on a scissor lift?
   a. Attached to the railing
   b. Ground controls
   c. Operation and safety handbook
   d. Operators Manual
   e. Why do you need to know that?

5. What is the first thing you need to do if the scissor lift malfunctions?
   a. Jump
   b. Drive to a safe and secure area
   c. Yell for help
   d. Shut down the lift
   e. Continue to operate in a cautious manner

6. The ground control station should be used to lower the platform
   a. When the platform controls need repaired
   b. To scare the ----- out of the guys in the basket
   c. Anytime
   d. In an emergency

7. If you exceed the rated capacity of the scissor lift platform or a platform extension, you may:
   a. Cause structural damage or collapse to the lift
   b. Lose your job or your life
   c. Increase your productivity
   d. a & c above
   e. a & b above

PIC...Rev.02/06/2012
8. You should not accept responsibility for operating a scissor lift until:
   a. You have had 5 years experience operating a scissor lift
   b. You have received training on the operation of a scissor lift and have read and understand the operator’s manual.
   c. You are given the keys
   d. You have done your pre-shift inspection
   e. b & d above

9. Safety props are to be used:
   a. To elevate the platform to increase stability
   b. To perform maintenance or inspections in or around raised scissor lift platforms
   c. Driving the scissor lift
   d. When using the deck extension
   e. a & c above

10. If the labels for the controls are not legible, you should:
    a. Activate each control to determine what its function is, then proceed with caution till you have them memorized.
    b. Clean and/or replace the labels
    c. Ask someone else, who knows the controls
    d. Shut down the scissor lift
    e. b & d above

11. Do not operate a scissor lift when wind speeds exceed
    a. 10 mph
    b. 20 mph
    c. 15 mph
    d. 30 mph
    e. None of the above

12. What can be used to extend the maximum reach of a boom lift?
    a. Scaffolding
    b. Nothing
    c. A step ladder, if properly secured
    d. A spruce 2X10 and two 5 gallon buckets

13. When inspecting the work area prior to operation, what hazards should be identified?
    a. Overhead obstructions
    b. Holes, rough terrain, uncompacted soil, unstable operating surfaces
    c. Debris or housekeeping hazards
    d. Unauthorized persons or vehicles
    e. All the above

14. When must the pre-shift inspection be performed?
    a. Daily
    b. Weekly
    c. At the beginning of each shift
    d. Prior to use during each shift

15. The control placards and warning decals are generally an accessory and are of no concern to a good operator.
    a. True
    b. False

16. Smoking is not allowed within _____ feet of fueling operations.
    a. 5
    b. 10
    c. 25
    d. 50
17. Which of the following may not be hoisted in a scissor lift?
   a. Hand tools
   b. Personnel
   c. Cutting Torch
   d. Piece of 6” pipe 3 foot long

18. What factors affect the stability of a scissor lift?
   a. Height of the platform
   b. Platform loading
   c. Ground conditions
   d. Ground angle
   e. All the above

19. Who is responsible for the safe operation of the equipment?
   a. The company
   b. My supervisor
   c. I am

20. The control placards and warning decals are generally an accessory and are of no concern to a
good operator.
   a. True
   b. False

Respond to the following statements as being either True (T) or False (F)

1. _____ Your tires should be checked weekly.
2. _____ When parking your scissor lift, make sure the loader platform is left high enough to clear obstructions.
3. _____ Keep the engine oil level at the full mark on the dipstick
4. _____ It is ok to work under the platform as long as there are no hydraulic leaks.
5. _____ It’s ok to smoke when refueling as long as you are in a restricted area
6. _____ Stay in low gear when traveling on slopes
7. _____ When the platform is lifted, you must be within 10% of level
8. _____ As long as you are in the platform, it is ok to let an unauthorized person operate a scissor lift.
9. _____ If you take special care, it’s ok to let bystanders walk beneath the platform.
10. _____ A careful driver follows the rules of the road.
11. _____ A careful driver sticks his head and arms outside the platform.
12. _____ A careful operator watches above, below and to the sides when operating a scissor lift.
13. _____ A good operator can lift all sorts of stuff with the platform.
14. _____ As long as you use proper rigging, it’s ok to lift light loads with the platform.
15. _____ Electrical lines are of no concern because the scissor lift has rubber tires.
16. _____ The pre-shift inspection is just for inexperienced operators.
17. _____ A good operator always keeps the steps and his shoes clean of mud and grease.
18. _____ It’s ok to use a ladder in the platform for additional reach, as long as I hook off with my lanyard.
19. _____ Although the basic controls may be the same, the exact controls and instruments vary from one scissor lift
to another.
20. _____ Any good welder can add an extension to the platform.
SCISSOR LIFT TEST ANSWERS

Multiple Choice

1. b
2. e
3. c
4. d
5. d
6. d
7. e
8. e
9. b
10. e
11. b
12. b
13. e
14. c
15. b
16. d
17. d
18. e
19. c
20. b

True Rr False

1. False
2. False
3. True
4. False
5. False
6. True
7. False
8. False
9. False
10. True
11. False
12. True
13. False
14. False
15. False
16. False
17. True
18. False
19. True
20. False
SCISSOR LIFT OPERATOR OBSERVATIONAL CHECKLIST

Operator Name: ___________________________ Date: ___________________________
(Print)

Equipment: ___________________________ Observer: ___________________________
(Print)

Yes No 1. Employee has on the appropriate personal protective equipment.

Yes No 2. Employee completed a pre-shift inspection of the equipment prior to operating the equipment.

Yes No 3. Any covers, guards, caps or safety devices removed for purposes of inspection have been replaced.

Yes No 4. Employee can identify and understands the operation of each control.

Yes No 5. Employee performed a functional test of each control.

Yes No 6. Employee can identify and understands all placards, decals, warnings and instructions for the equipment.

Yes No 7. Employee inspected the area for hazards prior to operation.

Yes No 8. Employee appears comfortable operating the equipment and operates the equipment smoothly without any jerking or other unsafe movements.

Yes No 9. Employee appears to have the proper eye, hand, and foot coordination to safely operate the equipment.

Yes No 10. Employee demonstrates a working knowledge of the equipment.

Yes No 11. Employee knows the procedures for reporting defects, malfunctions or other problems with the equipment.

______________________________  ________________________________
Operator’s Signature                Observer’s Signature
# OPERATORS SAFETY CHECK LIST

**PREFERRED INDUSTRIAL CONTRACTORS, INC.**

**OPERATORS SAFETY CHECK LIST**

REQUiRED FOR ALL MOBILE EQUIPMENT BEFORE EACH SHIFT

<table>
<thead>
<tr>
<th>DATE</th>
<th>SHIFT</th>
<th>SIGNATURE &amp; BADGE NO.</th>
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<tr>
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<td>REG. BRAKES</td>
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<td>STEERING</td>
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<td>FRT. LIGHTS</td>
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<td>REAR LIGHTS</td>
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<td>WINDSHIELD</td>
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<tr>
<td>W/S WIPERS</td>
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<tr>
<td>BACK-UP ALARM</td>
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<tr>
<td>FIRE EXTINGUISHER</td>
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<td>HYDRAULICS</td>
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<td>FLUID LEVELS</td>
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<td>SEAT BELTS</td>
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<td>DOOR LATCH</td>
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<td>TIRES</td>
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<td>EXHAUST</td>
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<td>CABLES</td>
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<td>SHEAVES</td>
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<td>HOOKS</td>
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<td>GAUGES</td>
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<tr>
<td>FUEL LEVELS</td>
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| REPAIRS NEEDED:         |      |
|                        |      |

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<thead>
<tr>
<th>MAINTENANCE REQUEST NO.</th>
<th>NAME OF SUPERVISOR</th>
</tr>
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<tbody>
<tr>
<td>White copy – Supervisor</td>
<td>Yellow copy – Stays in book</td>
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PIC  Rev 12/12/11
## Hazard Assessment for Boom Lifts and Scissors Lifts

<table>
<thead>
<tr>
<th>Task</th>
<th>Question</th>
<th>Yes/No</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right tool for the job</td>
<td>Have other alternatives been considered? (scaffolding, etc.)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>When compared to other alternatives, is this the solution that presents the least risk?</td>
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<tr>
<td></td>
<td>Is this the correct size of boom lift or scissors lift required for the job? (bigger is not always better)</td>
<td></td>
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<tr>
<td></td>
<td>Is the equipment designed for the job and is it marked accordingly?</td>
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<tr>
<td></td>
<td>Has the job been properly planned to provide sufficient time, materials and supervision?</td>
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<td></td>
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<tr>
<td>Operator trained/ certified</td>
<td>Are equipment operators trained and authorized to operate designated equipment?</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Can training documentation be readily provided?</td>
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<td></td>
<td>Will the equipment operator review the manufacturer's operating manual and become familiar with the equipment?</td>
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<tr>
<td></td>
<td>Has the operator operated designated equipment within the last six months?</td>
<td></td>
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</tr>
<tr>
<td>Mechanical Integrity</td>
<td>Will a pre-use inspection be completed prior to starting the job?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workplace Inspection</td>
<td>Is the area free of drop-offs, holes, or bumps, including those concealed by water, ice, mud, etc.?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The aerial platform shall not be operated on grades, side slopes or ramps exceeding the rating given by the manufacturer. Is the aerial work platform on flat stable ground?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is the work area free of debris?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is adequate clearance between overhead obstructions and electrical conductors maintained? (20ft clearance from electrical conductors)</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Is the area clear of hazardous locations and atmospheres?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Hazard Assessment for Boom Lifts and Scissor Lifts

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the ground surface and support sufficient to withstand all load forces imposed by the aerial platform in all operating configurations?</td>
<td></td>
</tr>
<tr>
<td>Are the wind and weather conditions conducive to the operation?</td>
<td></td>
</tr>
<tr>
<td>Is the affected area barricaded to control unauthorized persons?</td>
<td></td>
</tr>
<tr>
<td>Have other possible unsafe conditions been considered?</td>
<td></td>
</tr>
<tr>
<td>Personal Protection Is the guardrail system complete and intact?</td>
<td></td>
</tr>
<tr>
<td>Do all occupants have proper personal fall protection?</td>
<td></td>
</tr>
<tr>
<td>Do all occupants know how to properly wear personal fall protection?</td>
<td></td>
</tr>
<tr>
<td>Are all of the operators aware that standing on midrails, step-stools or anything other than the floor of the aerial lift is prohibited?</td>
<td></td>
</tr>
<tr>
<td>Does the aerial platform contain only the tools and other loose articles necessary to complete the job?</td>
<td></td>
</tr>
<tr>
<td>Are the tools stored neatly?</td>
<td></td>
</tr>
<tr>
<td>If it is necessary to exit the aerial platform while elevated, has proper approval been received and controls put in place?</td>
<td></td>
</tr>
<tr>
<td>Spotter Is a trained spotter needed to improve operability?</td>
<td></td>
</tr>
<tr>
<td>If it is determined that a spotter is needed, does the spotter need to be trained on how to operate the equipment?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spotter Signature (if applicable):</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print Name:</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Equipment Operator's Supervisor Signature:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print Name:</td>
<td></td>
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</tbody>
</table>

Verify that all items have been marked Yes. If an item has been answered No. Sufficient controls must be applied and documented in the comments section prior to approval.

Attach the completed Hazard Assessment to the ATW

<table>
<thead>
<tr>
<th>Equipment Operator Signature:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print Name:</td>
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<tr>
<td>Print Name:</td>
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<table>
<thead>
<tr>
<th>Job Rep Signature (if applicable):</th>
<th>Date:</th>
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</thead>
<tbody>
<tr>
<td>Print Name:</td>
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</table>
# 28.2 - Mobile - Hydraulic Cranes

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1.0 Introduction

A. Mobile Hydraulic Cranes come in a variety of sizes and designs and must be operated within the manufacturer’s specification for weight, height, radius, and site conditions. Crane operators must be competent and understand the design, performance and limitations of the crane in order to safely operate the crane under a variety of conditions and environments. It shall be the Project Superintendent’s responsibility to ensure that operators receive the training. Cranes are to be operated only by authorized persons who currently hold a valid Operators Training certification card for the specific type of crane. The Project Superintendent, Foreman, Project SH&E Supervisor or any other person qualified to perform task training may perform this training.

B. While the basic designs of cranes are the same, different cranes will have different designs, controls, weight capacities and restrictions on where they can operate. The basic parts of a crane include:
   1. Carrier - Frame or base of crane equipped with axles and rubber tires or tracks for travel, a power source, and having either a single control station used to drive the crane into location and operate all crane functions or dual control stations, one for driving and a separate control station for operating all crane functions.
   2. Superstructure - The rotating upper frame structure of the machine that houses the operating machinery.
   3. Outriggers - Extendable—members attached to the carrier used to extend the base and support the crane.
   4. Boom - A member hinged to the rotating superstructure used to support the hoisting cables and sheaves.
   5. Hoist Cables - Wire rope cables unreeled from a power driven drum, over the boom, used for lifting and lowering loads.

2.0 Inspection and Maintenance

Each crane shall be inspected and maintained as required to ensure proper and safe operation. Inspections and routine maintenance are to be performed by field personnel and are compatible with the manufacturer’s guidelines for the severity of the operating conditions and environment. Any crane that is not in proper working condition shall be removed from service
until repairs can be made. All repairs made to the unit shall be made by a qualified person and shall be in conformance with the manufacturer’s recommendations. A qualified mechanic shall perform repairs beyond the capabilities of job site personnel. A written report shall be prepared and maintained on site on any load tests and procedures used to confirm the adequacy of all alterations or repairs.

3.0 Pre-Shift Inspections

A. The operator shall check all cranes in use at the beginning of each shift to assure that equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use.

1. It will be the operator’s responsibility to report unsafe conditions.
2. Vehicles or equipment unsafe to operate shall immediately be taken out of service until repaired.
3. When repairs are made, the parts and components used shall meet manufacturer’s specifications.
4. No modifications or additions shall be made that could affect the safe operation or stability of the vehicle without written approval from the manufacturer.

B. Prior to operation, an Operators Safety Check List (SAF-28.2-2) shall be completed. When the crane is operated for more than one shift, the inspection form shall be completed for each shift the equipment is used. Items to be checked during the inspection include but not limited to:

1. Operating and emergency controls.
2. Data plate, placards, load charts and other labels.
3. Horn or other audible alarms.
4. Lights - front, rear, stop, etc.
5. Brakes including emergency brakes.
6. Alternator, starter, etc.
8. Anti-Two block and other safety devices (LMI) if so equipped.
9. Hydraulic, oil, water, and fuel hoses, couplings, pumps.
10. Fan belts.
11. Fluid levels.
13. Tires proper for proper inflation and damage.
15. Outriggers, stabilizers, and other structures.
16. Windshields, wipers, etc.
17. Fire Extinguishers.

4.0 Operational Check

If all items on the Pre-Shift Inspection check out, start the crane. Check all gauges, indicators and warning lights. Put the crane through its normal maneuvers and check boom up and down, extend and retract the boom, swing, brakes, steering, lights and horn. Check all safety devices including anti-two block for proper operation. The operator shall immediately report any problem malfunction that occur during operation of the vehicle. Problems, which occur
during the shift that affect the safety of the vehicle shall be repaired immediately, or the vehicle shall be removed from service until proper repairs can be made.

5.0 Periodic Inspections

To be performed by the operator depending on the crane’s activity, severity if service and environment. In most cases the periodic inspection will be performed monthly. A record of the dates and results of the inspection shall be maintained at the job site. This inspection shall include all items listed as part of the pre-shift inspection as well as a thorough inspection of the following:

A. Deformed, cracked, or corroded members in the crane structure and entire boom
B. Loose bolts or rivets
C. Cracked or worn sheaves and drums
D. Wire rope for excessive wear or damage
E. Worn, cracked, or distorted parts such as pins, bearings, gears, rollers, and locking devices
F. Excessive wear on brake and clutch systems, linings, pawls and ratchets
G. Load angle and other indicators over their entire range for accuracy
H. Power plants and hydraulic pumps for performance and compliance with safety requirements
I. Crane hooks for cracks or deformation
J. Travel steering, braking and locking devices
K. Hydraulic and pneumatic hoses, valves, and cylinders for leaks, deterioration or damage

6.0 Annual Inspection

A competent person shall make a thorough annual inspection of the crane. A record of the dates and results of the inspection shall be maintained at the job site.

7.0 Maintenance / Repair Precautions

Prior to performing any maintenance or repairs on mobile cranes, the following safety precautions are to be taken:

A. The engine is to be turned off, the equipment tagged out, and the key removed or other means taken to prevent unauthorized starting of the crane.
B. The boom shall be lowered to the full down position, if possible, or otherwise securely blocked or cribbed to prevent dropping.
C. All operating controls are to be placed in the “OFF” or “NEUTRAL” position. All operating systems are to be secured from inadvertent motion by brakes, interlocks, blocking or other means. The parking brakes are to be set and wheels blocked to prevent accidental motion.
D. Pressurized systems such as but not limited to: hydraulic, air, cooling, etc. are to be relieved of pressure prior to any maintenance or repairs.
E. Disconnect the batteries before working on the electrical system.
F. Guards, safety latches or supports are to be installed and used as per the manufacturer’s instructions.
G. All guards, covers, caps and safety devices must be replaced prior to operation.

8.0 Capacities

Each crane shall have the capacity load chart clearly posted, visible to the operator, indicating the capacity of the unit. Operators must understand the factors, which can affect crane capacity and the load handling ability of the crane for any given configuration. The load chart ratings pertain to the specific make and model of crane as originally manufactured and equipped. No modifications or additions, which can effect the safe operation of the equipment, shall be made without written authorization from the manufacturer.

9.0 Equipment Specific Training

The operator shall be trained on the same make and model of crane that he/she will be required to operate. As part of the operator qualification, the employee shall be required to demonstrate that they have the necessary skill levels needed to safely operate the equipment under a variety of work conditions. The hands-on operation of the equipment will be performed in a designated area with minimal hazards, under the direct supervision of a competent person. In compliance with current regulations, only properly trained and authorized persons will be allowed to operate a crane. Prior to operation of a crane, employees are to have completed the following:

A. Will have read and understood the manufacturer’s operation and safety manual for the specific type of equipment, or reviewed the manufacturer’s safety rules and requirements as part of a formal training program.
B. Demonstrated knowledge of the function of each control.
C. Demonstrated knowledge of all decals, charts, and placards.
D. Demonstrated a knowledge of all approved hand signals.
E. Demonstrated a knowledge proficiency of the cranes load chart under any possible configuration.

10.0 Training Records

A copy of the operator’s training records including classroom and hands-on or task training shall be maintained onsite for the length of employment plus one year.

11.0 Definitions

A. **Boom length** - The boom length is the length of the boom measured from the center or rotation axis point of the crane. Hydraulic cranes have extendable booms and added jib and/or fly sections, which can add to the total length of the boom.
B. **Boom Angle** - Is the angle of the boom as measured against horizontal. Depending upon the load, the manufacturer of the crane and the crane configuration, the loaded and unloaded boom angle may vary enough to affect the stability of the crane.
C. **Radius** - The distance measured from the rotation axis point to the center of the hoist lines. The radius is directly dependent upon the boom length and the boom angle. This distance may vary depending upon the crane manufacturer, the weight of the load, and the crane configuration.
D. **Quadrant** - Areas of operation measured in a circular arc around the crane defined as “over the front” “over the rear” and “over the side” Different cranes may have different load capacities for each quadrant.
E. **Counter weight** - The weight—used to supplement the weight of the machine in providing stability for lifting loads.

F. **Side Loading** - A load or force applied at an angle to the vertical plane of the boom.

G. **Two-Blocking** - The condition when the load block or hook assembly contacts the boom point sheave assembly.

H. **Center of Gravity** - The point in which the entire weight of a body may be considered to be concentrated so that if supported (or lifted) at this point the body would remain in equilibrium in any position.

*NOTE: Improper operation of a crane can cause it to tip over resulting in serious injury, death and equipment and property damage. In all cases, either loaded or unloaded, the stability of a crane can be affected by the surfaces on which the crane is operated, by turning, especially at high speeds, and by running over objects or into overhead structures. The operator must maintain the unit’s stability by keeping loads within the rated capacity of the load chart; keeping loads centered and not side loading the boom.*

12.0 Stability

A crane uses the power of its hoisting apparatus to lift a load. The actual stability of the crane is based on the lever principle. The factors that affect a crane’s stability include:

A. Boom length.
B. Boom angle.
C. Counter weight.
D. Quadrant (lifting over the front, side, or rear of the crane).
E. Load weight, size, and dimensions.
F. Center of gravity of the load.
G. Crane setup (crane level, on outriggers / rubber, stable surface, etc.).
H. Wind speed and direction.

13.0 Lift Planning

One of the basic elements of any crane safety program is the selection of the machine to suit the lift requirements of the job. If the crane’s characteristics do not match the job’s requirements, then unsafe conditions are created. No crane shall be selected to do any lifting until its size and characteristics, to safely and efficiently perform the job, are considered.

Crane are to be selected based on the following criteria:

A. Site access, can the crane be erected or set up at the site? How much operating room will there be once the crane is set up? Is there proper clearance for both the load and the counterweight from power lines, buildings and other overhead or adjacent obstructions? Ground conditions - are there adequate load bearing surfaces to support the crane?
B. The weights, dimensions and radius of the heaviest and largest loads.
C. The maximum lift height and the maximum lift radius of the heaviest loads that have to be lifted.
D. Will more than one crane be needed to lift and move the load into position?
E. The number of lifts that have to be made and at what frequency.
F. The type of carrier required, depends on what quadrants the crane will be operating in.
G. Whether or not the loads will have to be walked or carried by the crane.
H. Will the loads have to be held in the air for extended periods?
14.0 Visibility / Communications
The crane operator’s visibility and his ability to accurately see the load and its placement can be affected by a variety of job site conditions. Safe crane operations are dependent upon accurate communications between the crane operator and those employees whose job it is to rig the load to be hoisted or receive the load and position it into place. This communication may be by standardized hand signals, or by radio communication. In all cases the crane operator must take signals from one person designated to direct the crane operator. In an emergency a STOP signal can be given by anyone. When traveling with a crane, either with a load or without, building structures, storage systems, or materials may restrict the operator’s visibility. Operators must have a clear view in the direction of travel. When required to move in a direction where visibility is blocked, a spotter must be used to assist the operator.

15.0 Crane Operations
The operator is responsible for the safe movement and operation of the crane. Since the operator is in direct control of the equipment, complying with recognized safe operating practices is the responsibility of the operator. The operator shall make decisions on the safe use and operation of the crane based on surrounding hazards and operating conditions. Since the crane operator is ultimately responsible for the lift, he/she shall also have the authority to stop the lift at any time to review safety concerns or correct hazards.

16.0 Inspection of the Work Area
Before the crane or other mobile equipment is used, the employee and supervisor shall inspect the area where the equipment is to operate for hazards such as, but not limited to:
A. Overhead obstructions such as pipes and overhead high voltage lines.
B. Operating surfaces, check for holes, rough terrain, mud, ice, loose or uncompacted soil, bumps and floor obstructions, or other hazards, which may affect operation safety. The ground conditions must have enough stability and bearing capacity to support the loads imposed by the crane and hoisted loads.
C. Unauthorized persons or vehicles in work area.
D. Debris or housekeeping hazards
E. Adverse weather conditions
F. Hazardous locations.
G. Any other possible hazards or conditions, which can adversely effect the safe operation of the equipment.

17.0 General Operating Safety Rules
The operator shall ensure that the following procedures are adhered to prior to each movement and set of the mobile crane:
A. The crane is set up and operated within the limits specified by the manufacturer.
B. Out riggers, stabilizers and other stabilizing means are used as required by the manufacturer.
C. The loads weight and distribution are in accordance with the manufacturer’s rated capacity for the crane’s configuration.
D. There is adequate clearance from overhead obstructions including the minimum allowable safe approach distance from overhead power lines or other energized parts.

18.0 Capacity Charts

A. Every crane manufacturer has different capacity or load charts for each of their cranes. While they may be different, they all include the same type of information. The load chart will include:
   1. Weight capacity.
   2. Type of crane configuration.
   3. Quadrant of operation.
   4. Length of boom.
   5. Angle of boom.
   6. Load radius.
   7. Added weights for additional equipment.

B. Boom angle, load radius and boom length are critical factors to consider in load charts. The crane’s load ratings are based on the crane being level, on a firm stable surface, with all outriggers fully extended and in place as per manufacturer’s instructions. Some crane manufacturers may have charts for outriggers partially extended, and lifting without outriggers, on rubber. The operator must consult the crane operator’s manual and load charts for the equipment he/she is operating for each crane configuration.

C. It is important that operators understand that the design and stability of a crane is based on the crane’s load chart. At no time shall loads to be lifted exceed the cranes capacity. Lifting loads greater than the cranes rated capacity will cause instability and boom failure. The operator shall abide by the following safety precautions during the use and operation of a crane.

1. All hydraulic cranes greater than 20-ton capacity shall be equipped with a positive acting anti-two block or an LMI system.
2. Seat belts are required to be worn when operating a crane. In a turnover operators have a better chance of survival
3. The operator shall not leave his position at the controls while the load is suspended. Before leaving the crane the operator shall:
   a. Land any attached load, bucket or other device
   b. Disengage the clutch
   c. Set the swing, travel, boom brakes and other locking devices
   d. Put all controls in the “off” position
   e. Stop the engine
   f. Secure the crane against accidental travel
4. Prior to lifting any load, or swinging the boom over the side, the crane shall be level, with all outriggers fully extended and set on firm ground or footing, with the wheels off the ground. With no load and without the outriggers down and set in place, it is possible to tip the crane over by swinging the boom over the side.
5. Cribbing used to support outrigger pads shall be:
   a. Free from defects
   b. Be of sufficient width and length to prevent shifting or toppling under the load. **(Cribbing should be no less than 3 times larger in area than the outrigger float and completely support the float).**
   c. Be strong enough to prevent crushing under load.
   d. Never block under the outrigger beams

6. The crane shall be set up on a **firm, stable, and level surface.** It is difficult to level a crane using the eye. Check the crane with a level, using either the bullseye, or double levels mounted in the crane cab, or use a carpenter’s level longer than 4 feet to insure the crane is level. **Cranes only 1 degree off level will side load the boom.** A crane 3 degrees off level can increase the stresses in a long boom as much as 50%. After leveling the crane, raise the boom and lower the load line. The line should fall directly in the center of the boom in all positions. (end, side, and corner)

7. When leveling the crane, check the level in one direction, then rotate the boom 90 degrees and recheck the level. If making a series of lifts from the same location, check the level of the crane periodically.

8. The load charts are based on a freely suspended load. Do not attempt to drag any load on the ground in any direction. This can put unknown excessive loads onto the boom and cause structural damage.

9. Traveling with a load is not recommended; however, there are load charts for most cranes, on rubber, without the outriggers down and in place. If traveling is required, the following procedures shall be adhered to:
   a. The crane operator’s manual and load charts shall be reviewed to ensure that the manufacturer does not prohibit such practice.
   b. The load must be positioned over the front of the machine in the direction of travel
   c. All traveled loads must be tied off to the crane by a tag line
   d. If possible position the outriggers close to the ground
   e. Route of travel shall be level, compacted and free of obstacles
   f. The air pressure of the tires shall be checked and the charts capacity for lifting on rubber shall not be exceeded.
   g. The loads shall be carried as close to the ground as possible

10. Loads shall be attached to the crane hook by means of slings or other approved rigging devices. Taglines are required on all hoisted loads.

11. Before hoisting, the following conditions shall be noted:
   a. All rigging devices shall be inspected for damage or deterioration
   b. Hoist ropes shall not be kinked or have any signs of damage or deterioration
   c. Multiple part lines shall not be twisted around each other
   d. The hook shall have a working safety latch
   e. The load shall be connected directly under the hook in such a manner to prevent swinging or other unexpected movement when lifted.
12. The operator shall not hoist or swing loads over other personnel working in the area. No person shall be permitted to walk or stand under a hoisted load.

13. Avoid travel ways where standing water, sand, gravel, or loose material may cause loss of traction or unstable support for the weight of the crane, which could result in loss of control or roll over.

14. Cranes are not to be driven into an unsafe area. This will include areas of construction where unnecessary tire, steering or body damage could result.

15. No person shall be permitted to ride on a crane other than the operator.

16. No person shall be permitted to ride on the hook, ball, or load.

17. Cranes shall not be used as personnel hoists without an approved personnel platform. The crane must be properly equipped and all required safety procedures performed as required in the company Safety, Health and Environmental Manual. Prior approval must be obtained from the Project Superintendent, Project Manager and the Safety, Health and Environmental Department.

18. No crane is to be loaded beyond the manufacturer’s specifications except for authorized test purposes, which may be required after certain repairs or prior to certain lifts. The crane’s load ratings are not to be exceeded. Do not use the tipping action of the crane or the floating of the outriggers to determine the lifting capacity of the crane.

19. The anti-two block, limit switches or LMI system shall not be in a nonfunctioning or override condition at any time during the lifting operation.

20. Do not operate at a longer radius than that shown on the applicable load-rating chart.

21. The radius shown on the load capacity chart is an approximation of the actual operating radius for a given boom angle and does not consider boom deflection due to the weight of the load. It may be necessary to retract the boom or increase the boom angle to maintain the rated radius. On critical lifts the radius should be re-measured after the load has been raised a few inches off the ground. If the actual radius falls between the values listed in the load chart, use the next longer radius listed in the load chart.

22. Telescoping boom sections must be extended equally as per the manufacturer’s recommendations in the operator’s manual.

23. The weight of the load must be known. The weight of the hook block, slings, parts of line below the boom tip, and auxiliary rigging devices must be added to the weight of the load to be hoisted for a total gross load.

24. The jib is an auxiliary boom, which is in effect an extension of the main boom. It may vary in lengths according to the capacity of the crane and its intended use. The jib can be used as an extension to the main boom, or at an angle or offset to the main boom. In all cases the operator shall consult the cranes load chart for the specific jib configuration and load rating.

25. When lifting with the jib, the weight of any hook block, slings, parts of line below the jib tip and any auxiliary rigging devices must be added to the weight of the load for a total gross load.
26. When the jib is erected but not used, the weight of the jib, hook ball, cable, and any auxiliary rigging devices must be added to the weight of the load for a total gross load.

27. **Unless the crane has been specifically so designed, do not simultaneously lift with both the jib and the main boom.**

28. The ability of a mobile crane to safely lift and handle its load is also affected by the quadrant in which it is working. Be sure that all quadrants of any lifting operation can handle the load within its rated capacity. Never swing a load from a higher rated quadrant to a lower rated one without first raising the boom and bringing the load within the safe operating radius for the lower rated quadrant.

29. Side loading occurs when the load is positioned to one side of the boom, and can cause rapid structural failure. Side loading can occur with an off-level crane, dragging a load sideways, and by rapidly swinging the boom. If the boom is moved rapidly the load will not be able to catch up due to the flexibility in the load line. If the boom is moved rapidly then stopped suddenly, the load will continue to swing past the boom tip causing side loading. Use caution when swing long boom cranes to prevent side loading of crane booms.

30. Always keep the hoist line vertical to maintain the load radius and the load chart rating. Lifting a load either outside or inside the load radius can cause the load to swing.

31. The effect of wind on a crane can be disastrous. Over the years there have been many cases of crane accidents due to wind. Wind can push a load or the boom sideways causing side loading. Wind blowing from behind a crane can push the load out past the calculated radius overloading the crane. **Hoisting activities should be restricted or stopped completely in windy conditions.**

32. **Crane operators are to avoid impact loading caused by rapid hoisting or stopping.** Impact loading can cause substantial increases in the dynamic load imposed on the crane. Impact loading can easily increase the load by up to 30% or more.

33. At no time shall a boom lift work inside the minimum safe distance allowed from overhead electrical lines and other energized components. The minimum safe distances that shall be maintained to exposed energized overhead power lines and

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<tr>
<th>Voltage Range</th>
<th>Minimum Safe Distance</th>
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<td>(Phase to Phase)</td>
<td>Distance in Feet</td>
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<td>0 to 50 KV</td>
<td>10 FT.</td>
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<tr>
<td>Over 50 KV to 200 KV</td>
<td>15 FT.</td>
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<tr>
<td>Over 200 KV to 350 KV</td>
<td>20 FT.</td>
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<tr>
<th>Voltage Range</th>
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<td>Over 350 KV to 500 KV</td>
<td>25 FT.</td>
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<tr>
<td>Over 500 KV to 750 KV</td>
<td>35 FT.</td>
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<td>Over 750 KV to 1000 KV</td>
<td>45 FT.</td>
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34. When cranes or loads are required to pass under or by any energized high voltage power line and the clearance between such equipment and the power line is less than that specified in 1926.550 and ANSI B30.5, (10 foot minimum for voltages less than 50 KV) such power lines shall be de-energized and/or other safety precautions taken.
35. All cranes shall have a fire extinguisher of at least a 10 BC rating located in the crane.
36. The operator’s cab shall be kept free of personal belongings, tools, and other unnecessary items, which may interfere with the operator’s ability to safely operate the equipment.
37. Before and during driving while the boom is elevated, the operator shall:
   a. Not exceed elevated boom degree position as recommended by manufacturer for travel.
   b. Maintain a clear path of travel.
   c. Maintain a safe distance from obstacles, debris, drop-offs, holes, ramps, and other hazards.
   d. Maintain a safe distance from overhead obstacles including energized power lines.
38. Extreme care shall be taken when driving a crane on inclines, slopes, or grades that could cause rollover or loss of control. Do not exceed manufacturer’s recommendations.
39. Under all travel conditions, the operator shall limit travel speed according to existing ground conditions, visibility, congestion, location of other personnel, and any other factor, which may cause a hazard.
40. Striking a raised, fixed object such as a curb or concrete footer can also result in a turn over. Watch for bumps and potholes in the road that can cause you to lose control of the crane and or load.
41. Backing with the boom raised and striking an overhead obstruction can cause severe equipment damage and possibly a tip-over. If you have to back up with the boom elevated, check all clearances and use a signalman.
42. Use extreme caution when crossing railroad tracks. Remember the boom arrives before you do.
43. No vehicle or equipment shall be parked closer than eight feet from the centerline of a railroad track.
44. Disabling or altering safety devices including, anti-two block and LMI systems, is prohibited.
45. When crossing aisles and other areas where vision is obstructed, the operator shall stop, honk the horn and proceed with caution.
46. When fueling the crane, the engine shall be turned off and precautions taken to prevent spillage of fuel. Fueling of motor vehicles shall be done in an area that is well-ventilated and free from flame, sparks or other hazards that may cause fire or explosion.
47. Smoking will not be allowed on, in or within 50 feet of fueling operations.
48. Cranes shall be equipped with a backup alarm that is audible above the surrounding noise level.
49. Markings, including capacity charts, stickers and tags shall not be removed or defaced. Missing, or illegible markings shall be replaced immediately.
50. When other moving equipment, vehicles or pedestrians are present in the work areas, the operator must exercise caution to ensure safety.
51. Use the proper gear for driving and road conditions. Do not shift into neutral and coast down a hill; this can result in excessive braking and loss of control.
52. When parking the vehicle ensure that it is out of the way and visible to other traffic in the area. Use of cones, barricades or other warning devices may be necessary.
53. Stunt driving and horseplay shall not be permitted. Safe, courteous operation of a vehicle is expected of all employees because it prevents injury to you and others, saves damage or loss of valuable equipment and improves public relations. Safe operation of a company vehicle is a responsibility not a privilege.
54. When transporting cranes on trailers, the equipment shall be adequately secured against movement.

19.0 Multiple / Tandem Loads
The lifting of multiple loads is allowed under the following conditions:
A. Each load is rigged individually and attached to the crane hook
B. No less than seven (7) feet must be maintained between loads
C. Each load must have an individual tag line
D. Depending upon the crane and the size of the crane hook, no more than five (5) multiple picks is allowed at one time

20.0 Critical Lift Criteria
The following operations are considered “Critical Lifts” and require that the “Critical / Multiple Lift Plan be completed and signed by the Project Superintendent prior to beginning operations:
A. Loads exceeding 75% of the load chart for the crane - (Tipping a–d Structural).
B. Two or more cranes required for one lift.
C. Close proximity to power lines.
D. Unstable soil conditions.
E. Large or awkward loads.
F. Unique hoisting or rigging equipment that is to be used.
G. Strong winds and weather conditions.
H. Operators making lifts in blind areas.

21.0 Operator Controls and Instruments
Depending on the make and model of the vehicle, the operator controls and instrument gauges may vary depending on the manufacturer of the crane and its design and rating. Warning lights and gauges can signal that something is wrong or indicate that there is a problem with the vehicle before it becomes a serious problem or a safety concern. The operator must be familiar with the location and function of the following items:
A. Engine starter switch.
B. Wheel or joy sticks for steering or swinging.
C. Parking brake and release handle.
D. Location and function of all gauges and warning lights.
E. Hazard warning flasher switch.
F. Outrigger controls.
G. Anti-two block or LMI systems.
H. Levers to control hoist and boom functions.
I. Clutch pedal.
J. Brake pedal.
K. Accelerator pedal.

22.0 Attachments
There are a wide array of crane attachments, which can affect the stability, and operation of the crane in different ways. The manufacturer must approve all attachments for use. Homemade, or shop built attachments are not approved and are not to be used unless approved, in writing, by the manufacturer.

23.0 Pedestrian and Other Traffic
In many areas it may not be possible to completely separate crane operations from pedestrian, bicycle, and other vehicular traffic. Operators shall be aware of pedestrians and other traffic in the area and watch for potential hazards and take special precautions. Warnings such as but not limited to; closing off areas where lifts are being made, flagging off areas including the swing radius of the crane, barricades and flag person. Other precautions to take when moving the crane from one location to another are:
A. Watch where you are going, pedestrians and other vehicles use the same roadway as you. Sound the horn at intersections and blind spots.
B. Watch for people in and around the work area, they may not be watching you, even though the crane has warning lights and alarms. If you think they may not see you, do not move until you have made eye-to-eye contact. Make people stand back, even if you’re stopped.
C. When traveling with a load, if you view is blocked because of the load, use as many Spotters as needed to ensure that the travel path is clear. If you can’t see the spotter or the travel path, don’t move the crane.
D. Watch for employees working around you. Don’t let anyone walk under the raised load. Keep other employees off the crane - not on the–hook - not on the–load - not on the–crane.
E. If an employee is needed to hold or position the load while you are moving - Stop and r—rig the load. If the crane cannot handle the load alone, then change the load or the rigging equipment. Do not allow anyone to hold onto the load while the crane is in motion.
F. Cranes must be properly maintained. If there is a problem with the equipment, do not operate it until a qualified person has made adequate repairs.

24.0 Carbon Monoxide and Fumes
Cranes and other mobile equipment powered by internal combustion engines can generate carbon monoxide and exhaust fumes. Carbon monoxide acts as an asphyxiate and can affect the operator’s ability to safely operate the equipment and in high enough concentration, it can kill in a matter of minutes. When working in enclosed areas such as buildings or warehouses, be aware of possible carbon monoxide buildup and take protective measures, if required.
25.0 Retraining of Operators
 Operators of vehicles will be retrained when the company has reason to believe that the employee’s knowledge or skill level lacks the proficiency to safely operate the mobile equipment. In addition, retraining will be required in the following circumstances.
   A. Changes in the job site which present hazards that the employee has not been previously trained.
   B. Changes in the type of equipment the employee will be required to operate.
   C. When inadequacies are noted in an employees’ operation of a motor vehicle, which indicate the employee, needs retrained.

26.0 Physical Observational Checklist
 In addition to the classroom training and the written questionnaire used to evaluate operator knowledge, each operator will be required to demonstrate that they have the necessary skill levels needed to safely operate the equipment under a variety of work conditions. The hands-on operation of the equipment will be performed in a designated area with minimal hazards.

27.0 Forms
   A. SAF-28.2-1 - Mobile Crane Questionnaire and Answers

   B. SAF-28.2-2 - Mobile Crane Operator Physical Observational Checklist

   C. SAF-28.2-3 – Crane Operation Analysis (pg. 567)
<table>
<thead>
<tr>
<th></th>
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<th>A documented pre-shift inspection is required before use each day or at the beginning of each shift.</th>
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<tr>
<td></td>
<td></td>
<td>Crane set up is one of the most important aspects of crane safety.</td>
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<td>When performing the pre-shift inspection, a visual check of all the controls is all that is necessary.</td>
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<td>When hand signals are being used to direct a lift, it is acceptable for the operator to react to a stop signal from someone other than the designated signal person.</td>
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<td>The capacities on the load charts are based upon perfect conditions.</td>
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<td>The equal extensions of the power telescopic boom sections are not required for light loads.</td>
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<td>The load block is part of the load.</td>
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<td>A crane sitting 3 degrees off level can increase the boom stress by 50%.</td>
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<td>The tension load on slings can be increased without increasing the load to be lifted.</td>
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<td>When hoisting from the main boom point with the jib erected, no deduction is required from the capacity chart for the weight of the jib.</td>
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<td>If tipping is not the limiting factor for capacity, then structural failure will occur.</td>
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<td></td>
<td>Hooks and blocks are over designed and do not require inspection.</td>
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<td>Reductions of capacity do not occur when moving the load from one quadrant to another on cranes with an over the front and over the side capacity chart.</td>
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<td></td>
<td>Proper ground support is an integral part of the mobile crane lifting system.</td>
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<td>Safety devices and load indicators are for the convenience of the operator and do not always have to work properly.</td>
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<td></td>
<td>A Jib is an auxiliary boom, which is in effect an extension of the main boom.</td>
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<td></td>
<td>A crane that “goes light” can be safely returned to normal by rapid load lowering.</td>
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<td></td>
<td>It is the crane operator’s responsibility to maintain a safe distance from overhead power lines.</td>
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<td>Outriggers should only be used when lifting maximum loads.</td>
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<td>To prevent side loading or swinging of the load, the boom tip must be directly over the load to be lifted.</td>
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<td>Taglines are required on all hoisted loads.</td>
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<td></td>
<td></td>
<td>The maximum allowable lifting capacities are based upon the machine standing on a firm level surface.</td>
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</table>
23. **T**  **F** When the boom length, radius or both are between values listed in the load chart, the smallest weight listed at either the next larger radius or boom length must be used.

24. **T**  **F** The boom must be centered over the load and the boom sections must be extended equal before the lift is made.

**Multiple Choice. Select the answer, which is the most correct.**

25. When is it not acceptable for the operator to leave his controls?

   a. When the engine is running  
   b. When the load is suspended  
   c. All the above  
   d. None of the above  

26. The hydraulic crane (on outriggers) capacity charts are based on what percentage of tipping?

   a. 65%  
   b. 75%  
   c. 90%  
   d. 85%  

27. When lifting off the outriggers, the outriggers shall be:

   a. Fully extended  
   b. Tires off the ground  
   c. Cribbed under the outrigger beams  
   d. a & b  
   e. b & c  

28. When a crane is not level, what will happen to the radius when the boom swings to the low side?

   a. Increase in radius, decrease in capacity  
   b. Decrease in radius, increase in capacity  
   c. There will be no change  

29. Keeping all load handling devices a reasonable distance below the boom head is recommended to prevent the following condition:

   a. The load contacting the boom  
   b. Two-blocking the hook block with the boom point  
   c. All the above  
   d. None of the above  

   *(Use the enclosed load chart on the 50 Ton Linkbelt HSP – RT8050)*

30. How much can you lift with the center pin 20’0” from the load and 45’0” of main boom out lifting over the front with outrigger fully extended?

   - In A-max mode? __________________________
• In Boom Mode B? ____________________

31. Can this chart be used when making a lift on tires? Yes No
32. What are the maximum boom radius and the maximum boom length that can be used to lift a load of 38,000 pounds over the front of the crane, with the outriggers fully extended and in Boom Mode B?
   Radius ___________ Boom Length ___________ Boom Angle ___________
   • What would be maximum boom radius and maximum boom length that could be used to lift the same load in Boom Mode B on rubber?
   Radius ___________ Boom Length ___________ Boom Angle ___________

33. Why does the chart have a highlighted black line? ____________________
34. The load to be lifted weighs 24 tons, what is the maximum load radius and boom length that can be used on a 360-degree lift? (Lifting from main boom. Outriggers fully extended. 60 ton block, 34 ft. offset fly erected but not used.)
   Radius ___________ Boom Length ___________ Boom Angle ___________

35. Does the load chart include the weight of the block, slings, or any auxiliary devices? Yes No
36. Outriggers fully extended with Load Radius 45 ft. / Boom Length 105 ft. / Boom Angle ___________
   • What is the lifting capacity for 360 degrees? ____________________

37. Outriggers fully extended with Load Radius 100 ft. / 34 ft. offset fly section / 15 degrees offset, 85 ft. Boom.
   • What is the Boom Angle? ____________________
   • What is the lifting capacity? ____________________
   • What is the height above ground? ____________________

38. If the boom angle is 40 degrees, and the boom length is 85 ft. What is the load radius? ____________________
39. What is the maximum load that can be lifted and carried at a 12 ft. radius?
   ____________________ (Tire size 29.5x25 – 28 ply)

(Use the enclosed load chart on the Dresser 150A)

40. You have a 3-section boom and your boom angle is 45 degrees and the boom length is 40 feet.
   • What is the load radius from the centerline of rotation? ____________________
   • What is the maximum capacity at this crane setup with outriggers? ____________________
   • What is the maximum capacity over the front of this crane setup without outriggers? ____________________

41. Radius is 40 feet from the center pin and the boom length is 60 feet. What is the boom angle? ____________________
42. Load weighs 8 tons running multiple line hook block, jib stowed, lifting on outriggers.
• What is the total weight? ____________
• What is the maximum radius and boom length that can be used for this lift?
  Radius_________ Boom Length _______ Boom Angle ________
43. Outriggers extended / Load Radius 20’ / Boom Angle 45 degrees.
  • What is the capacity for 360 degrees? ________________
  • What is the boom length? ____________________________
  • What is the capacity over the front? ________________
  • What is the boom length? ____________________________
44. Load weighs 2 tons. Running single line weight hook, lifting with jib, 0 degrees angle, on outriggers.
  • What is the total weight? ________________
  • What are the maximum radius and the overall boom and jib length that can be used for this lift as 65 ft. above the ground?
  Radius_________ Boom Length __________ Boom Angle __________
45. When making a lift without the outriggers, can 7, 420 lbs be lifted and rotated 360 degrees?
  • If so at what radius? Yes No
    Radius__________
  • Can the same lift be lifted off the front? Yes No
    Radius __________
  • What size is the wire rope, how many strands must it have and how many wires are in each strand?
    Size of wire rope ________ Number of strands __________
    Number of wires __________
  • What is the single part winch line rated for? __________
MOBILE CRANE QUESTIONNAIRE ANSWERS

1. True 16. True
2. True 17. True
3. False 18. True
4. True 19. False
5. True 20. True
6. False 21. True
7. True 22. True
8. True 23. True
9. True 24. True
10. False 25. c
11. True 26. d
12. False 27. d
13. False 28. a
14. True 29. c
15. False

30. In A-max mode: 67,400  In Mode B: 42,000
31. No
32. Radius: 25  Boom Length: 75  Boom Angle: 69
33. All rated capacities above the line are structural, below are tipped or designates tipping condition or loss of stability.
34. Radius: 25  Boom Length: 60  Boom Angle: 55
35. No
36. Boom angle: 65  Lifting Capacity for 360 degrees: 17,400
37. Boom angle: 35  Lifting Capacity: 4,700  Height above ground: 80
38. Load Radius: 60
39. Maximum Load: 47,600  Tire pressure: 85  Speed: 2.5 mph
40. Load Radius: 28 ft.  Max Cap. w/: 9180  Max Cap. w/o: 6000
41. Boom Angle: 47.5
42. Total Weight: 17,160  Radius: 18 ft.  Boom Length: 27 ft. 6 in.  Boom Angle: 25
43. Capacity: 15,750  Boom Length: 30 ft.  Capacity: 10,200  Boom Length: 30
44. Total Weight: 5325  Radius: 19  Boom/Jib Length: 47.6  Boom Angle: 70
Size of wire: 9/16”  Number of Strands: 8  Number of Wires: 25  Winch Line Rating: 6,200
CRANE OPERATOR PHYSICAL OBSERVATIONAL CHECKLIST  SAF-28.2-2

Operator Name: ___________________________ Date: ______________________
(Print)

Equipment: ___________________________ Observer: ______________________
(Print)

Yes  No  1. The employee has on the appropriate personal protective equipment.

Yes  No  2. Employee completed a pre-shift inspection of the equipment prior to operating the equipment.

Yes  No  3. Any covers, guards, caps or safety devices removed for purpose of inspection have been replaced.

Yes  No  4. Employee can identify and understands the operation of each control.

Yes  No  5. Employee performed a functional test of each control.

Yes  No  6. Employee can identify and understands all placards, decals, warnings and instructions

Yes  No  7. Employee inspected the area for hazards prior to operation.

Yes  No  8. Employee appears comfortable operating the equipment and operates the equipment smoothly without any jerking or other unsafe movements.

Yes  No  9. Employee appears to have the proper eye, hand, and foot coordination to safely operate the equipment.

Yes  No  10. Employee demonstrates a working knowledge of the equipment.

Yes  No  11. Employee knows the procedures for reporting defects, malfunctions or other problems with the equipment.

________________________________________________________________________
Operator’s Signature

________________________________________________________________________
Observer’s Signature
MOBILE CRANE QUESTIONNAIRE
(IC-80-3F Operator Test)

1. T F A documented pre-shift inspection is required before use each day or at the beginning of each shift.
2. T F Crane set up is one of the most important aspects of crane safety.
3. T F When performing the pre-shift inspection, a visual check of all the controls is all that is necessary.
4. T F When hand signals are being used to direct a lift, it is acceptable for the operator to react to a stop signal from someone other than the designated signal person.
5. T F The capacities on the load charts are based upon perfect conditions.
6. T F The equal extensions of the power telescopic boom sections are not required for light loads.
7. T F The load block is part of the load.
8. T F A crane sitting 3 degrees off level can increase the boom stress by 50%.
9. T F The tension load on slings can be increased without increasing the load to be lifted.
10. T F When hoisting from the main boom point with the jib erected, no deduction is required from the capacity chart for the weight of the jib.
11. T F If tipping is not the limiting factor for capacity, then structural failure will occur.
12. T F Hooks and blocks are over designed and do not require inspection.
13. T F Reductions of capacity do not occur when moving the load from one quadrant to another on cranes with an over the front and over the side capacity chart.
14. T F Proper ground support is an integral part of the mobile crane lifting system.
15. T F Safety devices and load indicators are for the convenience of the operator and do not always have to work properly.
16. T F A Jib is an auxiliary boom, which is in effect an extension of the main boom.
17. T  F   A crane that “goes light” can be safely returned to normal by rapid load lowering.

18. T  F   It is the crane operator’s responsibility to maintain a safe distance from overhead power lines.

19. T  F   Outriggers should only be used when lifting maximum loads.

20. T  F   To prevent side loading or swinging of the load, the boom tip must be directly over the load to be lifted.

21. T  F   Taglines are required on all hoisted loads.

22. T  F   The maximum allowable lifting capacities are based upon the machine standing on a firm level surface.

23. T  F   When the boom length, radius or both are between values listed in the load chart, the smallest weight listed at either the next larger radius or boom length must be used.

24. T  F   The boom must be centered over the load and the boom sections must be extended equal before the lift is made.

Multiple Choice. Select the answer, which is the most correct.

25. When is it not acceptable for the operator to leave his controls?
   a. When the engine is running
   b. When the load is suspended
   c. All the above
   d. None of the above

26. The hydraulic crane (on outriggers) capacity charts are based on what percentage of tipping?
   a. 65%
   b. 75%
   c. 90%
   d. 85%

27. When lifting off the outriggers, the outriggers shall be:
   a. Fully extended
   b. Tires off the ground
   c. Cribbed under the outrigger beams
   d. a & b
   e. b & c
28. When a crane is not level, what will happen to the radius when the boom swings to the low side?
   a. Increase in radius, decrease in capacity
   b. Decrease in radius, increase in capacity
   c. There will be no change

29. Keeping all load handling devices a reasonable distance below the boom head is recommended to prevent the following condition:
   a. The load contacting the boom
   b. Two-blocking the hook block with the boom point
   c. All the above
   d. None of the above

30. Can this chart be used when making a lift on tires? Yes or No

31. Does the load chart include the weight of the block, slings, or any auxiliary devices?
   Yes   No

32. What is the capacity when lifting over the front on outriggers with 8 feet of boom extended?
    ________________________________________________________________________

33. What is the capacity when lifting at a 360 degree rotation on outriggers with 12 feet of boom extended?
    ________________________________________________________________________
# 28.3 - Crane Inspection, Maintenance, and Operation Manual

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No safety manual can cover all possible situations. In addition to this manual the operator is to be familiar with the manufacturer's operators' manual and the following safety principles.

- Cranes are powerful and complex machines, which require your complete attention and control.
- You as the operator are responsible for all operations under your control and are essential to the machine's performance.
- Do not operate or allow the operation of any machine under your control until you fully understand the operators' manual.

Preferred Industrial Contractors, Inc. expects all crane operators to operate this equipment within the safe limits specified by the crane manufacturer. This is a condition of employment.

1.0 General

The safety and reliability of mobile equipment cannot be ensured unless it receives regular inspections, tests and maintenance. Regular inspections provide the only means of identifying potential hazards, which could cause an accident or mechanical failure of the equipment. While it is true that the manufacturers do recommend inspection and maintenance intervals, these should be taken as minimum safe operating intervals for average conditions and may not reflect the conditions or environment on your jobsite.
2.0 Cranes

There is no other piece of construction equipment that has the potential of causing so much damage or injury to so many people as does an accident involving a crane. The primary requirement of any crane safety program begins in the selection of a crane, which best suits the requirements of the job. The selection of a crane should be made based on the requirements of the job and under all anticipated conditions to which it will be exposed and operated. The following factors should be considered in crane selection and configuration:

A. Maintain at least a 20% working margin in respect to the crane's load capacity on every lift.
B. The number of lifts to be made and type of lifting requirements.
C. Site conditions, including ground conditions, roads and travel ways, available space and any obstacle, which might affect the safe operation of the crane.
D. The maximum lift height and radius as well as the weight of the loads to be handled.
E. Maintain sufficient clearance between the load and the boom taking into account all rigging required to make the lift.

3.0 Inspection & Maintenance

ANSI B30.5 lists two (2) types of regular inspections that must be performed on all cranes in service. These inspections are to be performed by a qualified, designated person.

A. Frequent Inspections

1. To be performed at daily to monthly intervals. The crane is to be inspected by the operator prior to each shift, or if not used each day, prior to use. The frequent inspection shall consist of a check of the following items, as well as observation during the operation of the equipment. Any deficiencies shall be carefully examined and a determination made as to whether they constitute a hazard.

2. Check to see that the machine is properly lubricated and fueled and that the coolant, lubricating oil, and hydraulic oil reservoirs are filled to the proper levels. When refilling or adding oil to a lubricating or hydraulic system, use oil that meets recommended specifications.

3. Visually inspect the machine for leaks. All hydraulic hoses and belts should be inspected and replaced if damaged. (Pay particular attention to those hoses, which must flex during normal operation of the equipment.) Hydraulic system leaks must be corrected prior to operating the machine. Check to see that all filler caps and plugs are in place and secure, ensure that the machine is clean and free from grease and oil on all walking surfaces.

4. Check tires for proper inflation and any damage. Check to see that the wheel lugs are tight. Ensure that guards are in place on all exposed moving parts. Ensure that the machine is equipped with a fully charged fire extinguisher.
5. Inspect all wire ropes, sheaves, drums, rigging and attachments for wear or damage. Check all hooks for safety catches, cracks or deformation. Check rotation of all swivels. Inspect outriggers for cracks or broken welds on beams or floats. Check boom-angle indicator. Visually inspect the boom and jib for straightness and any evidence of physical damage such as cracking, bending or deformation of the boom or welds. On lattice boom cranes, look for bent or damaged lattices. (Do not attempt to straighten bent or damaged lattices. Repair of lattice booms must be performed per manufacturer’s recommendations.)

6. Check all gauges for proper readings after starting the engine. Check operation of all controls and steering. Listen for any unusual noise or vibration, which could indicate possible damage or wear.

7. Check air system for proper pressure and that there are no obvious air leaks.

8. Inspect and test all brakes, clutches and control mechanisms for proper adjustment and operation. Check load brakes if possible. Inspect boom hoist kick-out, anti-two block and any other safety devices for proper operation.

9. Check cab glass for any cracks or distortion, which could affect operator's view. Check lights, horn, and backup alarm if so equipped.

10. Upon completion of the inspection the operator is to fill out the operator's daily safety inspection form. Copies are available from the Safety Department. Any defects, which could affect the safe operation of the machine, must be corrected and noted on a daily inspection prior to use. Records of the daily inspections are to be kept on file at the jobsite.

B. Periodic Inspection

1. To be performed by the operator depending upon the crane's activity, severity of service and environment. In most cases the periodic inspection is to be performed monthly. It includes those items listed for daily inspection as well as the following:

2. Inspect the entire crane for structural damage. Check for any distortion or cracks in the main frame, the outrigger assemblies and all structural attachments of the carrier.

3. Inspect all welded connections for evidence of cracks or damage. On lattice booms inspect both the main cord and lacings and other structural connection for paint flaking, cracks, bends, dents, abrasions, and corrosion. On hydraulic booms check for cracked welds, dents, bending, side sway or droop. Check boom wear pads.

4. Check for loose bolts or rivets. These must be replaced, not just tightened. (If any are loose there is a possibility that they have been stretched.)

5. Inspect all hydraulic and pneumatic hoses, fittings and tubing. Any deterioration or damage indicates a potential hazard. The following conditions usually indicate that a particular part needs to be replaced.
   a. Evidence of a leak in the hose itself or at the area where the hose and coupling are joined.
   b. Any abnormal deformation of any hose or tubing, including blistering, enlargements or dents on tubing and connections.
c. Leakage at threaded or clamped connections that cannot be eliminated by normal tightening or recommended procedures.
d. Evidence of abrasive wear, which could reduce the pressure, rated capacity of hose or tube. The cause of the wear should also be eliminated.

6. Inspect for cracked or worn sheaves and drums. Inspect all wire rope for excessive wear or damage.

7. Inspect for worn, cracked or distorted parts such as pins, bearings, shafts, gears, rollers, locking devices and roller assemblies.

8. Inspect for excessive wear of drive sprockets and excessive chain stretch. Check response of steering, braking and locking devices for any malfunction.

9. Inspect for excessive wear on brake and clutch systems parts, linings, pawls and ratchets. Insure that all safety pawls operate correctly, are in good condition and are properly lubricated.

10. Inspect all power plants for performance and compliance with safety requirements.

11. Check the load, boom angle and other indicators over their full range for any significant inaccuracies.

12. Check Hydraulic Pumps And Motors For:
   a. Loose bolts or fasteners
   b. Leaks at joint sections and shaft seal
   c. Unusual noise or vibration
   d. Loss of operating speed
   e. Loss of pressure
   f. Excessive heating of fluid

13. Check Hydraulic And Pneumatic Valves For:
   a. Cracks in valve housing
   b. Leaks at spools or joints
   c. Improper operation of spool to return to neutral position

14. Check Hydraulic And Pneumatic Cylinders For:
   a. Leaks at the rod seals and welded joints
   b. Scored, nicked or dented rods
   c. Dented barrel
   d. Loose or deformed eyes or connecting joints

15. The operator performing the inspection is to complete the monthly crane inspection report for the type of crane in use, either hydraulic or conventional. Dated records indicating month and year are to be kept on file at the jobsite. Deficiencies indicated by the inspection, which could affect the safe operation of the machine, are to be corrected and noted on the inspection report prior to use.

C. Annual Inspections

1. Annual inspections are required on all cranes in use and will be done by the following:
   a. The crane rental company shall supply each rented crane with an annual inspection.
b. Designated Preferred Industrial Contractors, Inc. personnel may perform annual crane inspections.

c. Any crane that is not in proper working condition shall be removed from service until repairs can be made. All repairs made to the unit shall be made by a qualified person and shall be in conformance with the manufacturer’s recommendations. A qualified mechanic shall perform repairs beyond the capabilities of job site personnel. A written report shall be prepared and maintained on site on any load tests and procedures used to confirm the adequacy of all alterations or repairs.

4.0 Wire Rope: Inspection, Replacement, And Maintenance

The assurance of safety and economy in the use of cranes mandates that a program of inspections of all load supporting wire rope and fittings be performed. Factors such as wear, corrosion, fatigue, abrasion, kinking and improper revving can significantly reduce the strength of wire rope and consequently affect its length of service. Any deterioration, which could result in a loss of original rope strength, should be carefully examined and a determination made whether further use of the rope would constitute a hazard.

A. Frequent Inspection

1. All running ropes in service are to be visually inspected each day during the frequent inspection of the crane. This inspection should consist of checking all rope reasonably expected to be used during the day’s operations. Visually observe for the following:
   a. Gross damage such as kinking, crushing, un-stranding, bird-caging, main strand displacement or core protrusion.
   b. Reduction of rope diameter over a short distance or unevenness of outer strands.
   c. General corrosion
   d. Broken or cut strands
   e. Core failure in rotation resistant ropes.

2. Pay particular attention to sections of rope where rapid deterioration can occur, such as flange points, crossover points and repetitive pick up points on drums.

3. No records are required other than the wire rope or cable section of the daily equipment safety inspection form.

B. Periodic Inspection

1. The periodic inspection of the wire rope is to be performed during the periodic or monthly crane inspection. A thorough inspection of all ropes in use shall be made at least once a month and a certification record which includes the date of inspection, the signature of the person who performed the inspection and an identifier for the ropes shall be prepared and kept on file where readily available. The periodic wire rope inspection is to cover the
entire length of the rope to identify damage and deterioration. All inspections shall be performed by an appointed or authorized person. Any deterioration, resulting in appreciable loss of original strength shall be carefully observed and determination made as to whether further use of the rope would constitute a safety hazard. Some of the conditions that could result in an appreciable loss of strength are the following: as well as:

a. Reduction of rope diameter below nominal due to loss of core support, internal or external corrosion or wear of outside wires.
b. Severely corroded, cracked, bent, worn or improperly applied end connectors.
c. Severely corroded, or broken wires at end connectors.

2. Only surface wire of the rope needs to be inspected. Do not attempt to open up the rope.

3. Complete the wire rope inspection record. The record will be used as the basis for judging the proper time for wire rope replacement.

C. Wire Rope Replacement

Due to the variables involved, no precise rules as to exactly when to replace a rope can be made. The following conditions can, however, be sufficient reason to question the continued use of the rope.

1. In running ropes, six randomly distributed broken wires in one lay or three broken wires in one strand in one lay.
2. Wear of one-third the original diameter of outside individual wires.
3. Evidence of any heat damage.
4. Kinking, crushing, bird-caging or any other type of damage, which results in distortion of the rope structure.
5. Nominal diameter reductions of more than:
   a. 1/64 in. (.4mm) for diameters up to and including 5/16 in. (8.0mm)
   b. 1/32 in. (.8mm) for diameters of 3/8 in. (9.5mm), up to and including 1/2 in. (13.0mm)
   c. 3/64 in. (1.2 mm) for diameters of 9/16 in. (14.5 mm), up to and including 3/4 in. (19.0mm)
   d. 1/16 in. (1.6mm) for diameter of 7/8 in. (22.0mm), up to and including 1 1/8in. (29.0mm)
   e. 3/32 in. (2.4mm) for diameter of 1 1/4 in. (32.0mm), up to and including 1 1/2 in. (38.0mm)
   f. In standing ropes, more than two broken wires in one lay in sections beyond end connections, or more than one broken wire at an end connection.
6. All rope which has been idle for a period of a month or more due to shut-
down or storage of a crane on which it is installed shall be given a thorough inspection before it is used. This inspection shall be for all types of deterioration and shall be performed by an appointed or authorized person whose approval shall be required for further use of the rope. A certification record which includes the date of inspection, the signature of the person who performed the inspection, and an identifier for the rope which was inspected shall be prepared and kept readily available.

7. Replacement rope must have a strength rating at least as great as the original rope furnished or recommended by the crane manufacturer.

D. Rope Maintenance

1. Rope is to be stored in such a way to prevent damage or deterioration.
2. Unreeling or uncoiling rope shall be done per manufacturer's recommendations to avoid kinking or other damage.
3. Prior to cutting of the rope, the proper seizing must be replaced on each side of the cut to prevent unlacing of the strands.
4. During installation of the rope, care should be taken to avoid dragging of the rope in dirt or over objects, which will scrape, nick, crush or induce sharp bends.
5. All wire rope is to be maintained in a well-lubricated condition. The lubricant applied must be compatible with the original lubricant. The object of rope lubrication is to reduce internal friction and to prevent corrosion. Special attention may be required for sections of rope, which are located over sheaves or otherwise hidden during inspection and maintenance.

5.0 Crane Operation

A. Operators Cranes shall be operated by the following qualified personnel only:
   1. Designated persons in possession of a training certification card for the specific crane.
   2. Trainees under the direct supervision of a designated person
   3. Maintenance and test personnel (when necessary)
   4. Inspectors (crane) No one other than the personnel listed above shall enter a crane cab, with the exception of oilers, supervisors, and persons authorized by their supervisor and whose work duties require them to do so, and then only with the knowledge of the operator.

B. Operator Qualifications Crane operators must meet the following physical qualifications:
   1. Vision of at least 20/30 in one eye and 20/50 in the other, with or without glasses.
   2. Ability to distinguish colors, regardless of position, if color differentiation is required for operation.
   3. Adequate hearing for the specific operation with or without the use of a hearing aid.
4. Sufficient physical shape to meet the demands of equipment operation.
5. Evidence of physical defects or emotional instability which could create a hazard to the operator or to the safety of others, or in the opinion of the medical examiner could interfere with the operators performance may be cause for disqualification. In such cases, specialized clinical or medical tests and judgments may be required.
6. Operators should have normal depth perception, field of vision, reaction time, coordination, manual dexterity and no tendencies to dizziness or similar undesirable characteristics.

C. Operator Skills Test
Crane operators must meet the following skills tests:
2. Must demonstrate the proper inspection procedures for the type of crane assigned.
3. Must understand the application of the load chart for the type of crane assigned.
4. Successfully complete the following skills test or a similar procedure:
   a. Move the crane into position and level the crane.
   b. Drop a headache ball into a 55 gal. drum located at a radius of 25% of boom length.
   c. Control coordination - with a 4' long strap hanging from the hook; keep the strap in-contact with the ground following a course outline.
5. The supervisor shall complete the Operator Qualification Form acknowledging the qualifications of the operator. These must be kept on file at the jobsite for each operator. The Equipment Operator's Training Card is to be completed and given to the operator showing the dates of training and equipment the operator is qualified to operate.

D. Operator Conduct
1. The crane operator shall not engage in any practice, which will divert his attention during the operation of the crane.
2. If physically or mentally unfit, an operator will not be allowed to operate the equipment.
3. If the machine has been "Tagged Out" for any reason, the operator shall not start the crane until the warning sign or tag has been removed by an authorized person (review company lockout / tagout procedures).
4. Prior to starting the engine, ensure that all controls are in the off or neutral position and that all personnel are in the clear.

E. General Operating Requirements
1. Before starting the crane, inspect, test, and maintain the crane in accordance with this manual and the manufacturer’s handbook. Repair or replace any component showing excessive wear, damage, or other defects, which could affect the safe operation of the crane.
2. No crane is to be loaded beyond the specifications of the load-rating chart except for authorized test purposes, which may be required after certain repairs or prior to certain projects.

3. All loads to be lifted must be within the rated capacity of the crane in its existing configuration.

4. When loads are to be lifted and their actual weight is not known, the person responsible for the lift will ensure that the weight of the load does not exceed the crane's ratings at the radius, which is to be used for the lift.

5. Operators are responsible for those operations under their direct control. Whenever there is any doubt as to safety, the operator is to review the situation with his supervisor prior to continuing the lift.

6. Only one designated person shall direct the lift and give signals to the crane operator. Continuous contact, visual or vocal, shall be maintained between the crane operator and the signalman. If for any reason contact is lost, the crane operator is to stop the lift and shall not resume any crane function until full contact is restored.

7. Only standard hand signals will be used. These hand signals are illustrated in SAF-28.3-2 and must be posted on the equipment visible to the employees.

8. Prior to leaving the control station of a crane, the following precautions must be observed:
   a. Land any load, bucket or other device.
   b. Set travel, swing, boom brakes or locks to prevent machine movement.
   c. Set safety pawls on all drums where these are operated manually.
   d. Disengage the master clutch or shut off the engine.

9. No one is permitted to ride the bare hook or a load of material suspended from the hook.

10. Never continue use of a crane when weather conditions are such that hazards to personnel, property or the public are created. During conditions of high wind speeds the size and shape of the loads being lifted must be considered when determining if continued operation would create a hazard. Consider the safety of the men who handle the loads; men have been killed when struck by loads that were blown out of control by the wind. Wind loading can be critical depending on the boom angle and boom length, bulkiness of the load and the direction and velocity of the wind. In the absence of the crane manufacturer's instructions regarding maximum permissible wind speeds, use 25-30 MPH as the range to consider stopping operations.

11. When refueling the machine ensure that:
   a. The engine is stopped and no auxiliary fans or heaters are operating.
   b. Fuel is stored in containers that meet state, local and NFPA requirements.
   c. There are no flames or spark producers nearby.
   d. There is a fire extinguisher nearby and you know how to use it.
   e. No one is smoking nearby.

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12. Know the location and use of all emergency shutdowns.
13. Never move a machine without first making sure that no one will be injured. When clear vision behind the crane is blocked, use a signalman. Sound the horn before moving the machine and intermittently during travel, especially when approaching personnel. Use the following signals.
   a. Stop - One audible signal
   b. Move Forward - Two audible signals
   c. Back Up - Three audible signals
14. At no time are personnel to be positioned beneath suspended loads. Do not swing loads over personnel working in other areas.
15. Do not get on or off a machine when it is in motion. No adjustments, repair, or lubrication is permitted on moving machinery.
16. Outriggers on all truck cranes are to be set and the crane leveled for all lifts.
17. Rough terrain cranes operated in a stationary position shall have the outriggers fully extended and set before any lift is made.
18. Traveling with loads should be avoided. When necessary to do so the following shall apply:
   a. The travel route is to be solid and level footing.
   b. The load is to be tied to the frame of the crane.
   c. Tag lines must be used if additional control of the load is needed.
      Personnel are not to touch the load.
   d. Use the load chart on rubber
   e. Restrict travel speed to maintain control of the load.
   f. If possible the outriggers should be extended and set to within a few inches of the ground.
19. Weight of the load is to be positively established prior to the lift. Check brakes and machine stability while the load is only inches above the ground.
20. The operator shall not attempt any lift for which he feels conditions are inadequate or unsafe.
21. On mobile cranes when the counter weight is within 7 feet or less of the ground or deck, the swing radius must be barricaded with flagging, barricade tape, rope or a permanent barricade 42 inches off the ground to prevent employees from being crushed by the counterweight.
22. Toolboxes, oil cans, choker racks, water coolers or similar items shall not be placed in the swing radius of the counterweight where a person could conceivably be crushed.

6.0 Rigging / Handling the Load

A. Rigging the Load
1. Proper rigging of the load is as important as determining the weight of the load. While the crane operator might not actually rig the load, he is ultimately responsible for the lift and should ensure that the following procedures are observed when rigging for a lift.
2. Know the safe working load of the tackle and rigging equipment in use and do not exceed this limit.
3. Determine weight of the load prior to rigging it.
4. Wear gloves when handling wire rope.
5. Inspect all slings, hooks, spreader bars and other rigging equipment prior to use. Destroy defective components to prevent their use by someone who may be unaware of the defects.
6. Never use kinked or damaged slings. All slings and rigging equipment should be inspected prior to use for indications of wear, abrasions, broken wires, worn or cracked fittings, crushing, kinking or corrosion.
7. Sharp bends, pinching and crushing must be avoided. Use corner pads to prevent the sling from being bent sharply. These can consist of large diameter split pipe sections, pieces of split tires, padding or blocking. As a rule the bend in the rope should be at least one rope lay. At this arc each of the strands has been on the inner and the outer sides, this will minimize the stress. On very short bends with sharp angles, the strands on the outer side of the rope stretch resulting in kinks and broken strands.
8. Do not allow wire rope or slings to lie on the ground. Do not store on wet or damp surfaces, or near corrosives.
9. Never lift loads with one leg of a multi-leg sling unless the used legs are secured from movement or swing.
10. Never point load a hook unless specifically designed and rated for such use.
11. When using more than one sling on a load, ensure that all slings are made of the same type material.
12. Avoid contact with solvents and chemicals.
13. Never wrap a sling completely around a hook; the sharp radius will damage the rope.
14. Ensure that the sling angle is always greater than 45°. One of the easiest ways to make sure that the angle is adequate is to check that the horizontal distance between the points of attachment of the load is less than the shortest sling leg. If so, the angle will always be greater than 60°. Neither the load nor the boom is to be lowered below the point where less than two full wraps of rope remain on their respective drums.
15. In figuring the total weight of the lift, be sure to include the block, hook, and any slings or other rigging devices between the boom tip and the load. When making near capacity lifts, calculate the entire load carefully and check it against the rated lifting capacity of the crane and the load chart for the radius of the lift.
16. Prior to any lift that exceeds 80% of the rated capacity of the crane, the load radius must be measured to avoid the possibility of error.
17. Cranes are not to be operated when any part of the machine can come within ten feet of a high voltage conductor. When operating in proximity of a high voltage line, riggers shall not pull the load line at an angle to make a hookup. If it is necessary to operate a crane close to high voltage lines, make arrangements to have the lines de-energized.
18. For line rated over 50 KV, the minimum clearance between the lines and any part of the cranes or load must be 10 feet plus 4 inch for each 1 KV over 50 KV. or use twice the length of the line insulator. Never use less than 10 feet.
19. During transit with no load and the boom lowered, the minimum equipment clearance must be 4 feet for 50 KV or less, 10 feet for 50 KV to 345 KV, and 16 feet for voltages up to 750 KV.

20. Any overhead power line must be considered energized unless a representative of the responsible utility company says that it is not energized.

21. No modifications or additions, which affect the crane’s capacity and operation, shall be made without the manufacturer’s written approval.

B. Handling The Load

1. Before making a lift ensure that:
   a. The crane is rigged with sufficient parts of line to make the lift.
   b. The load is properly rigged and well secured. All loose objects have been removed.
   c. Taglines are connected to control the load.
   d. The load line is vertical and directly over the loads center of gravity.
   e. The rope is properly spooled on the drum with no slack or cross-coiling.
   f. All non-operating personnel have been warned or have left the area prior to the lift.

2. Avoid impact loading caused by sudden jerking when lifting or lowering. Raise the hoist line gradually, ease into the load, lift it a few inches off the ground and check the brakes on heavy loads.

3. Do not use the machine’s stability to see if a load falls within the crane's capacity. The crane can structurally fail before its stability is affected. If there are any indications of tipping then the machine is overloaded.

4. Prior to swinging a load, make sure that the swing path is clear and that all outriggers are properly set and secure. Control the load at all times. Avoid sudden starts or stops, which could cause the load to swing out beyond the radius that it can be controlled.

5. Never leave the operator’s station while a load is suspended.

6. When unloading trucks, make sure that the truck driver leaves his cab and always work over the rear of the truck. Do not swing loads over the cab of the truck.

7. If power fails during operations, immediately set all brakes and locking devices. Notify your supervisor or the person in charge of the lift. If possible the load should be landed under brake power.
7.0 Personnel Hoisting

The use of a crane or derrick to hoist employees on a personnel platform is prohibited, unless when the erection, use, and dismantling of conventional means of reaching the worksite, such as a personnel hoist, ladder, stairway, aerial lift, elevated work platform, or scaffold would be more hazardous or is not possible due to structural design or worksite conditions.

A. Operational Criteria Cranes And Derricks
   1. Hoisting of the personnel platform shall be performed in a slow, controlled, cautious manner with no sudden movements of the crane, derrick or the platform.
   2. Load lines shall be capable of supporting, without failure, at least seven (7) times the maximum intended load, except that where rotation resistant rope is used the lines shall be capable of supporting without failure, at least ten times the maximum intended load.
   3. Load and boom hoist drum, brakes, swing brakes and locking devices such as pawls or dogs shall be engaged when the occupied personnel platform is in a stationary working position.
   4. The load line hoist drum shall have a system or device on the power train, other than the load hoist brake, which regulates the lowering speed of the hoist mechanism. Free fall is prohibited.
   5. The crane shall be uniformly level to within 1% of level grade and located on firm footing. Cranes equipped with outriggers shall have all of them fully deployed as per manufacturer’s specifications, insofar as applicable, when hoisting employees.
   6. The total weight of the loaded personnel platform and related rigging shall not exceed 50% of the rated capacity for the radius and configuration of the crane or derrick.
   7. The use of live booms is prohibited. (Live boom is one, which the lowering speed is controlled by brake only without aid from other devices.)
   8. Cranes and derricks with variable angle booms shall be equipped with boom angle indicator, readily visible to the operator.
   9. Cranes with telescoping booms shall be equipped with a device to indicate clearly to the operator at all times the boom’s extended length, or an accurate determination of the load radius to be used during the lift will be determined prior to the hoisting of personnel.
  10. A positive acting device shall be used which prevents contact between the load block or overhaul ball and the boom tip (anti-two-blocking device), or a system shall be used which deactivates the hoisting action before damage occurs in the event of a two-blocking situation (two-block damage prevention device).

B. Design Criteria Personnel Platforms
   1. A qualified engineer or a qualified person competent in structural design shall design the personnel platform and suspension system.
   2. The suspension system shall be designed to minimize tipping of the platform due to movement of the employees in the platform.
3. The personnel platform itself, except for the guardrail system and body belt anchorages, shall be able to support without failure its own weight and at least five (5) times the maximum intended load.

4. Each platform shall be provided with perimeter protection from the floor to 42 inches above the floor, which shall consist of either solid construction or expanded metal having openings no greater than 1/2 inch.

5. A grab rail shall be installed inside the entire perimeter of the personnel platform.

6. Access gates shall not swing outward.

7. Access gates shall be equipped with a restraining device to prevent accidental opening.

8. Headroom shall be provided which allows employees to stand upright in the platform.

9. In addition to the use of hard hats, employees shall be protected by overhead protection on the personnel platform when employees are exposed to falling objects.

10. All rough edges exposed to contact by employees shall be surfaced or smoothed in order to prevent injury to employees from punctures or lacerations.

11. A qualified welder familiar with the weld grades, types and materials specified in the platform design must perform all welding of the personnel platform and its components.

12. The personnel platform must be conspicuously posted with a plate or other permanent marking which indicates the weight of the platform and it’s rated load capacity or maximum intended load.

C. Personnel Platform Loading

1. The personnel platform shall not be loaded in excess of its rated load capacity. When a personnel platform does not have a rated load capacity, then it shall not be loaded in excess of its maximum intended load.

2. The number of employees occupying the personnel platform shall not exceed the number required to perform the work.

3. Personnel platforms shall be used only for employees, their tools, and material needed to perform their work, and shall not be used to hoist only materials or tools when not hoisting personnel.

4. Materials and tools for use during a personnel lift shall be secured to prevent displacement.

5. Materials and tools for use during a personnel lift shall be evenly distributed within the confines of the platform while it is suspended.

D. Rigging

1. When a wire rope bridle is used to connect the personnel platform to the load line, each bridle leg shall be connected to a master link or shackle to ensure that the load is evenly distributed among the bridle legs.

2. Hooks on the overhaul ball, load blocks or other attachment assemblies shall be of a type that can be closed and locked to eliminate the hook throat.
opening. An alloy anchor type shackle with bolt, nut and retaining pin may be used.

3. Wire rope, shackles, rings, master links and other rigging hardware must be capable of supporting, without failure, at least five (5) times the maximum intended load applied to that component. Where rotation resistant rope is used, the slings shall be capable of supporting, without failure, at least ten (10) times the maximum intended load.

4. All eyes in rope slings shall be made to include thimbles.

5. Bridles, slings and associated rigging for connecting the personnel platform to the hoist line shall be only used for that purpose and shall not to be used to lift materials, equipment, etc. when not hoisting the personnel platform.

E. Trial Lift, Inspection, And Proof Testing

1. A trial lift with the personnel platform unoccupied, but loaded to at least the anticipated lift weight shall be made at any location where employees are to enter the platform. This trial lift will complete the entire course of travel to which the personnel platform is to be hoisted and positioned. This trial lift is to be made prior to employees entering the platform. During the trial lift the operator will ensure that all systems, controls, and safety devices are activated and functioning properly, that no interferences exist, and that the configurations necessary (boom angles, extensions, etc.) to reach work locations will still allow the operator to remain under the 50% limit of the hoist's rated capacity. Materials and tools to be used during the actual lift may be loaded in the platform for the trial lift. A single trial lift may be performed to all work locations that are to be reached from a single set up position.

2. The trial lift is to be repeated whenever the crane or derrick is moved and set up in a new location or returned to a previously used location. When the lift route is changed, the trial lift is to be performed unless the operator determines that the route change is not significant and will not affect the safety of the hoisted employees.

3. After the trial lift and prior to hoisting employees, the platform shall be hoisted a few inches and the following inspection performed:
   a. Ensure that platform is secure and properly balanced.
   b. Hoist ropes are free of kinks.
   c. Multiple part lines are not twisted around each other.
   d. The primary attachment is centered over the platform.
   e. All ropes on the hoisting system are properly aligned on drum and in sheaves.
   f. A visual inspection of the crane, derrick, rigging, personnel platform and the crane or derrick base support or ground to determine if the trial lift has exposed any defect or caused any adverse effect upon any component or structure.

4. Any defects found during any inspection, which create a safety hazard, shall be corrected prior to hoisting personnel.

5. At each jobsite, prior to hoisting employees on the personnel platform, and
after any repair or modification, the platform and rigging shall be proof tested to 125% of the platform's rated capacity by holding it suspended for five (5) minutes with the test load evenly distributed on the platform. (This may be performed at the same time as the trial lift). After the proof testing, the platform and rigging shall be inspected. Any deficiencies found shall be corrected and another proof test performed. Personnel shall not be hoisted until proof testing requirements are met.

F. Work Practices
   1. Employees shall keep all body parts inside the platform during raising, lowering and positioning. (Other than the person designated to give signals to the operator.)
   2. A personnel platform that is not landed shall be secured to the structure where the work is to be performed prior to employees entering or exiting the platform unless that by securing the platform it creates an unsafe condition.
   3. Taglines shall be used unless they create an unsafe condition.
   4. The operator shall remain at the controls at all times when the crane engine is running and the platform is occupied.
   5. Hoisting of employees shall be discontinued immediately upon indication of dangerous weather conditions or other impending danger.
   6. Employees being hoisted shall remain in continuous visual and direct communication with the operator or signal person. If direct visual contact with the operator is not possible and the use of a signal person would create a hazard, radio communication may be used.
   7. Except over water, employees occupying the personnel platform must use a body belt or harness system with the lanyard correctly attached to the load block, overhaul ball, or to a structural member within the platform capable of supporting the fall impact for the employee.
   8. No lifts are to be made on another of the crane or derrick's loadings while personnel are suspended on a platform.

G. Traveling
   1. Hoisting of employees while the crane is moving is prohibited unless the employer can demonstrate that there is no less hazardous way to perform the work. Exceptions to this are portal, tower and locomotive cranes.
   2. The following safeguards shall be implemented under any circumstances where a crane will travel with hoisted personnel.
      a. Crane travel shall be limited to a fixed track or runway.
      b. Travel shall be limited to the load radius of the boom used during the lift.
      c. The boom must be parallel to the direction of travel.
      d. A complete trial run of the route of travel shall be performed before employees are to occupy the platform. (This trial run can be performed at the same time as the trial lift.)
      e. If travel is done on rubber tires, the condition and air pressure of the tires shall be checked. The chart capacity for lifts on rubber tires shall be used and reduced to 50% of rated capacity.
      f. Outriggers may be partially retracted as needed for travel.
H. Pre-Lift Meeting
A meeting shall be held with the crane or derrick operator, signal person (if needed), employees to be lifted, and the supervisor or foreman responsible for the task to review the requirements and the procedures to be followed. This meeting shall be held prior to the trial lift at each new work location and shall be repeated for any employees newly assigned to the operation. After completion of all trial lifts and inspections, SAF-28.3-5 is to be completed and kept on file at the jobsite.

8.0 Overhead and Gantry Cranes

This section specifically applies to overhead and gantry cranes, including semi gantry, cantilever gantry, wall cranes, storage bridge cranes, and others having the same fundamental characteristics. These cranes are grouped because they all have trolleys and similar travel characteristics.

A. Overhead & Gantry Cranes are to be operated only by authorized persons who currently hold a valid Operators Training certification card for the specific type of crane.

B. A preventive maintenance program based on the crane manufacturer's recommendations shall be established for each individual overhead and gantry crane.

C. Before adjustments and repairs are started on a crane the following precautions shall be taken:
   1. The crane to be repaired shall be run to a location where it will cause the least interference with other cranes and operations in the area.
   2. All controllers shall be at the off position.
   3. The main or emergency switch shall be open and locked in the open position.
   4. Warning or "out of order" signs shall be placed on the crane, also on the floor beneath or on the hook where visible from the floor.
   5. Where other cranes are in operation on the same runway, rail stops or other suitable means shall be provided to prevent interference with the idle crane.
   6. After adjustments and repairs have been made the crane shall not be operated until all guards have been reinstalled, safety devices reactivated and maintenance equipment removed.

D. Prior to initial use all new and altered cranes shall be inspected to insure they are structurally sound and meet all safety and manufacturer requirements.

E. Hooks are to be visually inspection daily for deformation or cracks. A monthly inspection is to be performed which includes a certification record with the date of inspection, the signature of the person who performed the inspection and the serial number, or other identifier, of the hook inspected. Hooks with cracks or having more than 15% in excess of normal throat opening or more than 10º twist from the plane are to be removed from service.

F. Hoist chains, including end connections, are to be visually inspection daily for excessive wear, twist, distorted links interfering with proper function, or stretch.
beyond manufacturer's recommendations. A monthly inspection is to be performed which includes a certification record with the date of inspection, the signature of the person who performed the inspection and an identifier of the chain which was inspected.

G. A thorough inspection of all ropes shall be made at least once a month and a certification record which includes the date of inspection, the signature of the person who performed the inspection and an identifier for the ropes which were inspected shall be kept on file where readily available to appointed personnel. Any deterioration, resulting in appreciable loss of original strength, shall be carefully observed and determination made as to whether further use of the rope would constitute a safety hazard. Some of the conditions that could result in an appreciable loss of strength are the following:

1. Reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires.
2. A number of broken outside wires and the degree of distribution or concentration of such broken wires.
3. Worn outside wires.
4. Corroded or broken wires at end connections.
5. Corroded, cracked, bent, worn, or improperly applied end connections.
6. Severe kinking, crushing, cutting, or unstringing.
7. Other ropes. All rope which has been idle for a period of a month or more due to shut-down or storage of a crane on which it is installed shall be given a thorough inspection before it is used. This inspection shall be for all types of deterioration and shall be performed by an appointed person whose approval shall be required for further use of the rope. A certification record shall be available for inspection which includes the date of inspection, the signature of the person who performed the inspection and an identifier for the rope which was inspected.

9.0 Forms

A. SAF-28.1-5 - Operator's Daily Safety Inspection
B. SAF-28.2-4 - Conventional Crane Periodic Safety Inspection
C. SAF-28.2-8 - Hydraulic Crane Periodic Safety Inspection
D. SAF-28.2-12 - Wire Rope Inspection Report
E. SAF-28.3-1 - Sample Load Charts
F. SAF-28.2-9 - Operator Qualification
G. SAF-28.0-3 – Equipment Operator’s Training Certification
H. SAF-28.3-2 - Hand Signal Chart
I. SAF-28.3-3 - Required Clearance for High Voltage Lines
J. SAF-28.3-4 - Sling Angle Requirements
K. SAF-28.3-5 - Suspended Personnel Basket Inspection Report
L. SAF-28.3-6 - Personnel Basket Approval Form
M. SAF-28.2-6 - Critical Multiple Lift Plan
N. SAF-28.2-3 - Crane Operation Analysis
# OPERATORS SAFETY CHECK LIST

**PREFERRED INDUSTRIAL CONTRACTORS, INC.**  
OPERATORS SAFETY CHECK LIST  
REQUIRED FOR ALL MOBILE EQUIPMENT BEFORE EACH SHIFT

<table>
<thead>
<tr>
<th>DATE</th>
<th>SHIFT</th>
<th>SIGNATURE &amp; BADGE NO.</th>
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</thead>
<tbody>
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<table>
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<tr>
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<th>B.O.</th>
<th>O.K.</th>
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<tr>
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<td>REG. BRAKES</td>
<td>HORN</td>
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</tr>
<tr>
<td>STEERING</td>
<td>SEAT BELTS</td>
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<td>FRT. LIGHTS</td>
<td>DOOR LATCH</td>
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<tr>
<td>REAR LIGHTS</td>
<td>TIRES</td>
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<tr>
<td>WINDSHIELD</td>
<td>EXHAUST</td>
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<td>W/S WIPERS</td>
<td>CABLES</td>
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<td>BACK-UP ALARM</td>
<td>SHEAVES</td>
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<tr>
<td>FIRE EXTINGUISHER</td>
<td>HOOKS</td>
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<td>HYDRAULICS</td>
<td>GAUGES</td>
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<tr>
<td>FLUID LEVELS</td>
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**REPAIRS NEEDED:**  
__________________________________________

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<td>White copy – Supervisor</td>
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<td>Yellow copy – Stays in book</td>
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PIC  Rev 12/12/11
### Rigging Components

**List each component**

| Slings | | |
| --- | --- | --- | --- |
| Type | Hitch Capacity | Sling Angle | Actual Capacity |
| Sling 1 | | | |
| Sling 2 | | | |
| Sling 3 | | | |
| Sling 4 | | | |

<table>
<thead>
<tr>
<th>Shackles</th>
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<td>Shackles 3</td>
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<td></td>
</tr>
<tr>
<td>Shackles 4</td>
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**Other Devices:**

<table>
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### RIGGING PLAN

**Sketch all components of the rigging and devices.**

With hitches having more than two legs on a rigid load, figure the safe working load based on a two-leg bridle hitch only:

- 
- 
- 
- 

**REMEMBER**

**Identify all known hazards and safe clearance distances.**

- 
- 
- 
- 

### CRANE SET-UP DIAGRAM

### Safety Task Evaluation Process

**Crane Operation Analysis**

Crane: _____ Date: _____ Time: _______

- Crane has been inspected/safe condition: __Yes__ __No__
- Job Location: ________________________________
- Job Description: ________________________________
- The weight of the load is: ________________________________
- The swing radius of the lift is: ________________________________
- Is operator qualified to operate this crane? __Yes__ __No__
- Is operator's certification card current? __Yes__ __No__
- Is Critical Lift Permit required for this lift? __Yes__ __No__
- Is crane level/outriggers fully extended? __Yes__ __No__
- Is the rigger qualified for this task? __Yes__ __No__
- Is sling/hardware in safe condition? __Yes__ __No__
- Has sling sizing/hookup been reviewed? __Yes__ __No__
- Do sharp edges have softeners? __Yes__ __No__
- Are tag lines needed to help control load? __Yes__ __No__
- Is center of gravity of load located? __Yes__ __No__

**EMERGENCY INFORMATION**

- What is the wind direction? ________________
- Reviewed emergency alarms/phone numbers: __Yes__
- Escape route(s): ________________________________
- Location of eyewash/shower station: ________________________________
- Our evacuation assembly point is: ________________________________

Operator Signature: ________________________________
Rigger Signature: ________________________________
Signalman Signature: ________________________________
Foreman Signature: ________________________________
INSTRUCTIONS

The intent of this process is to have those Employees involved in the hoisting operation to analyze the task, plan the lift, and complete this assessment card as a group effort to establish good communications and assure job scope understanding. The expectation is to analyze all lifts. Some operations may require only one card for multiple lifts from one location/setup. The Project Manager/Superintendent must approve this option. When developing a rigging plan of action, it is important to choose the right rigging for the job and make sure it is inspected before use. Softeners may be required around sharp corners or to protect the surface of the piece. Never use nylon or synthetic web slings where they can be cut, burned or exposed to chemicals. Chainfalls, come-a-longs and similar equipment/tools should not be utilized in a load bearing leg. They should only be used to balance and position the load. The "Crane and Rigging Supervisor" must approve any variance to this rule. When manipulating a mechanical device or fitting the load, expect the load to transfer and the center of gravity to shift. The signalman and crane operator must establish and maintain a continuous and undivided line of communication while manipulating the load or maneuvering the crane. Working together as a team will assure a safe and healthful workplace.

DESCRIBE EACH TASK

1. Access/Egress to Location

2. Set-up

3. Lift Operation

4. Positioning/Fitting Load

5. Loading/Unloading Float

E = Eliminate
C = Control
# Conventional Crane Periodic Safety Inspection

<table>
<thead>
<tr>
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<th>INSPECT FOR</th>
<th>OK</th>
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<tr>
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<td>Cooling System</td>
<td>Level &amp; Leakage</td>
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<td>Battery</td>
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<tr>
<td>Instruments</td>
<td>Function</td>
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<td>Guards</td>
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<tr>
<td>Glass</td>
<td>Broken Or Distorted View</td>
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<tr>
<td>Fire Extinguisher</td>
<td>Charged &amp; In Place</td>
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<tr>
<td>Load Chart</td>
<td>In Place / Ledgeable</td>
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<td>Hand Signal Chart</td>
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<td>Bolts &amp; Rivets</td>
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**Inspected By** ____________  **Date** ____________  

PIC  Rev 12/12/11
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**Remarks:**

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**Inspected By:** ____________________________  **Date:** ____________________________

PIC  Rev 12/12/11
**Wire Rope Inspection Report**

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**Machine Data**

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**Wire Rope Data**

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**Remarks:**

**Inspected By:** ____________________________
SAMPLE LOAD CHART FOR CRANE EXAMPLE ONLY

- Denotes Main Boom + 61' Fly—Boom Mode “B”
- Denotes Main Boom + 36.5' Fly—Boom Mode “B”

Note: Boom and fly geometry shown are for unloaded condition and crane standing level on firm supporting surface. Boom deflection, subsequent radius, and boom angle change must be accounted for when applying load to hook.
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</table>
Operator Qualification

Operator Name: ______________________  Job Number: ______________________

In accordance with ANSI B30.5 Section 5-3.1.2 and company requirements the above named individual meets the following physical qualifications:

Check

(A) Has vision of at least 20/30 in one eye and 20/50 in the other, with or without glasses.  □

(B) Is able to distinguish red, green, and yellow, regardless of color position. If color differentiation is required for operation.  □

(C) Has adequate hearing, with or without hearing aid to operate assigned crane.  □

(D) Does not have a history of epilepsy or of a disabling heart condition.  □

(E) Does not have a history of high blood pressure and is not currently taking medication for high blood pressure.  □

The above named individual has completed the following reviews and tests satisfactorily:

(A) Has read the crane’s operating manual and the company crane operation manual.  □

(B) Has demonstrated proper inspection procedures including fluid levels, tires, rope condition, crane start-up and gauge readings and has tested all controls for proper function.  □

(C) Has reviewed and understands the load chart which is available to him while he is at the controls. He understands that the crane capacity shall not exceed 75% where tipping could occur. □

(D) Has demonstrated the following operation procedures:

1) Move the crane into position and level the crane.  □

2) Drop headache ball into a 55 gal drum located at radius of 25% of boom length.  □

3) Control coordination – with a 4’ long strap hanging from the hook, keeps the strap in contact with the ground following a course outline.  □

________________________________________  __________________________  __________________________
Verified By:  Date  Operator’s Signature
EQUIPMENT OPERATOR’S PROFICIENCY QUALIFICATION

THIS IS TO CERTIFY THAT:

HAS REVIEWED THE OPERATOR’S MANUAL, THE COMPANY INSPECTION AND OPERATIONAL MANUAL AND HAS SUCCESSFULLY COMPLETED THE PROFICIENCY PROCEDURES. THIS OPERATOR IS QUALIFIED TO OPERATE THE FOLLOWING EQUIPMENT:

<table>
<thead>
<tr>
<th>AUTHORIZED SIGNATURE</th>
</tr>
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<tbody>
<tr>
<td>COMPANY TITLE</td>
</tr>
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(INFORMATION MUST BE TYPED OR PRINTED)

CERTIFICATE VALID FOR 1 YEAR FROM THE DATE TRAINED

<table>
<thead>
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<th>DATE TRAINED</th>
<th>EQUIPMENT TYPE</th>
<th>SUPV. INITIALS</th>
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PIC  Rev 12/12/11
Hand Signal Chart

**HOIST.** With forearm vertical, forefinger pointing up, move hand in small horizontal circle.

**LOWER.** With arm extended downward, forefinger pointing down, move hand in small horizontal circles.

**BRIDGE TRAVEL.** Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.

**TROLLEY TRAVEL.** Palm up, fingers closed, thumb pointing in direction of motion, jerk hand horizontally.

**STOP.** Arm extended, palm down, move arm back and forth.

**EMERGENCY STOP.** Both arms extended, palms down, move arms back and forth.

**MULTIPLE TROLLEYS.** Hold up one finger for block marked "1" and two fingers for block marked "2." Regular signals follow.

**MOVE SLOWLY.** Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal. (Hoist slowly shown as example 1.)

**MAGNET IS DISCONNECTED.** Crane operator spreads both hands apart palms up.
Required Clearance for High Voltage Lines

<table>
<thead>
<tr>
<th>Line Voltage</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>50kV or below</td>
<td>10 feet</td>
</tr>
<tr>
<td>50kV and higher</td>
<td>10 feet + .4 inches for each 1kV above 50kV</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line Voltage</th>
<th>Distance</th>
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</thead>
<tbody>
<tr>
<td>50kV and below</td>
<td>4 feet minimum</td>
</tr>
<tr>
<td>50kV to 345kV</td>
<td>10 feet</td>
</tr>
<tr>
<td>Over 345kV to 750kV</td>
<td>16 feet</td>
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</table>

Be safe! The crane's mast or boom must be kept at least 10 feet away from a normal distribution power line at all times. And that includes the load line and the load. Skilled crane operators know that distances in the air are hard to judge, and that a spotter is a good, safe idea. When you must work near any power line, use the shortest boom possible. Never move a crane under a power line unless there are adequate clearances.
Sling Angle Requirements

Sling Angle in Degrees

IF \( L > S \) then the SUHG angle \( (A) \) is large enough to be safe.
Suspended Personnel Basket
Inspection Report
(To Be Completed Before Each Use)
Model #: Date: Serial #: Time:

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>
|     |    | Guardrails, floor plate, toe boards are free of distortion.
|     |    | Safety railing in good condition.
|     |    | Is rigging free of distortion, broken wires, shackles properly secured with cotter keys.
|     |    | Safety latch working correctly.
|     |    | Load hook in proper condition.
|     |    | Door locks and hinges working properly.
|     |    | Identification plate and capacity marking visible.
|     |    | All welds free of any defects.
|     |    | Safety belts and lanyards for each passenger inspected:
|     |    | Date: ________________ inspected by: __________________
|     |    | Crane inspected in accordance with 29 CFR 1926.550:
|     |    | Date: ________________ inspected by: __________________
|     |    | Crane equipped with proper safety equipment.
|     |    | Operational test of crane before lift is made.
|     |    | Load test of suspended personnel platform.
|     |    | Pre-lift safety meeting with all employees concerned.

Foreman’s Signature: ________________________________
Personnel Basket Approval Form

The use of a crane or derrick to hoist employees on a personnel platform is prohibited unless the erection, use or dismantling of conventional means of reaching the worksite, such as a personnel hoist, ladder, scaffold, aerial lift, stairway or elevated work platform would be more hazardous or is not possible due to structural design or worksite conditions.

Job # ____________________________________  Job Name__________________________________________

Crane Size and Type______________________________________________________________

Personnel Basket Make and Model_____________________________________________________

Justification for Personnel Basket Use_________________________________________________

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

Scope of Work Personnel Basket Use____________________________________________________

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

Use Additional Sheets If Needed  Attach Prints And / or Drawing of Work Location

Submitted By ___________________________ Date ____________ Projec ____________ t Manager Approval ____________

Date

Safety Department Review ___________________________ Date ____________

*All Requirements For Crane Setup, Testing, And Use Of Personnel Baskets Must Be Followed – Refer To Company SH&E Manual, Section 28.
**Location:**  
Lift Description:  

**Critical / Multiple Lift Plan**  
A Lift Plan Should Be Completed Prior To Mobilization Of Equipment And Rigging.

A. **WEIGHT:**  
1. Equipment Condition  
   New ( ) Used ( )  
2. Weight Empty  
   [ ] lbs.  
3. Weight of Headache Ball  
   [ ] lbs.  
4. Weight of Block  
   [ ] lbs.  
5. Weight of Lifting Bar  
   [ ] lbs.  
6. Weight of Rigging  
   [ ] lbs.  
7. Weight of Jib  
   [ ] lbs.  
8. Weight of Cable  
   [ ] lbs.  
9. Allowance for Uncounted Material in Equipment  
   [ ] lbs.  
10. Other  
   [ ] lbs.  

Total Weight:  
[ ] lbs.

Source Load of Weight (Name plate, drawings, etc.)

Weights Verified By:

B. **JIB:**  
   Erected [ ] Stowed [ ]  
1. Is Jib to be used?  
2. Length of Jib  
3. Angle of Jib  
4. Rated Capacity of Jib [ ] lbs.  

C. **CRANE PLACEMENT:**  
1. Foundation in the Area?  
2. Electrical Hazards in the Area?  
3. Obstacles or Obstructions to Lift or Swing Over?  
4. Swing Direction and Degree (Boom Swing)

D. **CABLE:**  
1. Number of Parts of Cable  
2. Size of Cable  
3. Cable Weight per Foot

SPECIAL INSTRUCTIONS OR RESTRICTIONS FOR CRANE, RIGGING, LIFT, ETC.

---

**E. SIZING OF SLINGS**  
1. Sling Selection  
   a. Type of Arrangement  
   b. Number of Slings in Hook-Up  
   c. Sling Size  
   d. Sling Length  
   e. Rated Capacity of Sling  
2. Shackle Selection  
   a. Pin Diameter (inches)  
   b. Capacity (tons)  
   c. Shackle Attached to Load By:  
   d. Number of Shackles

**F. CRANE:**  
1. Type of Crane  
2. Crane Capacity  
3. Lifting Arrangement  
   a. Max Distance to Center of Load to center Pin of Crane  
   b. Length of Boom  
   c. Angle of Boom at Pick-Up  
   d. Angle of Boom at Set  
   e. Rated capacity of Crane under Lifting Conditions (From Chart)  
4. Over Rear [ ] lbs.  
5. Over Front [ ] lbs.  
6. Over Side [ ] lbs.  
7. From Chart Rated Capacity of Crane for this Lift [ ]
8. Lift is [ ]% of Crane’s Rated Capacity

**G. PRE-LIFT CHECKLIST:**

<table>
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<th>No</th>
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<tbody>
<tr>
<td>1. Matting Acceptable</td>
<td>( ) ( )</td>
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<tr>
<td>2. Outriggers fully Extended</td>
<td>( ) ( )</td>
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<tr>
<td>3. Crane in Good Condition</td>
<td>( ) ( )</td>
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<tr>
<td>4. Swing Boom</td>
<td>( ) ( )</td>
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<tr>
<td>5. Head Room Check</td>
<td>( ) ( )</td>
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<td>6. Max Counterweights Used</td>
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<td>7. Tag Line Used</td>
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<tr>
<td>8. Experienced Operator</td>
<td>( ) ( )</td>
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<td>9. Experienced Flagman</td>
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<td>10. Experienced Rigger</td>
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<td>11. Load Chart in Crane</td>
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<tr>
<td>12. Wind &amp; Weather Conditions</td>
<td>( ) ( )</td>
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<td>13. Crane Inspected By:</td>
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Project Superintendent:
# 28.4 - Forklifts (Industrial Trucks)

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1.0 General

Powered Industrial Trucks (forklifts for short) come in a variety of sizes and designs and may operate on battery power, propane, gasoline or diesel fuel. Forklift operators must be trained and understand the design and performance of the forklift in order to safely operate the forklift under a variety of conditions and environments. It shall be the Project Superintendent’s responsibility to ensure that operators receive the training. Forklifts are to be operated only by authorized persons who currently hold a valid Operators Training certification card for the specific type of forklift. The Project Superintendent, Foreman, Project SH&E Supervisor or other persons qualified to perform task training may perform this training.

While the basic designs of forklifts are the same, different forklifts will have different controls, weight capacities and restrictions on where they can operate. The basic parts of a forklift include:

- Mast - The upright section that contains a set of tracks that house ball bearing rollers and chains. It tilts forward or backward and may shift side to side.
- Carriage - Housed inside the mast, it contains the rollers that allow the load to move up and down. The forks are mounted to the carriage.
- Backrest - Mounted to the carriage, it keeps the load from falling back onto the truck when the forks are tilted back.
- Overhead Guard - Keeps falling objects from hitting the operator but is not strong enough to withstand the force of a heavy load.

A. The operator shall be trained on the same make and model of forklift that he/she will be required to operate on the project. As part of the operator qualification, the employee shall be required to demonstrate that they have the necessary skill levels needed to safely operate the equipment under a variety of work conditions. The hands-on operation of the equipment will be performed in a designated area with minimal hazards, under the direct supervision of a competent person. In compliance with current regulations, only properly trained and authorized persons will be allowed to operate a forklift. Prior to operation of a forklift, employees are to have completed the following:

1. Will have read and understood the manufacturer’s operation and safety manual for the specific type of equipment, or reviewed the manufacturer’s safety rules and requirements as part of a formal training program.
2. Demonstrated knowledge of the function of each control.
3. Demonstrated knowledge of all decals, charts, and placards.
4. Demonstrated a knowledge proficiency of the equipment load capacity under any possible configuration.

2.0 Equipment Specific Training

The operator shall be trained on the same make and model of forklift that he/she will be required to operate on the project. As part of the operator qualification, the employee shall be required to demonstrate that they have the necessary skill levels needed to safely operate the equipment under a variety of work conditions. The hands-on operation of the equipment will be performed in a designated area with minimal hazards, under the direct supervision of a competent person.
In compliance with current regulations, only properly trained and authorized persons will be allowed to operate a forklift. Prior to operation of a forklift, employees are to have completed the following:

A. Will have read and understood the manufacturer’s operation and safety manual for the specific type of equipment, or reviewed the manufacturer’s safety rules and requirements as part of a formal training program.
B. Demonstrated knowledge of the function of each control.
C. Demonstrated knowledge of all decals, charts, and placards.
D. Demonstrated a knowledge proficiency of the equipment load capacity under any possible configuration.

3.0 Training Records
The training record shall certify that each operator has been trained and evaluated as to their ability to safely operate the forklift. The certification shall include the name of the operator, the date of the training, the date of the evaluation, and the identity of the person(s) performing the training or evaluation. A copy of the operator’s training records including classroom and hands on or task training shall be maintained onsite for the length of employment plus one year.

4.0 Inspection and Maintenance
Each forklift shall be inspected and maintained as required to ensure proper and safe operation. Inspections and routine maintenance are to be performed by field personnel and are compatible with the manufacturer’s guidelines for the severity of the operating conditions and environment. Any forklift that is not in proper working condition shall be removed from service until repairs can be made. All repairs made to the unit shall be made by a qualified person and shall be in conformance with the manufacturer’s recommendations. A qualified mechanic shall perform repairs beyond the capabilities of jobsite personnel.

5.0 Pre-Shift Inspections

A. At the beginning of each shift, the operator shall check all forklifts in use to assure that equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use.
   1. It will be the operator’s responsibility to report unsafe conditions.
   2. Vehicles or equipment unsafe to operate shall immediately be taken out of service until repaired.
   3. When repairs are made, the parts and components used shall meet manufacturer’s specifications.
   4. No modifications or additions shall be made that could affect the safe operation or stability of the vehicle without written approval from the manufacturer.

B. Prior to operation, an Operators Safety Check List shall be completed. When the forklift is operated for more than one shift, the inspection form shall be completed for each shift the equipment is used. Items to be checked during the inspection include:
   1. Operating and emergency controls
   2. Data plate, placards, and other labels
   3. Horn or other audible alarms
   4. Lights - front, rear, stop, etc.
   5. Brakes including emergency brakes
   6. Generator, starter, etc.
7. Forks, backrest, carriage and mast
8. Overhead guard and other safety devices
9. Hydraulic, oil, water, and fuel hoses, couplings, pumps
10. Fan belts
11. Fluid levels
12. Gauges
13. Tires proper for proper inflation and damage
14. Seat belts

6.0 Operational Check
If all items on the Pre-Shift Inspection check out, start the forklift. Check all gauges, indicators and warning lights. Put the forklift through its normal maneuvers and check lift, tilt, brakes, steering, lights and horn. The operator shall immediately report any problem or malfunction that occur during operation of the vehicle. Problems, which occur during the shift that affect the safety of the vehicle shall be repaired immediately, or the vehicle shall be removed from service until proper repairs can be made.

7.0 Maintenance / Repair Precautions
A. Prior to performing any maintenance or repairs on mobile equipment, the following safety precautions are to be taken:
1. The engine is to be turned off, the equipment tagged out, and the key removed or other means taken to prevent unauthorized starting of the forklift.
2. The forks shall be lowered to the ground or otherwise securely blocked or cribbed to prevent dropping.
3. All operating controls are to be placed in the OFF or NEUTRAL position. The parking brakes are to be set and wheels blocked to prevent accidental motion.
4. Pressurized systems such as but not limited to: hydraulic, air, cooling, etc. are to be relieved of pressure prior to any maintenance or repairs.
5. Disconnect the batteries before working on the electrical system.
6. Guards, safety latches or supports are to be installed and used as per the manufacturer’s instructions.
7. All guards, covers, caps and safety devices must be replaced prior to operation.

8.0 Capacities
Each forklift shall have a manufacturer’s data plate clearly posted on the vehicle, visible to the operator, indicating the capacity, load center and weight of the unit. Operators must understand that forklifts are heavy and that the weight of the machine and its load can affect the stability of the machine on different surfaces. No modifications or additions, which can effect the safe operation of the equipment, shall be made, including the forks.

9.0 Visibility
Forklifts are designed to lift and carry loads in front of the machine. The mast and load will greatly reduce the operator’s visibility. When loads that restrict forward visibility are carried, the truck should be operated in reverse. There are some tasks which require the operator to move in a forward direction such as moving in and out of trailers, traveling up and down grades, and picking up or depositing loads. Building structures, storage systems, or materials may also restrict visibility. Operators must have a clear view in the direction of travel. When required to move in a direction where visibility is blocked, a spotter must be used to assist the operator.
10.0 Stability

A. The factors that affect a forklifts stability include:
1. Height of the load
2. Position of the load as it is being tilted forward and backward
3. Speed of the forklift while the load is being moved and/or lifted
4. Load weight, size, and dimensions
5. Center of gravity of the load

B. Improper operation of a forklift can cause it to tip over resulting in serious injury, death and equipment and property damage. In all cases, either loaded or unloaded, the stability of a forklift can be affected by the surfaces on which the truck is operated, by turning, especially at high speeds, and by running over objects or into overhead structures. The operator must maintain the unit’s stability by keeping loads within the rated capacity of the forklift, keeping loads centered and balanced, and not tilting the uprights too far forward or backward with a raised load. Speed and a sharp, quick turn can cause even an unloaded forklift to overturn.

C. The operator can increase the stability of the forklift by carrying smaller loads. Load size is to be reduced under the following conditions:
1. If the load is tall, wide oddly shaped or if using attachments to handle the load.
2. If a high lift is involved or the forklift must travel over a rough route with the load.
3. If the load cannot be centered on the pallet or carried back on the forks close to the drive wheels.
4. If the route of travel requires the forklift to make tight turns, or travel on a ramp or slope.

D. To stabilize the load itself the operator should:
1. Space the forks as far apart as possible
2. Make sure the load will not shift while traveling. Secure loose or slippery items and wrap or strap loads of individual items.
3. Transfer loads on broken pallets or containers to sound ones before picking them up.

11.0 Lifting a Load

To pick up a load the operator must follow these basic guidelines:
A. Square up on its center and approach it straight on.
B. Stop with the tips of your forks about one foot from the load.

12.0 Putting Down a Load

A. To put down a load the operator must follow these basic guidelines:
1. Square up and stop about a foot away from where you intend to deposit the load.
2. Drive forward until you are about halfway into the loading area, stop, level the forks and drive the rest of the way in.
3. Lower the load. After the load is seated, lower the forks slightly to keep from hooking the load when you back out. An elevated load must not be tilted forward until the load is in the correct position to be deposited.
4. Look over both shoulders and back out slowly.

B. The following precautions are to be taken by all operators when working with loads.
1. Make sure the area is clear of pedestrians.
2. Stop before raising or lowering the forks.
3. Look over both shoulders before you back out.
4. Lift the load only high enough to clear obstacles, and lower it as soon as possible.
5. Never travel or turn with the load elevated.

13.0 Working with Stacks
When working with high stacks, approach and travel are the same with one difference; the higher the stack, the less stable the forklift and the load become. When stacking loads the operator must follow these basic guidelines:

14.0 Removing a Load from A Stack
A. Stop straight on about a foot away from the stack
B. Raise the mast until the forks are at the right height. Move forward slowly until the load is flush with the back of the forks.
C. Lift the load high enough to clear the material below. Look over both shoulders and back straight out to clear the edge of the stack.
D. Stop and lower the load to the travel position. Tilt the load back and move out slowly.

15.0 Placing a Load On A Stack
A. Approach the stack slowly and squarely, stopping about a foot away.
B. Lift the mast high enough to clear the top of the stack.
C. Slowly drive forward until the load is square over the stack. Level the forks and lower the mast until the forks no longer support the load.
D. Keep the forks level so you do not hook anything, look over both shoulders and back straight out. Once you clear the stack, stop and lower the mast to the travel position.
E. The following precautions are to be taken by all operators when working with stacked loads:
   1. Set the load squarely on the stack. Depending on the load and its size and shape, there may be limits as to how high material may be stacked.
   2. Never raise or lower a load unless you are at a full stop.
   3. Never attempt to turn with the mast raised.
   4. Always approach the load straight on and remove the forks by backing straight out to prevent hooking the load.
   5. Make sure you have enough overhead clearance. Watch for electrical lines, pipes, fixtures and other overhead hazards.

16.0 Causes For Forklift Accidents - (Listed By Ranking)
A. Operator Inattention
B. Overturn
C. Unstable Load
D. Operator Struck by Load
E. Elevated Employee
F. No Training
G. Overload / Improper Use
H. Accident During Maintenance
I. Obstructed View
J. Improper Equipment
K. Falling From Platform or Curb
L. Coworker Struck by Load
M. Carrying a Passenger
N. Vehicle Left in Gear
O. Falling From Trailer
P. Speeding
(Source: Professional Safety)

17.0 Primary Causes For Forklift Fatalities
A. Tip Over................................................................. 25.3%
B. Struck By Forklift .................................................. 18.8%
C. Elevated Employee on Forklift ................................. 12.2%
D. Ran Off Loading Dock or Other Surface.................. 7.0%
E. Improper Maintenance ........................................... 6.1%
F. Lost Control of Truck ............................................. 4.3%
G. Truck Struck Material ............................................. 4.3%
H. Employee Overcome by CO or Propane Fuel........... 4.3%
I. Faulty Truck .......................................................... 3.1%
J. Unloading Unchocked Trailer ................................. 3.1%
K. Employee Fell From Forklift ................................. 3.1%
L. Improper Vehicle Use ............................................ 2.6%
M. Electrocution ....................................................... 1.0%
(Source: Professional Safety)

18.0 Forklift Operation
The operator is responsible for the safe movement and operation of the forklift. Since the operator is in direct control of the equipment, complying with recognized safe operating practices is the responsibility of the operator. The operator shall make decisions on the safe use and operation of the forklift based on surrounding hazards and operating conditions.

19.0 Inspection of the Work Area
Before the forklift or other mobile equipment is used, the employee and supervisor shall inspect the area where the equipment is to operate for hazards such as but not limited to:
A. Overhead obstructions such as pipes and overhead high voltage lines.
B. Operating surfaces, check for holes, rough terrain, mud, ice, loose or uncompacted soil, bumps and floor obstructions, or other hazards, which may affect operation safety.
C. Unauthorized persons or vehicles in work area.
D. Debris or housekeeping hazards
E. Adverse weather conditions
F. Hazardous locations.
G. The ability of the operating surface to support the equipment and the loads being carried.
H. Any other possible hazards or conditions, which can adversely affect the safe operation of the equipment.
20.0 General Operating Safety Rules
A. It is important that operators understand that a forklift does not operate like a car or pickup. The design of a forklift is based on a stability triangle. The front axle, with the drive wheels, acts as the base of the triangle and supports the weight of the load. The sides of the triangle meet at a center point where the forklift steers, this will be in the center of the back axle on four-wheel models. The operator shall abide by the following safety precautions during the use and operation of a forklift.
1. Seat belts are required to be worn when operating a forklift. In a turnover operators have a better chance of survival
2. When the forklift is left unattended, the following practice shall be followed: (The forklift is to be considered unattended when the operator dismounts the vehicle.)
   • The parking brake shall be set
   • The forks lowered to the ground
   • The engine shall be shut off
   • The wheels shall be blocked or turned into the berm if the truck is parked on an incline.
5. Check capacities, do not overload the forklift. Do not travel with suspended or unstable loads that could affect the stability of the forklift.
6. Use the proper forklift for the job. Pneumatic tired, rough terrain forklifts are to be used on rough or uneven surfaces. Do not use solid tired warehouse type forklifts for off-road or outside use.
7. Avoid travel ways where standing water, sand, gravel, or loose material may cause loss of traction or unstable support for the weight of the forklift, which could result in a rollover.
8. Forklifts are not to be driven into an unsafe area. This will include areas of construction where unnecessary tire, steering or body damage could result.
9. No person shall be permitted to ride on a forklift other than the operator.
10. Forklifts shall not be used as personnel hoists without an approved safety platform properly mounted and secured and prior approval from the Project Superintendent and the Safety, Health and Environmental Department.
11. All posted traffic regulations shall be followed. No forklift shall be driven at a speed greater than is reasonable and proper, with due regard for weather, traffic, intersections, width and character of the roadway, load size and type, and any other existing condition.
12. Extreme care shall be taken when driving a forklift on inclines, slopes, or grades that could cause rollover or loss of control.
13. Do not turn on ramps or grades. Always ascend or descend ramps with the load upgrade.
14. When making a turn, slow down, keep the forks and any attachments tilted back and as low to the ground as possible. Even at slow speeds loads that are carried too high can cause the forklift to turn over. An empty forklift will generally turn over easier than a properly loaded one. The large counterweight on the back of the truck makes it rear-end heavy.
15. Striking a raised, fixed object such as a curb or concrete footer can also result in a turn over.
Watch for bumps and potholes in the road that can cause you to lose control of the forklift and or load.

16. Backing with a raised load and striking an overhead obstruction can cause a tipover. Keep your load low and know what is around the forklift in all directions before moving the load.

17. Use extreme caution when crossing railroad tracks. Hooking the tip of the forks on the tracks can result a sudden stop that could result in an accident or injury.

18. No vehicle or equipment shall be parked closer than eight feet from the centerline of a railroad track.

19. Disabling or altering safety devices is prohibited.

20. When crossing aisles and other areas where vision is obstructed, the operator shall stop, honk the horn and proceed with caution.

21. When fueling the forklift, the engine shall be turned off and precautions taken to prevent spillage of fuel. Fueling of motor vehicles shall be done in an area that is well-ventilated and free from flame, sparks or other hazards that may cause fire or explosion.

22. Smoking will not be allowed on, in or within 50 feet of fueling operations.

23. A 2-½ ABC fire extinguisher will be placed on all vehicles or equipment and inspected daily.

24. Forklifts shall be equipped with a backup alarm that is audible above the surrounding noise level.

25. Markings, including capacity charts, stickers and tags shall not be removed or defaced. Missing, or illegible markings shall be replaced immediately.

26. When other moving equipment, vehicles or pedestrians are present in the work areas, the operator must exercise caution to ensure safety.

27. Use the proper gear for driving and road conditions. Do not shift into neutral and coast down a hill; this can result in excessive braking and loss of control.

28. When parking the vehicle ensure that it is out of the way and visible to other traffic in the area. Use of cones, barricades or other warning devices may be necessary.

29. **Stunt driving and horseplay shall not be permitted.** Safe, courteous operation of a vehicle is expected of all employees because it prevents injury to you and others, saves damage or loss of valuable equipment and improves public relations. Safe operation of a company vehicle is a responsibility not a privilege.

30. When transporting forklifts on trailers, the equipment shall be adequately secured against movement.

### 21.0 Operator Controls and Instruments

A. Depending on the make and model of the vehicle, the operator controls and instrument gauges may vary depending on the manufacturer of the lift truck and its design and rating. Warning lights and gauges can signal that something is wrong or indicate that there is a problem with the vehicle before it becomes a serious problem or a safety concern. The operator must be familiar with the location and function of the following items:

1. Engine starter switch
2. Wheel crank or arm for steering
3. Parking brake and release handle
4. Location and function of all gauges and warning lights
5. Hazard warning flasher switch
6. Levers to control lift, tilt, side movement and attachments
7. Clutch pedal
8. Brake pedal
9. Accelerator pedal

22.0 Attachments
There are a wide array of forklift attachments, which can affect the stability, and operation of the forklift in different ways. The manufacturer must approve all attachments for use. Homemade, or shop built attachments are not approved and are not to be used unless approved, in writing, by the manufacturer.

23.0 Forks and Fork Retention
Forks are to be inspected regularly for cracks, heel wear, tip wear and alignment. Forks, which are worn beyond limits recommended by the manufacturer, are to be replaced. At no time are forks to be modified by cutting or welding.

24.0 Load Handling
A. Only stable and safely arranged loads within the rated capacity of the forklift are to be handled. If necessary, loads are to be weighed and marked to identify weight. Use the following precautions when handling a load:
   1. When handling long or high loads, watch the clearance and remember that these loads can reduce the capacity of the forklift and may require more room to maneuver.
   2. When picking up a load, place the forks under the load as far as possible and carefully tilt the mast backward enough to stabilize the load, carefully tilt the mast backward enough to stabilize the load.
   3. When raising a load use extra caution. Do not tilt an elevated load forward except when the load is in the correct position to be deposited. When stacking, use only enough backward tilt to stabilize the load.
   4. Forks on a forklift are adjustable. Spread them to fit the load. Generally the wider the better.
   5. Loads can come in many sizes and descriptions. Pallets are loaded with boxes, bags, packages, containers, or other objects. All loads should be made stable by interlocking, strapping, or shrink-wrapping the objects to keep them from falling off the pallet.

25.0 Grades, Ramps, Slopes, and Inclines
A. There are three basic points to remember when operating on grades.
   1. Travel straight up and down grades slowly. Never turn on slopes, ramps or inclines. Wait until you are back on a level surface.
   2. Loaded forklifts should be operated with the load upgrade. The load should be tilted back and raised only as high as necessary to clear the surface.
   3. Unloaded forklifts should be operated with the forks or attachments down grade.
26.0 Dock Operations

A. Dock operations account for 7% of forklift fatalities, operators must be aware of the hazards of dock operations. When operating a forklift from a dock, the following safety precautions must be taken:

1. A trailer restraint system must be used or the trailer must be properly chocked.
2. If the tractors are not attached, insure that the landing gear is secure and supports are placed under the trailer.
3. Watch the trailer to dock interface. Levelers, dock plates, and ramps must be used and properly maintained.
4. Travel slowly when entering and exiting the trailer. High speed or sudden acceleration can jar dock plates and ramps loose.
5. Move carefully when working on docks. Avoid getting the wheels too close to the edge of the dock and watch for the swing of the rear end of the machine that it does not swing over the edge of the dock.
6. Use lights when working inside trailers to improve visibility.

27.0 Personnel Elevators

A. Employees are not to be hoisted by standing on the forks, a pallet, or load. If it is necessary to work from an elevated position using a forklift, approval must be obtained from the Project Superintendent and the Safety, Health and Environmental Department and the following safety requirements must be met:

1. The forklift must be properly maintained and in safe working order with no deficiencies.
2. A safety platform meeting all of the applicable OSHA and ANSI standards must be securely fastened to the forks and carriage.
3. Insure that no part of the platform interferes with the operation of the carriage or upright assembly and that no mechanical problems exist which might cause the uprights to bind.
4. The platform is to be loaded to the anticipated load and lifted into place prior to allowing any person to enter the platform.
5. All persons inside the platform shall wear proper fall protection and all other needed personal protective equipment.
6. The uprights shall be kept in a vertical position.
7. The operator shall remain inside the forklift at the controls any time the platform is raised.
8. Do not allow anyone to climb on the uprights or walk under the raised platform.
9. Personnel shall not be allowed to ride on the platform while the forklift is being moved.

28.0 Pedestrian and Other Traffic

A. In many areas it may not be possible to completely separate forklift operations from pedestrian, bicycle, and other vehicular traffic. Operators shall be aware of pedestrians and other traffic in the area and watch for potential hazards. The following safety precautions must be adhered to by forklift operators when working in areas with pedestrians or other vehicular traffic:
1. Watch where you are going; always face the direction of travel. Pedestrians and other vehicles use the same roadway as you. Sound the horn at intersections and blind spots.

2. Watch for people in and around the work area, they may not be watching you, even though the forklift has warning lights and alarms. If you think they may not see you, do not move until you have made eye-to-eye contact. Make people stand back, even if you’re stopped.

3. If you view is blocked because of the load, travel backwards. If you must travel forward, use a spotter to ensure that the travel path is clear. If you can’t see the spotter or the travel path, don’t move the truck.

4. Watch for employees working around you. Don’t let anyone walk under the raised forks or load. Keep other employees off the truck - not on the forks – not on the load - not on the truck.

5. If another employee is needed to hold or position the load while you are moving - Stop and reposition the load. If the forklift cannot handle the load alone, then change the load or the equipment. Do not allow anyone to hold onto the load while the forklift is in motion.

6. Do not use or allow anyone to use the mast of the forklift as a ladder. Do not allow anyone to put any part of their body in any part of the attachments, carriage, uprights, or load. Forks and attachments can fall rapidly should a defect occur. Forklifts must be properly maintained. If there is a problem with the equipment, do not operate it until a qualified person has made adequate repairs.

29.0 Carbon Monoxide And Fumes
Forklifts and other mobile equipment powered by internal combustion engines can generate carbon monoxide and exhaust fumes. Carbon monoxide acts as an asphyxiate and can affect the operators ability to safely operate the equipment and in high enough concentration, it can kill in a matter of minutes. When working in enclosed areas such as buildings or warehouses, be aware of possible carbon monoxide buildup and take protective measures, if required.

30.0 Retraining Of Operators
A. Operators of vehicles will be retrained when the company has reason to believe that the employee’s knowledge or skill level lacks the proficiency to safely operate a motor vehicle. In addition, retraining will be required in the following circumstances.

1. Changes in the job site which present hazards that the employee has not been previously trained.
2. Changes in the type of equipment the employee will be required to operate.
3. When inadequacies are noted in an employees’ operation of a motor vehicle, which indicates the employee, needs retrained.

B. An evaluation of the forklift operator’s performance shall be conducted at least once every three (3) years.
31.0 Observational Checklist

In addition to the classroom training program and written tests used to evaluate operator knowledge, each operator will be required to demonstrate that they have the necessary skill levels needed to safely operate the equipment under a variety of work conditions. The hands-on operation of the equipment will be performed in a designated area with minimal hazards.

32.0 Forms

A. SAF-28.4-1 - Forklift Operator Test and Answers
B. SAF-28.4-2 - Forklift Operator Observational Checklist
C. SAF-28.1-5 - Operators Safety Check List
28.4 FORKLIFTS
(INDUSTRIAL TRUCKS)

COURSE OUTLINE

EQUIPMENT OPERATOR TRAINING

- Overview of OSHA 1910.178 Regulations
- Video: Forklift Fundamentals
- Review of “Rules for Safe Industrial Truck Operation”
- Video: Forklift Operations
- Review of Forklift Accidents: Professional Safety December 2010
- Forklift Safety Operator Exam
- Observational Qualification
FORKLIFT OPERATOR TEST

Name: ____________________________ Date: _____ / ____ / ____

SS# __ __ __ __ __ __ __ __ __

Multiple Choice. Select the answer, which is the most correct

1. When changing directions:
   a. Always stop
   b. Slow down to about 1 mph
   c. Don’t worry about speed; a forklift is built to take the shock

2. Never exceed the rated load capacity of your forklift.
   a. Unless you add additional counter weighting
   b. Unless your lift is under 84 inches high
   c. No never exceed the rated capacity

3. The greatest cause of accidents among new forklift operators is:
   a. Daydreaming
   b. Forgetting to watch overhead obstructions when lifting
   c. A & B are both correct

4. When taking a load down a ramp:
   a. Drive backwards
   b. Drive frontwards
   c. Reduce speed by zigzagging

5. If you have to park on a ramp:
   a. Leave the machine in gear
   b. Set the brakes and block the wheels
   c. Set the load down and rest the machine against the load
6. As an operator.
   a. It is your responsibility to watch for pedestrians
   b. Their responsibility to watch for you
   c. Management’s responsibility to keep them out of your work area

7. On your forklift, the horn
   a. Makes a good device to catch the foreman off guard
   b. Should be sounded at intersections and blind corners
   c. Should be sounded when you are racing another forklift

8. What is the purpose of forklift training programs?
   a. Reduce accidents
   b. Reduce maintenance costs
   c. Increase productivity
   d. All the above

9. How often should the forklift be inspected?
   a. Every day
   b. Every week
   c. At the beginning of each shift
   d. Twice a week

10. Which of the following is the greatest hazard?
    a. Worn tires
    b. Brake failure
    c. Inoperative horn
    d. Weak batter

11. When should the horn be used on a forklift?
    a. When the operator wants to let others know that he has the right of way
    b. When a clear path is required to move a load
    c. To warn pedestrians and other traffic, and on blind corners
    d. When something is blocking your path
12. How high should the forks be raised when the forklift is traveling on a level surface?
   a. 3 inches
   b. 6 inches
   c. 12 inches
   d. The height depends on the visibility of the driver

13. How does the rear-end steering of the forklift compare with an automobile?
   a. The rear of the forklift swings more than an automobile.
   b. The rear of the forklift swings less than an automobile.
   c. Rear end steering allows the forklift to make sharper turns at higher speeds
   d. The forklift steers about the same as an automobile.

14. What is OSHA Definition of an “unattended vehicle”?
   a. If the operator is more than 25 feet away from the vehicle
   b. If the forklift is out of the operator’s view
   c. Both a & b are correct

15. The maximum allowable load for the forklift can be found:
   a. In the maintenance manual
   b. On the data plate of the forklift
   c. In the operators manual
   d. All the above

16. When is smoking permissible?
   a. In refueling areas when there is no evidence of a leak
   b. Whenever the forklift engine is turned off and there is no evidence of a leak
   c. Smoking is never permissible in refueling areas
   d. Smoking is permissible in fueling areas where no fuel vapors are present.

17. Who may operate a forklift?
   a. Only those who have an automobile driver’s license
   b. Anyone who has the permission of a qualified forklift operator
   c. Only a qualified forklift operator
   d. All the above
18. When is it possible to walk beneath elevated forks or loads?

   a. When the load is less than 100 pounds.
   b. Only when the operator has the load raised securely and gives his permission
   c. Anytime there is no load on the forks
   d. It is not permissible under any conditions

19. Who may make repairs on forklifts?

   a. Only persons trained and authorized to do so
   b. A driver is allowed to make repairs if time permits
   c. A supervisor may designate drivers who will make the repairs.

Respond to the following statements as being either True (T) or False (F)

_____ 1. Your tires should be checked weekly.
_____ 2. When parking your forklift, make sure the forks are left high enough to clear obstruction.
_____ 3. Keep the engine oil level at the full mark on the dipstick.
_____ 4. A forklift steers with its rear wheels and allows it to make sharper turns.
_____ 5. It’s ok to smoke when refueling as long as you are in a restricted area
_____ 6. Stay in low gear with every load.
_____ 7. When lifted high, a load will reduce a forklifts’ stability.
_____ 8. As long as you are beside him, it is ok to let an unauthorized person operate the forklift.
_____ 9. If you take special care, it’s ok to let bystanders walk beneath the loads when you high-stacking.
_____10. A careful driver follows the rules of the road except he backs up when a bulky load obstructs his forward vision.
_____11. A careful driver hangs his leg outside the forklift as long as it is protected by a wide load.
_____12. A careful operator drives slowly on slippery and wet floors or pavement.
_____13. An efficient operator checks the load for stability before moving them.
_____14. Skid marks are generally a sign of poor driving.
_____15. A forklift may be loaded beyond its rated capacity only if additional counterweights are added.
_____16. The mast should be tilted back when traveling with a load.
17. A good operator always considers the clearance of elevated loads.

18. When doing work that requires you to get on and off the forklift, you are exempt from wearing the seatbelt.

19. Although the basic controls may be the same, the exact controls and instruments vary from one forklift to another.

20. You can safely turn on a ramp or incline if it is more than two forklifts wide.
## FORKLIFT OPERATOR TEST ANSWERS

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FORKLIFT OPERATOR
OBSERVATIONAL CHECKLIST

Operator Name: ___________________________ Date: ___________________________
(Print)

Equipment: ___________________________ Observer: ___________________________
(Print)

1. Employee has on appropriate protective equipment. Yes No

2. Employee completed a pre-shift inspection of the equipment prior to operating the equipment. Yes No

3. Any covers, guards, caps or safety devices removed for purposes of inspection have been replaced. Yes No

4. Employee can identify and understands the operation of each control. Yes No

5. Employee performed a functional test of each control. Yes No

6. Employee can identify and understands all placards, decals, warnings and instructions for the equipment. Yes No

7. Employee inspected the area of hazards prior to operation. Yes No

8. Employee appears comfortable operating the equipment and operates the equipment smoothly without any jerking or other unsafe movements. Yes No

9. Employee appears to have a proper eye, hand, and foot coordination to safely operate the equipment. Yes No

10. Employee demonstrates a working knowledge of the equipment. Yes No

11. Employee knows the procedures for reporting defects, malfunction or other problems with the equipment. Yes No

_________________________________________  ________________
Operator’s Signature  Observer’s Signature
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REPAIRS NEEDED: ________________________________

__________________________________

MAINTENANCE REQUEST NO. ____________ NAME OF SUPERVISOR

White copy – Supervisor Yellow copy – Stays in book
Loader / Backhoes

Backhoes and loaders come in a variety of sizes and designs and will generally operate on gasoline or diesel fuel. Operators must be trained and understand the design and performance of the equipment in order to safely operate the backhoe or loader under a variety of conditions and environments. It shall be the Project Superintendent’s responsibility to ensure that operators receive the training. Backhoes and loaders are to be operated only by authorized persons who currently hold a valid Operators Training certification card for the specific type of equipment.
This training may be performed by the Project Superintendent, Foreman, Project SH&E Supervisor or other persons qualified to perform task training. While the basic design of backhoes and loaders are the same, different equipment will have different controls, weight capacities, and restrictions on where they can operate. The basic parts of a backhoe include:

1. Loader Bucket - Used to load and lift material
2. Backhoe Bucket - Used for digging excavations
3. Lift Arm Support Struts - Mounted to frame, they control the height and angle of the bucket
4. Boom - Mounted to the frame, it controls the movement of the backhoe bucket
5. Stabilizers - Used to lift and support the back of the machine when digging with the backhoe bucket
6. ROPS Cab - Operators cab equipped with “Roll Over Protection”

1.0 Inspection and Maintenance

Each backhoe shall be inspected and maintained as required to ensure proper and safe operation. Inspections and routine maintenance are to be performed by field personnel and are compatible with the manufacturer’s guidelines for the severity of the operating conditions and environment. Any backhoe that is not in proper working condition shall be removed from service until repairs can be made. All repairs made to the unit shall be made by a qualified person and shall be in conformance with the manufacturer’s recommendations. Repairs beyond the capabilities of jobsite personnel shall be performed by a qualified mechanic.

2.0 Pre-Shift Inspections

A. All backhoes in use shall be checked by the operator at the beginning of each shift to assure that equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use.
   1. It will be the operator's responsibility to report unsafe conditions.
   2. Vehicles or equipment unsafe to operate shall immediately be taken out of service until repaired.
   3. When repairs are made, the parts and components used shall meet manufacturer’s specifications.
   4. No modifications or additions including, welding or cutting on buckets or booms, shall be made that could affect the safe operation or stability of the vehicle without written approval from the manufacturer.

B. Prior to operation, an Operators Daily Equipment Inspection report shall be completed. When the backhoe is operated for more than one shift, the inspection form shall be completed for each shift the equipment is used. Items to be checked during the inspection include:
   1. Operating and emergency controls
   2. ROPs data plate, placards, and other labels
   3. Horn or other audible alarms
   4. Lights - front, rear, stop, etc.
   5. Brakes including emergency brakes
   6. Alternator, starter, etc.
7. Backhoe boom, bucket, hydraulic cylinders, connectors and pins  
8. Loader bucket, support arms, hydraulic cylinders, connectors and pins  
9. Hydraulic, oil, water, and fuel hoses, couplings, pumps  
10. Fan belts  
11. Fluid levels  
12. Gauges  
13. Tires proper for proper inflation and damage  
14. Seat belts  

3.0 Operational Check  
If all items on the Pre-Shift Inspection check out, start the backhoe. Check all gauges, indicators, and warning lights. Put the backhoe through its normal maneuvers check the brakes, the backup alarm, steering, loader bucket, backhoe bucket, stabilizers, steering, lights, and horn. The operator shall immediately report any problem or malfunction that occurs during operation of the vehicle. Problems which occur during the shift that affect the safety of the vehicle shall be repaired immediately or the vehicle shall be removed from service until proper repairs can be made.

4.0 Maintenance / Repair Precautions  
Prior to performing any maintenance or repairs on mobile equipment, the following safety precautions are to be taken:  
A. The engine is to be turned off, the equipment tagged out, and the key removed or other means taken to prevent unauthorized starting of the equipment.  
B. The loader bucket shall be lowered to the ground or otherwise securely blocked or cribbed to prevent dropping.  
C. All operating controls are to be placed in the OFF or NEUTRAL position. The parking brakes are to be set and wheels blocked to prevent accidental motion.  
D. Pressurized systems such as but not limited to: hydraulic, air, cooling, etc. are to be relieved of pressure prior to any maintenance or repairs.  
E. Disconnect the batteries before working on the electrical system.  
F. Guards, safety latches, or supports are to be installed and used as per the manufacturer’s instructions.  
G. All guards, covers, caps, and safety devices must be replaced prior to operation.

5.0 Capacities  
Backhoe capacities and specifications for each machine are listed in the operator’s manual. Operators must review and understand specifications of the backhoe and understand that the weight of the machine and its load can affect the stability of the machine on different surfaces. No modifications or additions which can affect the safe operation of the equipment shall be made, including the loader and backhoe buckets.

6.0 Visibility  
Backhoes are designed to lift and carry loads in front of the machine. The loader bucket and load can affect the operator’s visibility. The loader bucket should be carried as low as possible except when raised to dump loads into trucks, bins, etc. Visibility may also be restricted by building structures, storage systems, or materials. Operators must have a clear view in the direction of travel. When required to move in a direction where visibility is blocked, a spotter must be used to assist the operator.
7.0 Stability

A. The factors that affect a backhoe’s stability include:
   1. Height of the loader bucket
   2. Speed of the backhoe while the load is being moved and/or lifted
   3. Load weight, size, and dimensions
   4. Angle of the working surface
   5. Center of gravity of the load

B. Improper operation of a backhoe can cause it to tip over resulting in serious injury, death and equipment and property damage. In all cases, either loaded or unloaded, the stability of a backhoe can be affected by the surfaces on which the truck is operated, by turning, especially at high speeds, and by running over objects or into overhead structures. The operator must maintain the unit’s stability by keeping loads within the rated capacity of the backhoe, and keeping the loader bucket low to the ground when traveling. Speed and a sharp, quick turn can cause even an unloaded backhoe to overturn.

C. When operating the machine, keep the loader bucket as low as possible. This position gives better balance and permits the operator to see more clearly. If the bucket is full and the machine is driven over ground that is rough or surfaces that can cause the machine to slide, always operate the machine at slow speeds. Failure to follow these procedures, the machine can go out of control and roll over.

8.0 Backhoe / Loader Operation

The operator is responsible for the safe movement and operation of the backhoe. Since the operator is in direct control of the equipment, complying with recognized safe operating practices is the responsibility of the operator. The operator shall make decisions on the safe use and operation of the backhoe based on surrounding hazards and operating conditions.

9.0 Inspection of the Work Area

When loading trucks, position them so that the work cycle is as short as possible. Spend a few minutes leveling off the work area for safe machine and truck travel. Before the backhoe or other mobile equipment is used, the employee and supervisor shall inspect the area where the equipment is to operate for hazards such as but not limited to:

A. Overhead obstructions such as pipes, poles, cables, and overhead high voltage lines.
B. Underground cables, gas lines, or utilities.
C. Operating surfaces, check for holes, rough terrain, mud, ice, loose or un-compacted soil, bumps and floor obstructions, or other hazards which may affect operation safety.
D. Unauthorized persons or vehicles in work area.
E. Debris or housekeeping hazards
F. Adverse weather conditions
G. Hazardous locations.
H. The ability of the operating surface to support the equipment and the loads being carried.
I. Any other possible hazards or conditions which can adversely affect the safe operation of the equipment.

10.0 General Operating Safety Rules

It is important that operators understand that a backhoe does not maneuver like a car pickup.
The backhoe will steer differently depending on whether the loader bucket is full or empty. When empty the front of the machine is lighter and may bounce, weave, or jump when driving over rough terrain. A sharp turn with a raised bucket could lead to a tip-over. The operator shall abide by the following safety precautions during the use and operation of a backhoe.

A. Seat belts are required to be worn when operating a backhoe. The backhoe is equipped with roll over protection (ROPS); in a turnover operators have a better chance of survival if you stay in the machine with the seat belt on.

B. When the backhoe is left unattended, the following practice shall be followed: (The backhoe is to be considered unattended whenever the driver dismounts the equipment)
   1. The parking brake shall be set
   2. The loader bucket lowered to the ground
   3. The engine shall be shut off
   4. The wheels shall be blocked or turned into the berm if the truck is parked on an incline.

C. Always maintain a speed consistent with plant traffic rules, road and weather conditions.

D. Excessive speed can cause loss of machine control. Never coast down a hill with the transmission in neutral or let the engine speed increase to more than 2500 RPM. Before operating or driving on a hill, always shift to a lower gear.

E. Check the capacity of the machine, do not overload the backhoe. Driving with a load could affect the stability of the forklift.

F. Use the proper backhoe for the job. Use rough terrain or tracked loaders for work on rough or uneven surfaces where improved travel ways are not provided.

G. Avoid travel ways where standing water, sand, gravel, or loose material may cause loss of traction or unstable support for the weight of the backhoe, which could result in loss of control or roll over.

H. Backhoes are not to be driven into an unsafe area. This will include areas of construction where unnecessary tire, steering, or body damage could result.

I. No person shall be permitted to ride on a backhoe other than the operator.

J. Backhoe buckets and loader buckets shall not be used to hoist employees.

K. All posted traffic regulations shall be followed. No backhoe shall be driven at a speed greater than is reasonable and proper, with due regard for weather, traffic, intersections, width and character of the roadway, load size and type, and any other existing condition.

L. Before working on a hill, always test the brakes and put the transmission in a lower gear.

M. Avoid turning on ramps or grades. When making a turn on a grade, slow down, keep the loader bucket as low to the ground as possible. Even at slow speeds loads that are carried too high can cause the backhoe to turn over. An empty backhoe will generally turn over easier than a properly loaded one.

N. Hillside operations can be dangerous. Rain, mud, ice, loose gravel, and soft ground can affect the stability of the machine. The operator must be able to make a judgment whether the machine can be safely operated on a hillside or ramp. When working on the side of a hill, if the backhoe does start to slide, turn the backhoe downhill and drop the loader bucket to stop the slide.

O. Striking a raised, fixed object such as a curb or concrete footer can also result in a turn over. Watch for bumps and potholes in the road that can cause you to lose control of the backhoe and or load.
P. Backing with the loader bucket raised and striking an overhead obstruction can cause a tip-over.
Q. Look behind the machine before backing up. Make sure the backup alarm is working.
R. Use extreme caution when crossing railroad tracks. Hooking the loader bucket on the tracks can result a sudden stop that could result in an accident or injury.
S. No vehicle or equipment shall be parked closer than eight feet from the centerline of a railroad track.
T. Disabling or altering safety devices is prohibited.
U. When crossing aisles and other areas where vision is obstructed, the operator shall stop, honk the horn, and proceed with caution.
V. When fueling the backhoe, the engine shall be turned off and precautions taken to prevent spillage of fuel. Fueling of motor vehicles shall be done in an area that is well ventilated and free from flame, sparks, or other hazards that may cause fire or explosion.
W. Smoking will not be allowed on, in or within 50 feet of fueling operations.
X. A 2 ½ ABC fire extinguishers will be placed on all vehicles or equipment and inspected daily.
Y. Backhoes shall be equipped with a backup alarm that is audible above the surrounding noise level.
Z. Markings, including capacity charts, stickers, and tags shall not be removed or defaced. Missing, or illegible markings shall be replaced immediately.
AA. When other moving equipment, vehicles, or pedestrians are present in the work areas, the operator must exercise caution to ensure safety.
BB. Sudden stops with a load can shift the center of gravity of the load and the loader. Plan ahead, allow safe following distances (at least 3 backhoe lengths), and stop smoothly.
CC. When parking the backhoe, make sure the machine is on level ground, lower the loader bucket to the ground, raise the front wheels off the ground, lower the stabilizers and raise the level of the machine with the rear tires above the ground. Always lower the stabilizers before you lower the boom and extend the backhoe bucket.
DD. When digging with the backhoe, follow these safety rules:

1. Always know the location of all workers in the area. Warn them and keep them away from your area.
2. Dump the loader bucket and lower the bucket to the ground. Raise the front wheels off the ground.
3. Lower the stabilizers and raise the level of the machine with the rear tires above the ground. Always lower the stabilizers before you lower the boom and extend the backhoe bucket.
4. Do not dig the ground under the backhoe stabilizers. The machine can fall into the excavation if the bank falls in.
5. The working area 180 degrees around the back of the machine from both sides is the danger area. It is the operator’s responsibility to ensure that all persons remain clear of this area.
6. Maintain safe clearances from electrical lines and other energized equipment. (Minimum 10 feet) Allow for poles, guy wires, and electrical line swaying. At no time shall mobile
equipment work inside the minimum safe distance allowed from overhead electrical lines and other energized components. The minimum safe distances that shall be maintained to expose energized overhead power lines and energized parts are:

**Voltage Range Minimum Safe Distance**
*(Phase to Phase) Distance in Feet (Meters)*
- 0 to 50 KV 10 FT. (3.1)
- Over 50 KV to 200 KV 15 FT. (4.6)
- Over 200 KV to 350 KV 20 FT. (6.1)
- Over 350 KV to 500 KV 25 FT. (7.6)
- Over 500 KV to 750 KV 35 FT. (10.6)
- Over 750 KV to 1000 KV 45 FT. (13.7)

7. When working on the side of a hill, level the machine with the stabilizers and put the spoil from the excavation on the high side of the excavation.

EE. Stunt driving and horseplay shall not be permitted. Safe, courteous operation of a vehicle is expected of all employees because it prevents injury to you and others, saves damage or loss of valuable equipment, and improves public relations. Safe operation of a company vehicle is a responsibility not a privilege.

11.0 Operator Controls and Instruments
Depending on the make and model of the vehicle, the operator controls and instrument gauges may vary depending on the manufacturer of the backhoe and its design and rating. Warning lights and gauges can signal that something is wrong or indicate that there is a problem with the vehicle before it becomes a serious problem or a safety concern. The operator must be familiar with the location and function of the following items:
- A. Engine starter switch
- B. Wheel crank or arm for steering
- C. Parking brake and release handle
- D. Location and function of all gauges and warning lights
- E. Hazard warning flasher switch
- F. Levers to control lift, tilt, and swing movements of loader bucket and backhoe
- G. Clutch pedal
- H. Brake pedal
- I. Accelerator pedal

12.0 Attachments
There are a wide array of loader and backhoe attachments which can affect the stability and operation of the backhoe loader in different ways. All attachments must be approved for use by the manufacturer. Homemade, or shop built attachments are not approved and are not to be used unless approved, in writing, by the manufacturer.

13.0 Hoisting With the Backhoe
The backhoe is NOT a crane. For this reason always be very careful when lifting a load with the backhoe bucket. There are specific backhoe lifting charts in the operators manual that list the lifting capacity of the backhoe at different radiiuses.
DO NOT OVERLOAD THE MACHINE. Read the specifications section of the operator’s manual and follow these guidelines:

A. Know and understand the hand signals before the lift is made.
B. Know the location of all persons in the working area.
C. Lower both stabilizers and raise the machine so that both rear tires are about one to two inches off the ground, making sure that the machine is level.
D. Dump and lower the loader bucket to the ground.
E. Connect a tag line to the load and ensure that no one will be in the path of the load.
F. Use the proper rigging to connect the load to the end of the dipper as shown in the operator’s manual.
G. Lift the load so that the load is one to two inches above the ground.
H. Move the load into position making sure that the load remains one to two inches above the ground.
I. Immediately lower the load to the ground if one of the stabilizers is raised above the ground or if there is any indication that the stability of the machine is reduced.
J. Always move the load slowly, and keep the load away from anyone working in the area.

14.0 Pedestrian and Other Traffic
In many areas it may not be possible to completely separate backhoe / loader operations from pedestrian, bicycle, and other vehicular traffic. Operators shall be aware of pedestrians and other traffic in the area and watch for potential hazards. The following safety precautions must be adhered to by equipment operators when working in areas with pedestrians or other vehicular traffic:

A. Watch where you are going; always face the direction of travel. Pedestrians and other vehicles use the same roadway as you. Sound the horn at intersections and blind spots.
B. Watch for people in and around the work area, they may not be watching you, even though the backhoe has warning lights and alarms. If you think they may not see you, do not move until you have made eye-to-eye contact. Make people stand back, even if you’re stopped.
C. Watch for employees working around you. Don’t let anyone walk under the raised bucket or load. Keep other employees off the backhoe - not in the buckets - not on the load – not in the cab.
D. Keep all parts of your body inside the cab. Do not lean out or stick arms or legs outside of the cab.

15.0 Carbon Monoxide and Fumes
Backhoes and other mobile equipment powered by internal combustion engines can generate carbon monoxide and exhaust fumes. Carbon monoxide acts as an asphyxiating agent and can affect the operator’s ability to safely operate the equipment, and in high enough concentration, it can kill in a matter of minutes. When working in enclosed areas such as buildings or warehouses, ensure that adequate ventilation is provided.

16.0 Retraining of Operators
Operators of mobile equipment will be retrained when the company has reason to believe that the employee’s knowledge or skill level lacks the proficiency to safely operate a motor vehicle. In addition, retraining will be required in the following circumstances.

A. Changes in the job site which presents hazards that the employee has not been previously trained.
B. Changes in the type of equipment the employee will be required to operate.
C. When inadequacies are noted in an employees’ operation of a motor vehicle which indicate the employee needs retrained.

17.0 Observational Checklist
In addition to the classroom training program and written tests used to evaluate operator knowledge, each operator will be required to demonstrate that they have the necessary skill levels needed to safely operate the equipment under a variety of work conditions. The hands-on operation of the equipment will be performed in a designated area with minimal hazards.

18.0 Forms
A. SAF-28.5-1 – Loader / Backhoe Training Learning Exercises
B. SAF-28.5-2 – Backhoe Operator Observational Checklist
C. SAF-28.5-3 – Skid Loader Test
Loader / Backhoe Training
Learning Exercises

Name:_________________________ Date:_________________________
Employee Number:____________________

Multiple Choice. Select the answer which is the most correct

1. As an operator it is:
   a. Your responsibility to watch for pedestrians
   b. Their responsibility to watch out for you
   c. Management’s responsibility to keep them out of your work area

2. How often should the loader / backhoe be inspected?
   a. Twice a week
   b. Daily
   c. Monthly
   d. At the beginning of each shift

3. Seat belts are to be worn:
   a. Just when you are going down the highway
   b. At speeds over 20 MPH
   c. Only when you face forward
   d. At all times

4. The greatest cause of loader / backhoe accidents is:
   a. Daydreaming
   b. Swinging and rollover
   c. Both a and b are correct

5. When getting on or off the machine, face the backhoe and use the handles
   a. True
   b. False

6. If the loader bucket is too high, material could fall back onto the cab, and also affect stability
   a. True
   b. False

7. It is the operator’s responsibility to safely operate the equipment
   a. true
   b. false

8. The backhoe lift capacity and other specifications are found in the ____________________
9. Persons other than the operator are not allowed to ride anywhere on the machine  
   a. True  
   b. False 

10. Safety decals are generally an accessory and are of no concern to the operator.  
    a. True  
    b. False 

11. When should the backhoe horn be used?  
    a. To let others know you have the right of way  
    b. When something is in your path  
    c. To warn pedestrians and other traffic 

12. Excavations greater than 5 feet deep require shoring, benching, shielding, or sloping.  
    a. True  
    b. False 

13. When operating the loader, you should keep the loader bucket as high as possible so you can see.  
    a. True  
    b. False 

14. Operating the backhoe with the loader bucket low gives you more stability and allows you to see better.  
    a. True  
    b. False 

15. When digging an excavation, the spoil material must be:  
    a. Piled in one area so it is easy to get to  
    b. Placed as close to the excavation as possible so it can be backfilled easier  
    c. Kept at least 2 feet away from the edge of the excavation to prevent the material from falling back into the excavation, and causing a cave in. 

16. It is ok to swing the bucket over persons working in the area as long as they have a hard hat on.  
    a. True  
    b. False 

17. When working the backhoe / loader on a hill:  
    a. Use low gear and test the brakes prior to working on a hill  
    b. Never coast down a ramp or hill with the transmission in neutral.  
    c. Avoid turning the machine and keep the load low.  
    d. Always move forward up the hill and back down  
    e. All the above are correct 

18. When operating the backhoe on the side of a hill:  
    a. Make the machine level with the stabilizers  
    b. Put the spoil material from the excavation on the high side of the hill  
    c. A & b are both correct
19. The danger area for a working backhoe is:
   a. 90 degrees from the operators seat
   b. 360 degrees from the operators seat
   c. An area covering 180 degrees around the back of the machine from one side to the other.

20. The minimum safe distance to maintain from electrical lines and other energized equipment 50 KV and less is?

21. What is the purpose of the outrigger pads?

22. What is the purpose of the rollover cage?
Backhoe / Loader Operators
Learning Exercises

Respond to the following statements as being either True (T) or False (F)

1. ___ Your tires should be checked weekly.
2. ___ When parking your backhoe, make sure the loader bucket is left high enough to clear obstructions
3. ___ Keep the engine oil level at the full mark on the dipstick
4. ___ It is ok to work under the loader bucket as long as there are no hydraulic leaks.
5. ___ It’s ok to smoke when refueling as long as you are in a restricted area
6. ___ Start in low gear with every load
7. ___ When the loader bucket is lifted high, material can fall out onto the operator.
8. ___ As long as you sit beside him, it is ok to let an unauthorized person operate a backhoe.
9. ___ If you take special care, it’s ok to let bystanders walk beneath the loader bucket if it’s empty.
10. ___ A careful driver follows the rules of the road.
11. ___ A careful driver sticks his head outside the cab if his vision is obstructed.
12. ___ A careful operator drives slowly on slippery and wet roads or pavement.
13. ___ An efficient operator sets up his work area to keep the work cycles as short as possible.
14. ___ Skid marks are generally a sign of poor driving.
15. ___ It’s ok to undermine material piles if the material is wet and hold together.
16. ___ The stabilizers don’t have to be used if you are digging on hard ground.
17. ___ A good operator always keeps the steps and his shoes clean of mud and grease.
18. ___ When doing work that requires you to get on and off the backhoe, you are exempt from wearing the seatbelt.
19. ___ Although the basic controls may be the same, the exact controls and instruments vary from one backhoe to another.
20. ___ Before you dig you need to check for underground pipes or utilities.
Backhoe Operator
Observational Checklist

Operator Name: ___________________________ Date: ___________________________

Equipment: ___________________________ Observer: ___________________________

1. ___ Yes ___ No The employee has on the appropriate personal protective equipment.
2. ___ Yes ___ No Employee completed a pre-shift inspection of the equipment prior to operating the equipment.
3. ___ Yes ___ No Any covers, guards, caps, or safety devices removed for purposes of inspection have been replaced.
4. ___ Yes ___ No Employee can identify and understands the operation of each control.
5. ___ Yes ___ No Employee performed a functional test of each control.
6. ___ Yes ___ No Employee can identify and understands all placards, decals, warnings, and instructions for the equipment.
7. ___ Yes ___ No Employee inspected the area for hazards prior to operation.
8. ___ Yes ___ No Employee appears comfortable operating the equipment and operates the equipment smoothly without any jerking or other unsafe movements.
9. ___ Yes ___ No Employee appears to have the proper eye, hand, foot coordination to safely operate the equipment.
10. ___ Yes ___ No Employee demonstrates a working knowledge of the equipment.
11. ___ Yes ___ No Employee knows the procedures for reporting defects, malfunctions or other problems with the equipment.

______________________________    ______________________________
Operator’s Signature                      Observer’s Signature
SKIDLOADERTEST

1. Only trained, authorized and competent persons should operate a Skidsteer.
   True____    False____

2. There are fines and penalties under the Occupational Health and Safety Act specific to the operation of mobile equipment and lifting devices.
   True____    False____

3. It is the responsibility of the Operator of a Skidsteer to insure the load is stable before lifting and/or moving the load.
   True____    False____

4. It is the responsibility of the Skidsteer Operator to insure there is sufficient clearance.
   True____    False____

5. It is a generally accepted practice to complete a pre-shift inspection of a Skidsteer?
   True____    False____

6. You should always read the Operator’s Manual BEFORE operating a skidsteer.
   True____    False____

7. The location of the Skidsteer’s and load’s combined centers of gravity determines the stability of the Skidsteer?
   True____    False____

8. The center of gravity shifts on a Skidsteer when turning a corner?
   True____    False____

9. The center of gravity on an Skidsteer moves as the load is raised?
   True____    False____

10. A Skidsteer will be more likely to tip if operated on a grade?
    True____    False____

11. If you are operating a Skidsteer and it is going to roll over on its’ side you should jump free of the unit?
    True____    False____

12. If you are operating a Skidsteer and it is going to fall off an embankment you should brace yourself and stay on the Skidsteer?
    True____    False____

13. It is an acceptable practice to drive with the work tools or bucket of the Skidsteer tipped forward?
    True____    False____

14. Whenever possible while lifting a load the load should be touching the back of the work tools?
    True____    False____

15. The correct way to pick a load up is to have it centered and placed at the heel of the work tools or in the center of the bucket?
    True____    False____
16. When lifting a load that is too heavy for the Skidsteer it is acceptable to push it along the ground?
   True    False
17. When lifting a load when using a skidsteer, it is acceptable to lift more than capacity as long as the rear wheels are still on the ground.
   True    False
18. Only 1 of the locking arms needs to be engaged for safe operation.
   True    False
19. Always drive a Skidsteer as fast as it will go?
   True    False
20. When driving a Skidsteer always look in the direction of travel?
   True    False
21. All Skidsteer’s are designed so there is no obstructions to the operators vision?
   True    False
22. If the operator of a Skidsteer cannot see over the load or other hazardous conditions exist a spotter/signaler is required?
   True    False
23. If an Operator of a Skidsteer cannot see over the load it is acceptable to raise the load high enough to see under the load before proceeding?
   True    False
24. When there is a no load on a Skidsteer it should be driven forward down an incline?
   True    False
25. When there is a load on a Skidsteer it should be driven in reverse down a hill or incline?
   True    False
26. It is a generally accepted practice to travel with the work tool twenty (20) to twenty five (25) inches off the ground?
   True    False
27. If the load is stable and secure it is an acceptable practice to have a person ride on the Skidsteer?
   True    False
28. If the load is unstable and the distance of travel is short, it is acceptable for a person to walk along side the Skidsteer to help steady the load?
   True    False
29. All Skidsteers have the same capacities?
   True    False
30. Vertical lift skidsteers have the same lifting capacity as radial lift units.
   True    False
31. It is a generally accepted practice for an Operator of a Skidsteer to sound the horn at all blind corners?
   True    False
32. It is a generally accepted practice to lift, swing or move a load over people if the Skidsteer Operator advises all people affected?
   True       False
33. Skidsteer Operator’s should drive slowly when operating a Skidsteer on slippery, wet, and rough surfaces?
   True       False
34. When speaking with anyone operating a Skidsteer you should stand close enough so that they can hear you.
   True       False
35. When approaching people the Operator of a Skidsteer should sound the horn and insure eye contact is made with the people?
   True       False
36. It is a generally accepted practice to stand in front of a Skidsteer when a load is being put in place?
   True       False
37. It is an acceptable practice to operate a skidsteer without Roll Over Protection.
   True       False
38. While operating a Skidsteer an operator should keep all body parts inside the cab enclosed area?
   True       False
39. It is acceptable to have Skidsteer races on the jobsite if no one is around.
   True       False
40. It is an acceptable practice to lift people with a skidsteer on a construction site.
   True       False
41. When entering or exiting a skidsteer, always use the 3 point entry position.
   True       False
42. When exiting a skidsteer, it is acceptable to leave the lifting boom up.
   True       False
43. It is NOT required to ensure that all gas, water, hydro etc. locates are completed before beginning to dig.
   True       False
44. Each jobsite may site specific safety rules that must be followed.
   True       False
45. Specific Personal Protective Equipment (PPE) is required when operating a Skidsteer?
   True       False
46. If the Skidsteer is equipped with a seat belt it should be worn along with the restraining bar?
   True       False
47. It is a good practice to inspect jobsite conditions so that you are aware of any hazards that may exist.
   True       False
48. A good time to take a cigarette break is when refueling a Skidsteer?
   True____   False____

49. When properly parking an Skidsteer the power is off, parking brake is engaged, the Skidsteer is on level ground and the edge/tip of the work tool is flat on the floor/ground?
   True____   False____

50. It is acceptable to operate a Skidsteer after drinking a few beers?
   True____   False____
1.0 Scope

This procedure provides minimum requirements for steel erection and installation of decking, flooring, and grating. The greatest hazard in steel erection is the possibility of workers falling due to loss of footing, loss of balance, being knocked off a structure by swinging materials, or workers falling through unprotected openings. Even though steel workers are exposed to a potentially hazardous work environment, falls and other accidents during steel erection can be prevented through the combined efforts of management, supervision, and individual workers. A written steel erection plan that includes construction specifications and safety provisions must be developed before the actual steel erection of the structure may begin.

2.0 Fall Protection Requirements

A. The exemptions set forth in OSHA 29 CFR 1926, Subpart R “Steel Erection” which allows certain workers and work operations not to use fall protection when exposed to falls greater than 6 feet, ARE NOT RECOGNIZED OR ALLOWED BY PREFERRED INDUSTRIAL CONTRACTORS, INC.

B. All ironworkers, including connectors, bolt up operations, decking operations, roofing operations, etc. shall be provided with positive fall protection 100% of the time. (See Section 24.0 for details on fall protection).

C. Fall protection / prevention methods such as temporary flooring, scaffolds, boom lifts, scissor lifts, handrails, guard rails, lifelines, safety harnesses and double lanyards, or safety nets are all forms of fall protection used.
3.0 Definitions
A. **Choker** - A wire rope or synthetic fiber rigging assembly that is used to attach a load to a hoisting device.
B. **Column** - A load-carrying vertical member that is part of the primary skeletal framing system. Columns do not include posts.
C. **Competent Person** - One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
D. **Connector** - An employee who, working with hoisting equipment, is placing and connecting structural members and/or components.
E. **Controlling Contractor** – Is the prime contractor, general contractor, construction manager or any other legal entity which has the overall responsibility for the construction of the project -- its planning, quality and completion.
F. **Critical Lift** – is any lift that (1) exceeds 75 percent of the rated capacity of the crane or derrick, or (2) requires the use of more than one crane or derrick.
G. **Leading Edge** – Is the unprotected side and edge of a floor, roof, or formwork for a floor or other walking/working surface (such as deck) which changes location as additional floor, roof, decking or formwork sections are placed, formed or constructed.
H. **Multiple Lift Rigging** - Is a rigging assembly manufactured by wire rope rigging suppliers that facilitates the attachment of up to five independent loads to the hoist rigging of a crane.
I. **Opening** – Is any gap or void 12 inches (30.5 cm) or more in its least dimension in a floor, roof, or other walking/working surface. Skylights and smoke domes that do not meet the strength requirements of twice the anticipated load imposed by workers, equipment, and materials at any one time shall be treated as openings.
J. **Personal Fall Arrest System** – Is the system used to arrest an employee in a fall from a working level. A personal fall arrest system consists of an anchorage, connectors, a body harness and may include a lanyard, deceleration device, lifeline, or suitable combination of these. (See section 24.0 Fall Control).
K. **Qualified Person** - One who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project.
L. **Steel Erection** - Is the construction, alteration or repair of steel buildings, bridges and other structures, including the installation of metal decking and all planking used during the process of erection?
M. **Unprotected Sides and Edges** – Is any side or edge (except at entrances to points of access) of a walking/working surface, for example a, floor, roof, ramp or runway, where there is no wall or guardrail system at least 39 inches (1.0 m) high.

4.0 Planning
A. The commencement of steel erection activities cannot begin until written verification has been received stating that anchor bolt repairs and concrete curing requirements have been met.
B. No repairs, replacement or field modifications shall be performed to anchor bolts without the approval of the project structural engineer of record.
C. Adequate access roads into and through the site must be provided for the safe delivery and movement of derricks, cranes, trucks, other necessary equipment, for the staging and erection of the material as well as allowing for pedestrian and vehicular control.

D. All hoisting operations in steel erection shall be pre-planned to ensure that no employee is required to work directly below a suspended load.

E. Development of a Site-Specific Erection Plan.

Thorough planning is essential and is required for all steel erection, and for all installation and removal of decking, flooring, and grating. A site specific erection plan must be prepared to define the erection sequence and procedures to be followed. The following factors must be considered when planning the work:

1. Site preparation, identify material staging, storage and delivery locations and how erection activities will be coordinated with other trades and contractors.
2. Describe the crane selection and placement procedures, including identifying the path for overhead loads, rigging hardware i.e. slings and shackles and any critical lifts.
3. The qualifications and training of personnel.
4. Detailed, specific job and safety instructions for each worker.
5. Scheduling (identify who, what and when for each task).
6. Means of access, such as ladders and scaffolding or other equipment such as boom lifts, etc.
7. A description of steel erection activities and procedures, including any temporary bracing and guyng of the structure. The plan should identify the erection sequence for columns, beams, bracing, flooring, piping, vessels and mechanical equipment as well as the steps to be taken to decrease the hazard exposure, i.e., early erection of stairs and railing to provide access and egress as the steel is erected.
8. Tools appropriate to the task - Field-modified tools are not allowed.
9. Barricades, warning signs, and other protection for personnel and equipment.
10. Proper PPE including Fall Protection systems, lifeline systems and temporary platforms to maintain 100% fall protection.
12. Availability and location of emergency equipment and procedures.

5.0 Unloading, Storing And Handling Steel

A. When steel and grating are delivered by truck, the driver must be out of the truck when unloading. Before the load is lifted, personnel unloading steel must stand clear of the truck.

B. Arrange and sequence materials to minimize excessive handling

C. Store steel members on wood or other appropriate tonnage and place material in a stable position. Block or crib materials as necessary to prevent movement.

D. When unloading trucks, materials must be unloaded in a manner to prevent the load from shifting or being knocked off.

E. When unloading materials, a minimum 6’ tagline is required on all suspended loads.

F. When lifting a load of steel, keep hands away from the load, make sure that the remaining steel does not obstruct, or get entangled with the load.

G. The use of “shake out” hooks shall not be used for lifting or placing loads.
6.0 Connecting, Bolting, And Guying Steel

A. Always use either decking, safety nets, or a tied-off harness system to protect employees from falls. Harness systems equipped with two lanyards, when properly used, allow steel workers to tie-off 100% of the time. (Refer to Section 24 Fall Protections).

B. Climbing up or sliding down columns is prohibited. Use ladders scaffolding or Boom lifts to make connection points.

C. To provide access to each level, install stairs equipped with guardrails as each elevation of steel is erected.

D. Straddle (coon) beams when moving laterally. Walk on the top of a beam only if it is too large or too small to straddle.

E. Do not work directly over other workers. This restriction protects employees at lower levels from being struck by falling tools, bolts, nuts, or other debris. Tools and materials used at elevated heights should be secured using tools lanyards, bolt bags, buckets, etc.

F. Do not throw tools, bolts, washers or drift pins, place them in bolt baskets or other approved containers and raise or lower them with a hand line. Bolt baskets, water kegs and other supplies must be secured against accidental displacement when aloft.

G. When bolts or drift pins are knocked out, they shall not be allowed to fall to a lower level.

H. Do not use a wrench in a bolt hole as a step.

I. Erect, tag, and maintain barricades on all elevations where employees are exposed to overhead work. Use "Danger - Overhead Work" signs in these areas.

J. Always keep clear of moving loads. When erecting steel, keep hands clear. Leave drift pins or temporary bolts in place until it is certain no one is below.

K. When connectors are working together, designate only one person to give signals. That person makes sure that his or her partner, or others working on the job, are in the clear.

L. Each person must select a position where he or she cannot be struck by a swinging load.

M. A wrench or drift pin placed in a hole is not a reliable connecting device and should be used only for alignment purposes.

N. When connectors are working at the same connecting point, one end of the structural member must be connected and snug with a spud wrench before going out to connect the other end. Only one connector should go out to connect to the other end.

O. During the final placing of solid web structural members, the load shall not be released from the hoisting line until the members are secured with not less than two bolts, or the equivalent at each connection and drawn up wrench tight. All structural members are to be securely bolted prior to removing the hoisting line.

P. Connectors, like all other personnel, must practice Continuous Fall Protection at all times.

Q. Permanent floors must be installed as the erection of structural members progresses. To meet this requirement, structures must be plumbed and permanently bolted as the steel is erected.

R. At no time should there be more than 4 floors or 48 feet (14.6 meters) of unfinished, temporarily bolted or welded structure above the foundation or uppermost permanently secured floor.

S. Where permanent floors cannot be installed, install temporary floor decking as soon as possible. Temporary flooring shall be solidly planked or decked over the entire surface except for access openings. All planking or decking shall be of sufficient thickness to carry the working load. All access openings shall be guarded. (Refer to Section 27)
T. Temporary flooring shall be secured against displacement.
U. On buildings or structures not adaptable to temporary floors and where scaffolds are not used, safety nets are to be installed and maintained whenever the potential fall distance exceeds two stories or 25 feet. The nets shall be placed with sufficient clearance to prevent contact with the surface of structures below.
V. On multiple level steel constructions, provide ladders, scaffolds, stair towers, or other safe means to the protected floor level immediately below the area of connection. All personnel must use this means for safe access and egress to the protected floor or level.
W. When climbing ladders, do not hand carry any tools or materials, use three point contact rule.
X. A periphery safety railing of ½ inch wire rope or equivalent shall be installed, approximately 42 inches high around the perimeter of the temporary floors. MidRails and toe boards shall be installed when needed to prevent tools and materials from falling to lower levels.
Y. Properly install and use the correct size and number of clips for the cable size. A minimum of three (3) clips are required for wire rope handrails.
Z. Inspect and re-tighten all wire rope clips weekly.

7.0 Hoisting And Rigging
A. Cranes being used in steel erection activities shall be visually inspected prior to each shift by a competent person; the inspection shall include observation for deficiencies during operation. (See section 28.3)
B. Inspect ground conditions around the hoisting equipment for proper support, including ground settling under and around outriggers, ground water accumulation, or similar conditions;
C. If any deficiency is identified, an immediate determination shall be made by the competent person as to whether the deficiency constitutes a hazard. If the deficiency is determined to constitute a hazard, the hoisting equipment shall be removed from service until the deficiency has been corrected.
D. The operator shall be responsible for those operations under the operator's direct control. Whenever there is any doubt as to safety, the operator shall have the authority to stop and refuse to handle loads until safety has been assured.
E. A qualified rigger shall inspect the rigging prior to use and as necessary during its use to ensure that it is safe. Defective rigging equipment shall be removed from service. (See section 30.0)
F. Carefully observe the entire load during the lift to see that nothing gets in the way or fouls the line.
G. Stand in the clear when slings are loosened on a load of steel.
H. Do not take hold of the hoist rope near the sheave block.
I. Safety latches on hooks shall not be deactivated or made inoperable.
J. Employees are not permitted to ride loads or crane headache ball.
K. Tag lines are to be used to control loads.
L. Crane operators shall sound their horns before swinging of the crane boom.
M. Materials shall not be swung over employees nor shall employees be allowed to walk, stand, or work under suspended loads.
N. Where possible, use two wire rope slings on structural members over 15 feet (4.6 meters) in length.
O. When steel must be tilted to drift it into position, it may be preferable to rig with one sling using a double wrap.

8.0 Working Under Loads

A. Routes for suspended loads shall be pre-planned to ensure that no employee is required to work directly below a suspended load except for:
   1. Employees engaged in the initial connection of the steel, or
   2. Employees necessary for the hooking or unhooking of the load

B. When working under suspended loads, the following criteria shall be followed;
   1. Materials being hoisted shall be rigged to prevent unintentional displacement.
   2. Hooks with self-closing safety latches or their equivalent shall be used to prevent components from slipping out of the hook; and
   3. All loads shall be rigged by a qualified rigger

9.0 Multiple Lift Rigging Procedure

A. A multiple lift shall only be performed if the following criteria are met:
   1. A multiple lift rigging assembly is used;
   2. A maximum of five members are hoisted per lift;
   3. Only beams and similar structural members are lifted; and
   4. All employees engaged in the multiple lift have been trained in these procedures including the nature of the hazards associated with multiple lifts, the proper procedures and equipment to perform multiple lifts and the pre-task JSA / TSA has been completed and reviewed with the steel erection crews.
   5. No crane is permitted to be used for a multiple lift where such use is contrary to the manufacturer's specifications and limitations.
   6. Components of the multiple lift rigging assembly shall be specifically designed and assembled with a maximum capacity for total assembly and for each individual attachment point. This capacity, certified by the manufacturer or a qualified rigger, shall be based on the manufacturer's specifications with a 5 to 1 safety factor for all components.

B. The total load shall not exceed:
   1. The rated capacity of the hoisting equipment specified in the hoisting equipment load charts
   2. The rigging capacity specified in the rigging rating chart.
   3. The multiple lift rigging assembly shall be rigged with members:
      a. Attached at their center of gravity and maintained reasonably level;
      b. Rigged from top down; and
      c. Rigged at least 7 feet (2.1 m) apart.
   4. The members on the multiple lift rigging assembly shall be set from the bottom up.
   5. Controlled load lowering shall be used whenever the load is over the connectors.

10.0 Safe Practices

A. Protection of others, whether public or other workers, shall be safeguarded at all times. See that “Men Working Overhead” or other safety signs are posted where necessary to keep people out of the danger areas. Establish barricades where indicated. A woven plastic barricade fence provides good protection.

B. Employees who may indicate a fear of heights or are subject to dizziness shall be kept on groundwork.
C. Pneumatic hand tools shall be used with extreme caution with special attention to the following:
   1. Power sources shall be secured and hose lines shall be bled off prior to disconnecting tools or hose sections.
   2. Airlines hose connections shall be wired or tied together to prevent accidental separation.
   3. Impact wrenches shall be provided with a locking device for retaining the socket. Make sure that the socket is properly attached to the impact wrench and that the locking device is secured. Use only flush-fitting pins to secure the socket of an impact wrench. Nails or protruding wires may injure your hands or body.
   4. Appropriate eye and hearing protection shall be provided and used by workers using pneumatic hand tools.
   5. Have a firm footing when bolting with hand or pneumatic power tools.
D. Connections of the equipment used in plumbing-up shall be properly secured.
E. Turnbuckles shall be secured to prevent unwinding under stress.
F. Plumbing-up guys and related equipment shall be placed so that employees can get at connection points.
G. Limit access to the area until decking, grating or roofing is in place and secured. Provide fall protection for employees installing decking, grating or roofing and for any other employees authorized to be on the incomplete levels.
H. Workers exposed to “leading edges” must be protected by guardrail systems, body harness systems or a safety net.
I. Install permanent handrails and mid-rails when the decking or grating work has progressed far enough to allow installation to begin. If permanent guardrail material is not on site, use cable or equivalent material.
J. If holes for equipment, vessels, piping or other openings are in the decking, grating or roofing, promptly cover them with identified hole covers or surround them with temporary railing. Do not leave holes uncovered or leave out pieces of grating, decking or roofing. Do not use barricade tape at the edge of any opening instead of a substantial railing.
K. Use appropriate PPE. Always wear gloves.
L. Do not leave tools, bolts, washers, and drift pins lying on beams and scaffold platforms or other areas where they could be kicked off or fall to lower levels.
M. Roof sheets or other materials remaining on the roof overnight must be secured or lowered to the ground and secured in a safe area.
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1.0 Rigging Requirements - General
A. Rigging equipment shall be inspected prior to use on each shift and as necessary during its use to ensure that it is safe. Defective rigging equipment shall be removed from service.
B. Rigging equipment shall not be loaded in excess of its recommended safe working load.
C. Rigging equipment when not in use should be removed from the immediate work area so as not to present a hazard to employees.
D. Special custom design grabs, hooks, clamps or other lifting accessories for such units as modular panels, prefabricated structures and similar materials shall be marked to indicate the safe working loads and shall be proof tested prior to use for 125 percent of their rated load.

2.0 Working Load Limits
A. The manufacturers recommended safe working loads for chains, shackles, slings, hooks and all other lifting devices shall not be exceeded. If this information is not available, the device should be tested to at least twice the intended working load before putting into use. Such test must be documented.
B. Job or shop hooks and links or makeshift fasteners, formed from bolts, rebar, rods, etc. should not be used.
3.0 Sling Maintenance
A. Hoisting equipment shall always include slings or other lifting devices and must be kept in good condition.
B. Wire rope slings must be inspected and lubricated frequently and regularly. Slings shall be stored on racks and protected from moisture.
C. Blocks or heavy padding should be used at corners of the load to protect the sling from sharp bending.

4.0 Wire Rope
A. All wire ropes must be inspected before being used. Any rope showing excessive wear, corrosion or rust or when any of the following conditions exist, shall be taken out of service:
   1. In running ropes, six randomly distributed broken wires in one lay or three broken wires in one strand in one lay.
   2. Wear of 1/3 the original diameter of outside individual wires. Kinking, crushing, bird caging or any other damage resulting in distortion of the rope structure.
   3. Reductions from nominal diameter of more than 1/64 inch for diameters up to and including 5/16 inch, 1/32 inch for diameters 3/8 inch to and including 1/2 inch, 3/64 inch for diameters 9/16 inch to and including 3/4 inch, 1/16 inch for diameters 7/8 inch to 1-1/8 inches inclusive, 3/32 inch for diameters 1-1/4 to 1-1/2 inches inclusive.
   4. Evidence of any heat damage from any cause.
   5. In standing ropes, more than two broken wires in one lay in sections beyond end connections or more than one broken wire at an end connection.

B. Kinking and untwisting of the wire rope shall be carefully avoided. At no time shall a load be applied to a kinked rope.
C. Wire ropes shall be lubricated with the lubricant recommended by the wire rope manufacturer.
D. Wherever necessary, wire ropes shall be guarded to prevent persons or materials coming in contact with them.
E. Friction of wire ropes with other objects causing chaffing or breaking of wires shall be prevented.
F. Protruding ends of strands in splices on slings and bridles should be covered or blunted.
G. The U-bolt of all wire rope clips must be applied on dead end of rope.
H. The recommended number and spacing of wire clips is illustrated in the following table:

<table>
<thead>
<tr>
<th>Improved plow steel, rope diameter inches</th>
<th>Drop forged</th>
<th>Other material</th>
<th>Min. Spacing (Inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>½</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>5/8</td>
<td>3</td>
<td>4</td>
<td>3 ¼</td>
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<tr>
<td>¾</td>
<td>4</td>
<td>5</td>
<td>4 ½</td>
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<tr>
<td>7/8</td>
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<td>1</td>
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<td>7</td>
<td>7 ½</td>
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<tr>
<td>1 3/8</td>
<td>6</td>
<td>7</td>
<td>8 ¼</td>
</tr>
<tr>
<td>1 ½</td>
<td>6</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

I. Wire rope clips must not be used to fabricate wire rope slings or be used for hoisting purposes.

J. SAF-30.0-3 “Good and Bad Rigging Practices” indicate good and bad rigging practices and the efficiency of various wire rope connections and manila rope knots.

5.0 Chain Falls and Lever Hoists
A. Chain falls and lever hoists shall be clearly marked to show the capacity of the unit and the capacity shall not be exceeded.

B. Chain falls and lever hoists shall be regularly inspected to ensure that they are safe, particular attention being given to the lift chain, pinion, sheaves and hooks for distortion and wear. Lever hoists shall be regularly inspected to ensure that they are safe, particular attention being given to the lever, ratchet, pawl, chain and hooks for distortion and wear.

C. Straps, shackles, and the beam or overhead structure to which a chain fall or lever hoist is secured shall be of adequate strength to support the weight of load plus gear.

D. Chain falls and lever hoists shall not be used when the hook safety latch is damaged or missing.

E. Chain falls and come-a-long hoist load chains are not to be wrapped around piping or other loads and hooked back to itself.

F. Do not operate chain falls or lever hoists unless the load slings or other approved attachments are properly sized and seated in the hook saddle.

G. Do not operate a chain fall or lever hoist which has not been securely attached to a suitable support.

H. Chain falls and lever hoists must always be used in a straight line pull from hook to hook in the direction of loading.

I. Scaffolding shall not be used as a point of attachment for lifting devices such as tackles, chain falls, and pull-lifts unless the scaffolding is specifically designed for that purpose.

6.0 Inspections
A. Slings Inspection Frequencies
1. **Initial Inspection** - The sling and its hooks, rings, links and attachments are to be inspected, load tested and certified by the manufacturer or a recognized agency or company.

2. **Frequent Inspection** - The rigger is to visually examine each sling and its hooks, rings, links and attachments before use for damage, evidence of deficiencies, which could lower the load rate of the sling, and presence of the current periodic inspection tag. Deficiencies, or lack of a current periodic inspection tag, will be cause to remove the sling from service and a periodic inspection to be performed.

3. **Periodic Inspection** - Each chain and wire rope sling and their hooks, rings, links and attachments and each fiber rope/synthetic web sling is to be inspected quarterly. The inspection is to be performed by a designated competent person for damage or deficiencies, which would lower the load rating of the sling. This inspection is to be performed on the entire length of the sling and on each of its components.

B. **Repair or Reconditioning** Qualified personnel using procedures recommended by the manufacturer and / or ANSI / ASME B30.9 will perform repair or reconditioning of the slings. Repaired or reconditioned slings will be proof tested as stated in ANSI / ASME B30.9 prior to being placed back into service.

C. **Frequent Inspection Defect Characteristics**

1. **Alloy Steel Chain Slings**
   a. Wear, nicks, cracks, breaks, gouges, stretch bands, weld splatter, discoloration from excessive temperature and evidence of opening of the hook throat.
   b. Free movement between chain links and attachments.
   c. Free movement and proper seating of hook latches.

2. **Wire Rope Slings**
   a. Distortion of rope such as kinking, crushing, understanding, bird caging, main strand displacement or core protrusion.
   b. Loss of rope diameter in short rope lengths or unevenness of outer strands.
   c. General corrosion
   d. Broken or cut strands
   e. Number, distribution and type of broken wires
   f. Missing or illegible sling identifications, and
   g. Other conditions that cause doubt as to continual safe use of the sling.
   (1.) Where any such defect or deterioration is present, remove the sling or attachment from service immediately.

3. **Natural and Synthetic Fiber Rope Slings**
   a. Cuts, gouges and abrasions
   b. Worn fibers or yarns
   c. Filament or fiber breakage
   d. Particles of debris or broken fibers between strands.
   e. Evidence of chemical agents and/or sunlight damage (discoloration, harshness, brittleness, etc.)
   f. Kinks or knots
   g. Evidence of heat damage (melting or charring)
   h. Damaged fittings and/or attachments
   i. Missing or illegible sling identifications, and
j. Other conditions that cause doubt as to continual safe use of the sling.

4. Synthetic Webbing Slings
   a. Acid or caustic burns
   b. Evidence of heat damage (melting or charring)
   c. Holes, tears, cuts or snags
   d. Abrasive wear
   e. Knots
   f. Damaged fittings and/or attachments
   g. Missing or illegible sling identifications, and
   h. Other conditions that cause doubt as to continual safe use of the sling.

D. Periodic Inspection Defect Characteristics

1. Alloy Chain Slings
   a. Each link and each attachment will be inspected individually and visually
      examined for Wear, nicks, cracks, breaks, gouges, stretch bands, weld
      splatter, discoloration from excessive temperature and evidence of hook
      deformation, safety latches, connections and attachments.
   b. Worn links will not exceed the following values as stated below or that
      are specified by the manufacturer.

<table>
<thead>
<tr>
<th>Nominal Chain or Coupling Link Size</th>
<th>Maximum Wear (Diameter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/32</td>
<td>3/32</td>
</tr>
<tr>
<td>3/8</td>
<td>5/64</td>
</tr>
<tr>
<td>½</td>
<td>7/64</td>
</tr>
<tr>
<td>5/8</td>
<td>9/64</td>
</tr>
<tr>
<td>¼</td>
<td>5/32</td>
</tr>
<tr>
<td>7/8</td>
<td>11/64</td>
</tr>
<tr>
<td>1</td>
<td>3/16</td>
</tr>
<tr>
<td>1 ¼</td>
<td>1/4</td>
</tr>
</tbody>
</table>

c. Sharp transverse nicks and gouges can be rounded out by grinding and
   the sling used at its rated capacity, providing the depth of the grind does
   not exceed the above values.

2. Wire Rope Slings
   a. The entire length of the sling and its splices, end attachments and fittings are
      to be visually examined. Evaluation of the sling and determination of its
      suitability for continued use depends on the judgment of the qualified
      individual inspecting the sling.
   b. Conditions such as the following should be sufficient to remove the sling
      from service:
      (1.) For strand laid and single part slings, ten (10) randomly
          distributed broken wires in one (1) rope lay, or five (5) broken
          wires in one (1) strand in one (1) rope lay.
      (2.) Severe localized abrasion or scraping.
(3.) Kinking, crushing, bird caging or any other damage resulting in distortion of the rope structure.
(4.) Evidence of heat damage.
(5.) Cracked, deformed or worn end attachments.
(6.) Corrosion of the rope or end attachments.
(7.) Other visible damage that causes doubt as to the strength of the sling.

3. Natural and Synthetic Fiber Rope Slings
   a. The entire length of the sling and its splices, end attachments and fittings are to be visually examined. Evaluation of the sling and the determination of its suitability for continued use will depend on the judgment of the qualified individual inspecting the sling.
   b. Conditions such as the following should be sufficient reason to remove the sling from service:
      (1.) Cuts, gouges and badly abraded spots.
      (2.) Serious worn surface fibers or yarns.
      (3.) Considerable filament or fiber breakage along the line where adjacent strands meet.
      (4.) Particles of broken filament or fibers inside the rope between the strands (inspect inside the rope).
      (5.) Discoloration or harshness that may mean chemical damage or excessive exposure to sunlight. Inspect filaments or fibers for weakness or brittleness.
      (6.) Kinks or brittleness.
      (7.) Melting or charring on any part of the sling.
      (8.) Excessive pitting or corrosion or cracked, distorted or broken fittings.
      (9.) Other visible damage that causes doubt as to the strength of the sling.

4. Synthetic Webbing Slings
   a. The entire length of the sling and its stitching, end attachments and fittings are to be visually examined. Evaluation of the sling and the determination of its suitability for continued use will depend on the judgment of the qualified individual inspecting the sling.
   b. Conditions such as the following should be sufficient reason to remove the sling from service:
      (1.) Acid or caustic burns.
      (2.) Melting or charring of any part of the sling.
      (3.) Holes, tears, cuts or snags.
      (4.) Broken or worn stitching in load bearing splices.
      (5.) Excessive abrasive wear.
      (6.) Knots in any part of the sling.
      (7.) Excessive pitting or corrosion; or cracked, distorted or broken fittings.
      (8.) Other visible damage that causes doubt as to the strength of the sling. For example, colored threads exposed.
E. Hook Inspections

1. Inspection of hooks is to be performed in conjunction with the inspection of slings or the inspection of the hoist or crane. The documentation of this inspection will be as stated by the referenced procedures.

2. Inspection Defect Characteristics
   a. Hooks having any of the following deficiencies are to be removed from service unless a qualified person approves their continued use and initiates corrective action:
      (1.) Wear exceeding 10%, or as recommended by the manufacturer of the original sectional dimension.
      (2.) A bend or twist exceeding 10 degrees from the plane of the unbent hook.
      (3.) An increase in throat opening exceeding 15% or as recommended by the manufacturer.
      (4.) If a latch that is provided becomes inoperative because of wear or deformation, and is required for the service involved, it will be replaced or repaired before the hook is put back into service.
      (5.) If the latch fails to fully close the throat opening, the hook will be removed from service or not used until repairs are made.

3. If hooks are coated, visual inspection should take this coating into consideration. Surface variations can disclose evidence of heavy or severe service to require more detailed analysis. In such instances, the surface condition may then call for stripping the coating or nondestructive testing.

F. Inspection Documentation

1. Initial Inspection - This inspection is documented by the manufacturer's identification markings on the sling.

2. Frequent Inspections - Documentation of frequent inspections is not required. The rigger will identify slings removed from service for suspected deficiencies with a conspicuous tag with wording such as "Warning, Removed From Service" printed on it. He/she will also remove the periodic inspection identification and cause the sling to be inspected. Removal of the warning tag is to be performed only by qualified inspection personnel.

3. Periodic Inspection
   a. Chain and Wire Rope Slings - The periodic inspection will be documented by using colored tape, tag or paint, placed near the hook end, such as the colors stated below:
   b. Fiber Rope and Synthetic Slings - The periodic inspection will be documented and the slings marked by applying colored tags or tape to the inside of the sling's loop eye using a color scheme such as the following:

<table>
<thead>
<tr>
<th>January through March</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>April through June</td>
<td>Green</td>
</tr>
<tr>
<td>July through September</td>
<td>Red</td>
</tr>
<tr>
<td>October through December</td>
<td>Orange</td>
</tr>
</tbody>
</table>
7.0 Sling Use
Whenever any sling is used, the following safe practices shall be observed:

A. Sling that are damaged or defective shall not be used. (See inspection procedures for type of sling.)

B. Nylon web or round slings must be marked or coded to show the rated capacities for each type of hitch and type of synthetic web material.

C. Nylon web slings shall not be used where fumes, vapors, sprays, mists or liquids of acids or phenolics are present.

D. Nylon Web or round slings shall not be used at temperatures in excess of 180 deg. F. Polypropylene web slings shall not be used at temperatures in excess of 200 deg. F.

E. Nylon web or round slings which are repaired shall not be used unless repaired by a sling manufacturer or an equivalent entity. Each repaired sling shall be proof tested by the manufacturer or equivalent entity to twice the rated capacity prior to its return to service. A certificate of the proof test must be available for examination.

F. Never exceed the rated capacity chart for the sling type and the rigging configuration used.

G. Never rig a load angle less than 30º.

H. Never point load a lifting hook. Always make sure the safety latch is working properly.

I. Sling shall not be shortened with knots or bolts or other makeshift devices.

J. Sling shall not be kinked.

K. Sling shall not be loaded in excess of their rated capacities.

L. Sling used in a basket hitch shall have the loads balanced to prevent slippage.

M. Sling shall be securely attached to their loads.

N. Sling shall be padded or protected from the sharp edges of their loads.

O. Suspended loads shall be kept clear of all obstructions.

P. Tag lines are to be connected to all hoisted loads, unless their use creates an unsafe condition.

Q. All employees shall be kept clear of loads about to be lifted and of suspended loads.

R. Hands or fingers shall not be placed between the sling and its load while the sling is being tightened around the load.

S. Shock loading is prohibited.

T. A sling shall not be pulled from under a load when the load is resting on the sling.

U. Rigging for Crane Suspended Personnel Baskets must comply with the following:

1. When a wire rope bridle is used to connect the personnel platform to the load line, each bridle leg shall be connected to a master link or shackle to ensure that the load is evenly distributed among the bridle legs.

2. Hooks on the overhaul ball, load blocks or other attachment assemblies shall be of a type that can be closed and locked to eliminate the hook throat opening. An alloy anchor type shackle with bolt, nut and retaining pin may be used.

3. Wire rope, shackles, rings, master links and other rigging hardware must be capable of supporting, without failure, at least five (5) times the maximum intended load applied to that component. Where rotation resistant rope is used, the slings shall be capable of supporting, without failure, at least ten (10) times the maximum intended load.
4. All eyes in rope slings shall be made to include thimbles.
5. Bridles, slings and associated rigging for connecting the personnel platform to the hoist line shall be only used for that purpose and shall not to be used to lift materials, equipment, etc. when not hoisting the personnel platform.

8.0 References
   A. OSHA 1910.176 and 1910.184
   B. OSHA 1926.251
   C. OSHA 1926.550

9.0 Forms
   A. SAF-30.0-1 – Effect of Angle and Sling Loading Charts
   B. SAF-30.0-2 - Proper Use of Cribbing
   C. SAF-30.0-3 - Good and Bad Rigging Practices
Effect of Angle

When slings are used at an angle (i.e., two slings, or one sling in a basket hitch, attached to only one crane hook), sling capacity is reduced. How much it is reduced depends on the degree of the angle. You can determine whether a sling will be rated high enough if you know the angle between the sling leg and the horizontal. Once you know this angle, multiply the sling’s rating by the appropriate factor in the table. This will give the sling’s reduced rating.

<table>
<thead>
<tr>
<th>ANGLE DEGREES</th>
<th>FACTOR</th>
<th>ANGLE DEGREES</th>
<th>FACTOR</th>
<th>ANGLE DEGREES</th>
<th>FACTOR</th>
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<tbody>
<tr>
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<td>1.00</td>
<td>65</td>
<td>0.906</td>
<td>40</td>
<td>0.643</td>
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<tr>
<td>85</td>
<td>0.996</td>
<td>60</td>
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<td>0.819</td>
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<td>50</td>
<td>0.766</td>
<td>25</td>
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<tr>
<td>70</td>
<td>0.940</td>
<td>45</td>
<td>0.707</td>
<td>20</td>
<td>0.342</td>
</tr>
</tbody>
</table>

Sling capacity decreases as the angle decreases.

A sling capable of lifting 1,000 lbs. in a 90° vertical basket hitch can only lift 866 lbs. at a 60° angle, 707 lbs. at a 45° angle, and 500 lbs. at a 30° angle.
<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
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<td>4</td>
<td>.41</td>
<td>.56</td>
<td>.79</td>
<td>.56</td>
<td>.65</td>
<td>.65</td>
<td>.1 .12</td>
<td>.1 .14</td>
<td>.1 .12</td>
</tr>
<tr>
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<td></td>
<td>3</td>
<td>6</td>
<td>.93</td>
<td>1.2</td>
<td>1.7</td>
<td>1.2</td>
<td>1.1</td>
<td>1.4</td>
<td>1.14</td>
<td>2.4 2.0</td>
<td>1.14 1.4</td>
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<tr>
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<td>4</td>
<td>8</td>
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<td>3.1</td>
<td>2.2</td>
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<td>2.5</td>
<td>1.93</td>
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<td>9.7 7.9</td>
<td>5.6 7.9</td>
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<td>9.8</td>
<td>7.23</td>
<td>17 14</td>
<td>9.8 14</td>
</tr>
<tr>
<td>1-1/8</td>
<td>9</td>
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<td>18</td>
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<td>12 17</td>
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<td>20</td>
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<td>11</td>
<td>15</td>
<td>11.33</td>
<td>26 21</td>
<td>15 21</td>
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<td>13.33</td>
<td>31 25</td>
<td>18 25</td>
</tr>
<tr>
<td>1-3/4</td>
<td>8</td>
<td></td>
<td>14</td>
<td>28</td>
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<td>31</td>
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<td>21 30</td>
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<td>28</td>
<td>21.33</td>
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<td>28 40</td>
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<td>45</td>
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<td>54 76</td>
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<td>65 92</td>
</tr>
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<td>77</td>
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<td>77 109</td>
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<td>18</td>
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<td>64</td>
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<td>177 144</td>
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<td>139</td>
<td>160</td>
<td>139.33</td>
<td>277 226</td>
<td>160 226</td>
</tr>
</tbody>
</table>

* Rated capacities of basket hitches are based on a minimum diameter of curvature at the point of load contact of 40 times the rope diameter for slings 1/4" thru 1" diameter and 25 times the rope diameter for slings 1-1/4" diameter and larger.
Proper Use Of Cribbing

Proper Use of Cribbing

Incorrect

Correct
**Good And Bad Rigging Practices**

**Double Slings**
- **Correct Practice**: Use double slings when handling 2 or more pieces of material over 12" long.
- **Wrong Practice**: Use a single sling over 12" long.

**Eye Bolts**
- **Correct Practice**: Lift using eye bolts from a right angle to reduce the risk of damage.
- **Wrong Practice**: Lift on eye bolts from an angle, which reduces the safe load as much as 90%.

**Eye Splices**
- **Correct Practice**: Use a wire rope knot with a clip for efficiency 60% or less.
- **Wrong Practice**: Use a thimble on the end to increase strength or eye and reduce wear on the rope.

**Hoisting Structural Steel**
- **Correct Practice**: Use a block and pad to reduce wear on the rope.
- **Wrong Practice**: Cut the rope using a thimble instead of the splice.

**Suspending Needle Beams or Scaffolds**
- **Correct Practice**: Use a block and pad to reduce wear on the rope.
- **Wrong Practice**: Cut the rope using a thimble instead of the splice.

**APPLICATION OF WIRE ROPE CLIPS**

**CROSS-BUTTON**

1. **Correct Method**: Button of clips - short end of rope. (No distortion of eye or bend in eye.)

2. **Wrong Method**: Jull, etc. Use a block & pad to reduce wear.

3. **Wrong Method**: Button of clips, two corners clipped. (This will reduce bending on the eye splice to take up some strain.)

**Number of Clips and Distance Between Clips Needed For Safety**

<table>
<thead>
<tr>
<th>Diameter of Rope (inches)</th>
<th>Number of Clips Needed</th>
<th>Distance Between Clips</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8</td>
<td>2</td>
<td>1/16&quot;</td>
</tr>
<tr>
<td>3/32</td>
<td>3</td>
<td>1/32&quot;</td>
</tr>
<tr>
<td>1/4</td>
<td>4</td>
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<tr>
<td>3/16</td>
<td>6</td>
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</tr>
<tr>
<td>5/16</td>
<td>10</td>
<td>5/16&quot;</td>
</tr>
</tbody>
</table>

**钩索吊装**

- **Bad Practice**: Hook openings should be turned out.
- **Good Practice**: Hooks are turned out.

**安全应用**

1. **正确方法**：使用剪绳工具剪断绳索。
2. **错误方法**：使用剪绳工具剪断绳索，导致绳索损伤。

**PIC Rev 12/12/11**
SHACKLE
Safe Load in Pounds
Drop Forged Steel, Weldless

STRENGTH OF MANUFACTURED EYE HOOKS
Drop Forged Steel, Weldless

<table>
<thead>
<tr>
<th>Eye Hook Diameter (in.)</th>
<th>Safe Load (Pounds)</th>
<th>Safe Working Load (Pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/16</td>
<td>2.200</td>
<td>1.000</td>
</tr>
<tr>
<td>9/32</td>
<td>3.500</td>
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<td>1/2</td>
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</tr>
<tr>
<td>1</td>
<td>16.000</td>
<td>7.000</td>
</tr>
</tbody>
</table>

Efficiency of Wire Rope Connections
All Compared to Safe Load on Wire Rope

- Clove hitch (outside)  "Stnghth - 75%"
- Bowline (outside)  "Stnghth - 50%"
- Bowline (inside)  "Stnghth - 35%"
- Sheepshank  % Stnghth - 35%
- Timote Hitch & Hitch  % Stnghth - 75%
- Square or Reef Knot  % Stnghth - 35%

Efficiency of Manilla Rope Knots and Coils Compared to Safe Load on Manila Rope

Loose Splice:
% Strength - 85%

 Seamless Splice:
3/8" to 5/8" chail or..... - 90%
3/4 to 1-1/8" dam. lach - 80-85%
1-3/8" to 1" dam. lach or..... - 75-80%
31.0 - Welding and Cutting

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1.0 Scope
This procedure provides basic guidelines for electrical welding operations and oxy-fuel cutting operations.

2.0 Fire Prevention
A. Before starting to burn or weld, the work area around and below must be inspected to ensure that sparks or molten metal will not fall on workers or flammable/combustible materials. Certain project sites may require hot work permits prior to any flame or spark producing work being performed.
B. Areas where welding and cutting operations are performed shall be kept clean and all accumulations of trash, rags, and other flammable/combustible materials shall be removed. Consideration must be given to the distance that sparks and slag can travel.
C. If the object to be welded or cut cannot be moved, all movable fire hazards in the vicinity shall be taken to a safe place. If the object to be welded or cut cannot be moved and if all the fire hazards cannot be removed, then guards shall be used to confine the heat, sparks, and slag, and to protect the immovable fire hazards. If not possible to move or guard all fire hazards then welding and cutting work shall not be performed.
D. A suitable fire extinguisher with a rating of at least 10ABC must be maintained in the work area accessible to the welder. (Refer to Section 16)
E. A Fire watch is required whenever welding or cutting is performed in locations where sparks or molten metal has the possibility of contacting ignitable materials, or any of the following conditions exist:
1. Appreciable combustible material, in building construction or contents, closer than 35 feet (10.7 m) to the point of operation.
2. Appreciable combustibles are more than 35 feet (10.7 m) away but are easily ignited by sparks.
3. Wall or floor openings within a 35-foot (10.7 m) radius expose combustible material in adjacent areas including concealed spaces in walls or floors.
4. Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and are likely to be ignited by conduction or radiation.

F. Assigned fire watch personnel shall have fire extinguishing equipment readily available, be instructed as to the anticipated fire hazards, the use of fire fighting equipment to be used and be familiar with the procedures for sounding an alarm in the event of a fire. They shall watch for fires in all exposed areas, try to extinguish them only when obviously within the capacity of the equipment available, or otherwise sound the alarm. A fire watch shall be maintained for at least a half hour after completion of welding or cutting operations to detect and extinguish possible smoldering fires.

G. Drums, vessels, containers, or hollow structures, which have contained toxic or flammable substances, shall be thoroughly cleaned, ventilated, and tested prior to any welding, burning or heating.

H. When cutting and welding operations are performed above gratings, decks, or near floor and wall openings, suitable protective measures must be used to prevent the sparks and slag from being directed through the nearby openings. Do not allow hot slag to remain on surfaces long enough to cause combustion or damage.
1. Sparks and slag must be contained in congested work areas.
2. Fire resistant blankets, tarps or other similar protective coverings shall be used to contain sparks or molten metal on floor gratings and open floor or wall openings.
3. When it is impossible to contain sparks and slag, the danger area shall be barricaded.

I. All hoses, fittings, leads, torches and regulators shall be inspected daily prior to use. Damaged or defective equipment shall be removed from service.

J. Before welding, cutting, or heating any surface covered by a protective coating, the flammability and toxicity of the coating must be determined. Flammable or toxic coatings must be stripped back or removed a sufficient distance away from the area to be heated to prevent ignition or the release of toxic fumes. Additional safety measures such as respiratory protection may be required.

3.0 General Requirements
The Project Superintendent or his/her designee is responsible to inspect and approve all welding and cutting areas to ensure the areas meet the requirements of this section prior to the start of work.

A. No welding or cutting is to be done on a closed vessel or tank, which has not been properly cleaned and tested for hazardous, combustible or toxic contaminants. (Refer to Confined Space Entry Section 34.3)

B. Welding and cutting equipment shall be inspected before use. Flashback devices shall be installed attached between the regulators on both the oxygen and acetylene hoses.

C. Work areas shall be inspected for flammable solvents, vapors, and gases.

D. Flammable and combustible materials shall be removed.
E. Suitable fire extinguishing equipment shall be available in the work area.
F. A fire watch will be posted during welding / cutting operations and for one half hour following these operations, when conditions make it appropriate. The fire watch shall be trained in the use of the fire extinguisher.
G. A welding and cutting permit, if required for your work area, shall be obtained and site welding and cutting guidelines followed.
H. Identify if work will be in a confined space, if so follow confined space and entry work procedures.
I. Identify the type of metal to be worked on and protective coatings that have been applied.
J. Identify what type of respiratory protection is required, if applicable, and other types of personal protective equipment to be used.
K. The contents of drums, tanks, barrels, piping or other containers shall be ascertained. Containers shall be thoroughly cleaned so that no flammable vapors will be present.
L. Employees should be alerted for potential hazards created by other employees in the work area.
M. Adequate ventilation (natural or mechanical) must be provided for all welding, cutting, brazing, and other related operations.
N. Welding, burning and heating performed in confined spaces requires general mechanical or local exhaust ventilation to reduce the concentrations of smoke and fumes to acceptable levels.
O. If adequate ventilation cannot be provided, employees must be provided with and required to use proper respiratory protective equipment.
P. When sufficient ventilation cannot be obtained without blocking the means of access, employees must be provided with and required to use proper respiratory protective equipment.
Q. Employees welding, cutting or heating metals of toxic significance shall use airline or other approved filter-type respiratory protection. (See section 35.4 Respiratory Protection Procedures)
R. The following components, which can be found in metals and coatings, have Permissible Exposure Limits. If these materials are encountered in welding, cutting or brazing operations refer to material safety data sheets (MSDS). Conduct personal sampling as necessary to determine if additional ventilation and/or approved respirators are required. Contact the Corporate SH&E Department for assistance.
   a. Antimony
   b. Arsenic
   c. Barium
   d. Beryllium
   e. Cadmium
   f. Chromium
   g. Cobalt
   h. Copper
   i. Fluorine Compounds
   j. Lead
   k. Manganese
   l. Mercury
   m. Nickel
n. Ozone
o. Selenium
p. Silver
q. Vanadium
r. Zinc
S. Welders or helpers when engaged in welding or cutting operations shall not carry matches or butane lighters.
T. Keep all welding leads and burning hoses up off floors, walkways, and stairways.

4.0 Welding Operations
A. Before starting to weld or cut, welders shall inspect the work area to ensure that sparks or molten metal will not fall on combustible materials or other employees.
B. Inspect welding leads prior to use to ensure that the insulation is not damaged and that the conductor is not exposed.
   1. Repair or discard damaged cord sets.
   2. Repairs shall be made by a qualified person, using only correct repair materials
C. Only cable free from repair or splices for a minimum distance of 10 feet from the cable end to which the electrode holder is connected shall be used. All arc welding cables shall be completely installed, flexible type and capable of handling the maximum current requirements of the work.
D. Welding leads shall not be secured to supports with conductive ties (wire, welding rod, etc.)
E. Welding leads shall not be tied in a knot.
F. Welding leads must be removed from vessels and other confined spaces anytime they are not actively used.
G. Welding leads must not be routed across roads or travel ways where they can be driven over by mobile equipment. Welding leads should be elevated above the walking/working area if possible.
H. Ground leads for electric arc welding shall be located as close to the welding area as possible to minimize secondary arcs.
I. Welding machines shall be shut down any time the job is left unattended.
J. Portable welding machines shall be shut down when being refueled.
K. When a portable welding machine includes a receptacle for AC power, the receptacle must be equipped with a ground fault circuit interrupter (GFCI).
L. Welding machines and leads must be inspected prior to their initial use on site and at least quarterly thereafter. This inspection shall be indicated by a color-coded tape system or its equivalent.
M. When arc welding is being done near other workmen, they must be protected from the arc rays by noncombustible screens or they must wear proper eye protection.
N. All welding leads must be adequately insulated from the machine connection to the electrode holder or ground clamp.
O. Do not leave a rod in the holder when it is laid down. Put stub ends in proper containers, not on the ground or floor.
P. Workers assigned to operate or maintain arc welding equipment shall be acquainted with the following requirements:
1. Before starting operations all connections to the machine shall be checked to make certain they are properly made. The work lead shall be firmly attached to the work; magnetic work clamps, if used, shall be free from adherent metal particles of spatter on contact surfaces. Coiled welding cable shall be spread out before use to avoid serious overheating and damage to insulation.

2. Equipment shall be inspected before use at the start of each shift. Defective equipment is to be reported to the supervisor and removed from service until repaired.

3. Grounding of the welding machine frame shall be checked. Special attention shall be given to safety ground connections of portable machines.

4. There shall be no leaks of cooling water, shielding gas, or engine fuel. Portable welding machines must be turned off before being refueled.

5. Proper disconnect switches and over-current devices must be provided for shutting down the machine.

6. Manufacturers' instructions, printed rules, and requirements covering operation of equipment supplied by the manufacturers shall be strictly followed.

7. Electrode holders when not in use shall be so placed that they cannot make electrical contact with persons, conducting objects, fuel, or compressed gas tanks.

8. Hot electrode holders shall not be dipped in water: to do so may expose the arc welder to electrical shock.

9. Cables with splices within 10 feet (3 m) of the holder shall not be used. The welder should not coil or loop welding electrode cable around parts of his body.

10. When the arc welder or cutter has occasion to leave his/her work for any appreciable length of time, or when the arc welding machine is to be moved, the power supply switch to the equipment shall be opened.

11. Workers should report any equipment defect or safety hazard to their supervisor and the use of the equipment shall be discontinued until its safety has been assured. Modification and repairs to welding equipment shall only be performed by the equipment manufacturer or a qualified service technician.

12. Machines which have become wet shall be thoroughly dried and tested before being used.

13. Cables with damaged insulation or exposed bare conductors shall be replaced. Joining lengths of work and electrode cables shall be done by the use of connecting means specifically intended for the purpose. The connecting means shall have insulation adequate for the service conditions.

14. Fire protection, personal protection, health protection and ventilation requirements of (CFR1910.252 (a), (b) and (c) as well as AWS A6.1-1966 Recommended Safe Practices for Gas-Shielded Arc Welding When Performing Any Gas Shielded Arc Welding Process

5.0 Cutting Operations

A. Pressure Reducing Regulators

1. The operator must inspect the equipment prior to each use. In particular, the operator should look for leaks, burns, worn areas, and other defects.

2. Oxygen cylinders, cylinder valves, couplings, regulators, hose, and apparatus shall be kept free from and away from oil and grease (oil or grease in the
presence of oxygen under pressure may ignite violently). Employees shall be prohibited from handling oxygen cylinders or apparatus with oily hands or gloves.

3. Pressure regulators including the gauges shall be in proper working order while in use, if not, remove from service.

4. Regulators shall be an approved type of gas to be utilized.

5. Before a regulator is connected to a cylinder valve, the valve shall be cracked (opened slightly and then closed) to clean the valve of any dust or dirt.

6. The working pressure of acetylene shall not be adjusted above 15 psig as it becomes unstable to safely use.

7. When the glass becomes cracked or broken on the regulator gauge, it shall be replaced to prevent dirt and moisture from entering and damaging the gauge.

8. When a pressure-reducing regulator is attached to a compressed gas cylinder, the cylinder valve should be opened just slightly at first so that the regulator can take on pressure slowly, after which the valve may be turned open to its normal position. If the regulator takes on pressure too suddenly it can damage the regulator and pressure gauges. The operator shall stand to the side of the glass covered gauges and not in front of them.

9. When removing regulators from or attaching regulators to oxygen cylinders, keep all sources of oil and grease (e.g. dirty gloves) away. Regulators shall not be stored in tool boxes/gang boxes where they can become damaged.

10. Flash Back Arrestors are required on all cutting rigs.

11. Attach reverse-flow check valves to the torch and flash back arresters to the regulator.

12. At the end of the shift, or when the work is complete, remove the regulator from the cylinders, replace the protective cylinder caps, and cap the regulator threaded compression nipples to prevent dirt and foreign material from entering the system.

13. Store the torch, hoses, and regulators in a clean, dry, oil-free area and in a manner to protect them from physical damage.

14. Oxygen and acetylene bottles valves must be closed any time the equipment is not actively used or is left unattended. Bleed off pressure from torch hoses when the torch is not actively used.

15. Acetylene cylinder valves shall be opened slowly not more than one and one-half (1-1/2) turns of the spindle. If the cylinder valve takes a special wrench provided by the supplier, the wrench must be left in position on the stem while the cylinder is in use so that it may be quickly turned off in case of an emergency.

B. Hose and Torch Connections.

1. Use only hose made especially for welding and cutting to connect an oxyacetylene torch. Metal clad or armored hose is prohibited.

2. Unnecessarily long lengths of hose shall be avoided. When lengths must be used, care shall be taken that the hose does not become kinked or tangled, that it is protected from being run over by trucks or other mobile equipment, stepped on or otherwise damaged.

3. When parallel lengths of oxygen and acetylene hose are taped together for
convenience and to prevent tangling, no more than four inches (4") out of twelve inches (12") shall be covered with tape.

4. Gas hoses must be removed from vessels and other confined spaces anytime the equipment is not actively used.

5. Fuel gas hose and oxygen hose shall be easily distinguishable from each other. The two shall not be interchangeable.

6. Unnecessary long lengths of hose should be avoided. The hose needs to be protected from being run over by equipment or other damage.

7. All hose shall be inspected at the start of the shift for leaks. Hose when worn at connections should be cut off and reinserted. Breaks in the hose should be cut out and a splice inserted. A knowledgeable person using proper/ approved prohibited.

8. Defective hose or hose in doubtful condition shall not be used. Hose subjected to a flashback shall be taken out of service.

9. Do not use matches or cigarette lighters to light torches. Spark igniters must be used.

6.0 Storage and Handling of Compressed Gas Cylinders

A. Compressed gas cylinders (empty or full) shall be secured in an upright position at all times except, if necessary, for short periods of time while cylinders are actually being moved. Empty cylinders shall be marked EMPTY or M.T.

B. A suitable cylinder truck, chain or other secure fastening shall be used to keep cylinders from being knocked over while in use. When cylinders are transported they shall be secured in a vertical position.

C. Valve protection caps shall be in place at all times, except when cylinders are connected for use.

D. All cylinders shall be checked for leaks or other possible damage upon delivery from gas supplier. This is done with a mixture of dish soap and water sprayed on valves, connections and pressure relief plugs.

E. While in use, cylinders are to be secured by a chain or bar in a special carrier or cart.

F. Cylinder storage area is to be clearly marked with warning signs: "DANGER NO SMOKING, MATCHES OR OPEN LIGHTS OR FLAMES".

G. Cylinders are to be kept far enough away from the actual welding or cutting operation so that sparks, hot slag, or flame will not come in contact with the cylinders. Fire resistant shields may be used.

H. When cylinders are hoisted, a rack or other suitable platform shall be used. Cylinders shall not be hoisted or transported by means of magnets or choker slings.

I. Never drop cylinders or permit them to strike one another violently, or use them as rollers or supports, even when empty.

J. Regulators shall be removed and valve protection caps put back in place before cylinders are moved unless cylinders are firmly secured on a special carrier intended for this purpose.

K. Cylinder valves shall be closed when work is finished, when the cylinders will be left unattended, when cylinders are empty and when cylinders are moved at any time.

L. Cylinders of acetylene and other fuel gases shall not be stored with cylinders of oxygen. They shall be separated by a minimum distance of twenty (20) feet or by a noncombustible barrier at least five (5) feet high having a fire resistance rating of at least one-half hour.
M. Compressed gas cylinders shall not be taken into confined spaces. Cylinders are not to be stored or staged for use inside vessels, tanks or other confined spaces.

N. Fuel gas cylinders shall be placed with valve end up.

O. Cylinders shall be located so as not to be subjected to sparks, hot slag, flame, hot metal, or other sources of heat, artificial or otherwise.

P. Smoking, spark-producing work, and open flame activities are not allowed within 20 feet (6 meters) of any cylinder storage area containing cylinders of flammable gas.

Q. No person other than the gas supplier shall attempt to mix gases in a cylinder. No one except the owner or person authorized by the owner of the cylinder shall refill a cylinder. Cylinder contents shall not be used for purposes other than those intended by the supplier.

R. Cylinders shall be placed where they cannot become part of an electrical circuit.

S. No damaged or defective cylinders shall be used.

T. Fuel gas cylinders in which leaks occur shall immediately be taken out of use and handled in accordance with the following procedure:
   1. The valve shall be closed; the cylinder tagged and removed out-of-doors away from sources of flame or sparks and the supplier notified. A regulator attached to the valve may be used temporarily to stop a leak through the valve seat.
   2. If the leak occurs at the fuse plug or other safety device, tag the cylinder, remove it out-of-doors away from sources of flame or sparks, and leave the valve slightly open to permit the gas to escape slowly.
   3. Warnings against approaching the leaking cylinder with lighted cigarettes or other sources of ignition must be posted. The supplier shall be notified immediately and follow his/her instructions for returning the cylinder and preferably have the supplier pick up the cylinder.

7.0 Personnel Protective Equipment

A. To protect eyes, face and body, employees engaged in electric arc welding shall wear an approved helmet, approved protective gloves and long sleeves or welder sleeves. For eye protection the helmet must be equipped with no less than a #10-filter lens, with a safety lens on both sides of the filter.

B. Adequate ventilation and/or approved respiratory equipment must be used when welding in poorly ventilated areas or when cutting or welding zinc, galvanized, or lead coated materials. If adequate ventilation cannot be provided, employees must be provided with and required to use proper respiratory protective equipment.

C. A qualified medical person should promptly remove metal flakes or particles in the eye in order to prevent rust ring formation.

D. Clothing should be free of oil and grease.

E. Some type of welding may require the use of flame resistant gauntlets, gloves, caps, shoulder covers, leggings, high boots, or flame resistant aprons.

8.0 References

OSHA 1926.350

9.0 Forms

SAF-31.0-1 - Welding / Burning – Hot Work Permit
Welding/Burning - Hot Work Permit

Location and Description: __________________________________________________________

Location of Work: ________________________________________________________________

Work Description: __________________________________________________________________

Date: _______________________________ Time: _________________________________

Person In Charge Of Work: __________________________________________________________

No welding, grinding, cutting or other hot work is to be performed on any piping, pipelines, drums, barrels, tanks, vessels or other containers until they have been physically isolated, cleaned and adequate tests have been performed to ensure that no flammable materials, gases or vapors are present.

Site Preparation

System Lockout / De-Energize ☐ Source Valves Shut Off Locked/ Tagged ☐

Lines Broken / Capped / Blanked ☐ Blinds Installed And Marked ☐

Flush / Ventilate Lines And Equip. ☐ Additional Ventilation Required ☐

Fire Protection / Firewatch ☐ Area Barricaded ☐

Combustible Materials Removed Or Covered With Fire blankets ☐ Flammable Materials Removed From Area ☐

Gas Test Performed

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<th>Test Performed</th>
<th>Location</th>
<th>Reading</th>
<th>Time</th>
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Additional Safety Equipment Required

Face Shield ☐ Goggles ☐ Respirator ☐ Gloves ☐ Other ☐

Special Procedures: ______________________________________________________

Authorizations:
I certify that I have inspected the work area for safety and I have reviewed all precautions recorded on this permit and understand all procedures to be taken.

Supervisor Authorizing Work: ____________________________________________
32.0 - Concrete And Masonry

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1.0 General Requirements
  A. Establish a limited-access zone prior to the start of construction of any masonry wall. Only those employees actively engaged in constructing the wall may enter this zone.
  B. To prevent inadequately supported masonry wall from overturning or collapsing, brace them until permanent supports are in place.
  C. All concrete formwork shall be designed, fabricated, erected, braced, and maintained so that it is capable of supporting, without failure, all loads which may reasonably be anticipated. (Formwork designed, fabricated, erected, braced and maintained in accordance with ANSI A10.9-1983 will meet this requirement.)
  D. All scaffolds and scaffold components should be adequately designed to carry, without failure, four (4) times the maximum intended load. At no time shall any scaffold be overloaded. Materials shall be evenly distributed on platforms and not concentrated in one area. Do not set scaffolds on foundations of cement block. (Refer to Section 24.1 Scaffolds)
  E. Do not stack or store blocks more than 24 inches (60 centimeters) high on the scaffold deck except during the initial placement of the stock on the scaffold. To disperse the load, immediately break down stacks once they are placed on the scaffold.
  F. Ensure that materials are placed over the strongest point of the scaffold frame and not at the center of the decking span.
  G. All shoring equipment is to be inspected prior to use and any shoring equipment found to be damaged shall not be used. Erected shoring is to be inspected prior to, during and after the pour, any shoring equipment found to be damaged or weakened shall be reinforced.
  H. All protruding reinforcing steel is to be guarded or covered to eliminate the hazard of impalement.
  I. Employees placing or tying reinforcing steel six feet 6’ or more above the ground or adjacent levels are to wear fall protection as per Section 24.0.
  J. When concrete and masonry work requires the use of scaffolding, all requirements of Preferred Industrial Contractors, Inc. scaffolding (section 24.1) must be in place.

2.0 Storage and Handling
  A. Stockpile masonry materials on a solid, even grade, out of the way of high-activity areas.
  B. Use caution when removing metal banding materials from brick and block stacks.
  C. Use only strap or side cutters.
  D. Properly dispose of used banding materials. Accumulating scrap banding becomes a safety hazard.
E. Measures shall be taken to prevent unrolled wire mesh from recoiling. Such measures may include: securing each end of the roll or turning the roll over.

F. When cutting tie wires under tension, care must be taken to prevent the backlash, which might hit the body, particularly the eyes, face or throat. Eye and face protection is mandatory.

G. When cleaning formwork with compressed air, (normally 30 psi.) higher air pressure may be used provided the following safety precautions are taken:
   1. A wand made of pipe, no shorter than 3 feet, equipped with a valve, which requires constant finger pressure.
   2. Areas to be cleaned shall be barricaded with barrier tape and signs posted "CAUTION - COMPRESSED AIR IN USE - KEEP OUT". All employees working inside the barricaded area shall wear goggles.

   *NOTE: This is the only exception to using higher pressures for cleaning purposes. All other cleaning procedures with compressed air must be reduced to 30 psi.

3.0 Concrete Buckets and Ready Mix Trucks
   A. A signalman, positioned to have a clear view of the area behind the truck and be visible to the truck driver, shall control backing operations.
   B. A reasonably smooth surface should be provided. Personnel and other job equipment are to avoid crossing the truck lane.
   C. When drivers or other ready mix personnel are out of their vehicles, they shall wear approved hard hats and safety glasses.
   D. Employees handling sacked or bulk cement shall wear goggles, durable close fitting clothing with snug wrists, ankle and neckbands and appropriate respiratory protection. Employees handling wet concrete are to wear rubber boots, rubber gloves, and other personal protective equipment as needed.
   E. One of the best means of avoiding skin irritation from cement dust is through frequent and thorough washing combined with the use of protective cream.
   F. Employees working on top of rebar mats should have planking or plywood laid on top of the mat for employees to walk on.
   G. Rebar caps or other adequate protective measures must be installed on all exposed rebar to prevent impalement hazards.
   H. No employee is permitted to ride concrete buckets. Employees are not permitted to work under concrete buckets. During a pour, concrete buckets are to be routed so as to not swing over employees and exposing them to the hazard of falling concrete.
   I. Forms shall not be removed until concrete is properly set and has attained sufficient strength to carry loads. Job specifications and local building codes shall be consulted prior to removing forms.

4.0 Housekeeping and Cleanup
   Masonry workers shall maintain good housekeeping in their work areas. This shall include:
   A. Gathering up broken masonry pieces at least once per day into a central pile or container for disposal:
   B. Gathering up waste mortar / mortar spills at least once per day into a central pile or container for disposal;
C. Removing the nails from form boards and stakes as the forms are removed, throwing the used nails into a container for disposal, stacking the re-usable boards and stakes so that they are not a hazard to other workers on the site, and placing all un-usable boards and stakes in a container for disposal.

D. Gathering up scrap paper and other trash resulting from the masonry contractor’s work into a container for disposal.

E. Masonry workers shall remove and properly dispose of their accumulated debris from the job site at least once per week.

F. At the completion of their work, masonry contractors shall remove and properly dispose of their accumulated debris from the job site before leaving the job site.
1.0 Scope

This procedure provides minimum guidelines for the evaluation, planning, and demolition of
structures following safety requirements and local environmental regulations.

2.0 Definitions

Competent Person - An experienced CONTRACTOR craftsperson or engineer, acceptable to
COMPANY, who is qualified by experience or training.

3.0 Engineering Survey and Written Job Plan

A. Prior to the start of demolition of structures, piping, walls, floors, etc., an engineering
survey shall be done to establish the condition of the structural members and the
possibility of an unplanned collapse of any portion of the structure or any adjacent
structures where employees may be exposed.

B. A written evaluation of structures to be demolished shall be prepared wherever personnel
may be potentially exposed to collapsing beams, equipment, walls, or floors. Work shall
be so planned that no employee will cut beams that support his or other worker’s work
platform.

C. A review all planned lifts will be performed to determine which may qualify as “Critical
Lifts”. All Critical Lifts must follow the Critical Lifts Procedure.
4.0 Lock, Tag, Try, and Verify
   A. All utilities are to be shut off, capped, or otherwise controlled outside the building prior to the start of demolition. If it is necessary to maintain any power, water or other utilities during demolition, they shall be relocated as necessary and protected against damage.
   B. Where personnel are required to enter structures that are subject to collapse due to ongoing demolition work, work areas shall be adequate shoring in place to prevent untimely collapse.

5.0 Material Hazards
   A. Asbestos or other toxic insulation materials, glass and other hazardous materials shall be removed prior to the start of general structural demolition.
   B. Demolition generally shall start at the top of a structure and progress downward.
   C. Stairways and other access ways shall be inspected and maintained as long as possible and shall be lighted and maintained in a safe condition.

6.0 Ongoing Inspection
   A competent person shall continually inspect the structure to ensure the stability of remaining columns and walls where employees are working.

7.0 Barricades
   A. Openings in elevated workplaces shall be protected with barricades. Where hazards exist to employees falling through wall openings, the opening shall be protected with a standard guardrail system 42 inches high (see Section 17).
   B. Where debris is dropped through floor openings or through walls to the ground below, chutes shall be used to control flying debris, dust and other hazards. Chute openings shall be protected and gates provided to close chutes when the discharge end is not protected.
   C. Single-story drop areas shall be barricaded with a clear area around it proportional to the height from which materials are dropped.

8.0 Access
   A. Employees are not allowed in any areas where the demolition operations could create a hazard.
   B. Entrances to the building shall be covered with sheds or canopies designed to allow employees safe access and providing overhead protection from falling debris. They shall extend at least six feet away from the structure and be at least two feet wider than the entrance and capable of withstanding a loading of 5 lb. /sq. ft.
   C. All other access ways shall be barricaded.
   D. Walkways or ladders shall be used to provide safe access to any wall or scaffold.
   E. Safe, temporary access ways to all work areas shall be provided where permanent access ways are removed.

9.0 Temporary Bracing
   A. Demolition work within structures, which have been damaged by fire, flood, explosion, or other damage, shall have the walls and floor braced.
   B. Walls left standing must be capable of self-support or shall be shored. Wind loading shall be factored in as required.
C. No material shall be dropped to any point unless the area has been adequately protected.

D. Material chutes shall be designed and constructed of sufficient strength to eliminate failure due to impact or load. Chutes shall be entirely enclosed when the angle to horizontal is greater than 45 degrees.

E. A standard guardrail 42 inches high shall protect chute openings where workers dump materials. Where material is dumped from mechanical equipment or wheelbarrows, a securely attached toe board or bumper, not less than 6 inches high by 4 inches thick shall be provided.

F. Masonry walls or other sections of masonry shall not be allowed to fall upon floors of lower sections in quantities, which exceed the safe capacities of the floors. No cement or masonry walls shall be knocked down onto above ground floors unless they are designed to handle the anticipated impact loading.

G. Skeleton steel shall be dismantled tier by tier and no lower load bearing members cut until upper stories are removed. Steel left in place shall be self-supporting or shall be adequately braced. Openings cut into floors for the disposal of materials shall be no larger than 25% of the total floor area unless lateral supports of the removed floor area remain in place. Floors weakened or otherwise made unsafe by demolition work shall be shored or braced to safely carry imposed loads during the demolition process.

H. Structural supports and beams left up shall be cleared of loose materials as demolition progresses downward.

10.0 Equipment

A. Demolition equipment shall meet all appropriate crane and heavy equipment safety requirements.

B. The demolition ball shall not exceed 50% of the cranes rated capacity at specified boom length/angle and shall not exceed 25% of the line breaking strength.

C. The ball shall be connected by a swivel-type attachment.

11.0 Housekeeping

A. Debris and trash shall be continually wetted to keep dust levels down.

B. All stairs, passageways, ladders and other designated means of access to the structure or building shall be periodically inspected and kept in a clean and safe condition.

C. Trash and debris shall be removed daily so as to minimize fire hazards and maximize safe access to and egress from the work area.

D. Waste material shall not be allowed to accumulate and shall be disposed of on a regular basis. All hazardous materials shall be separated and disposed of per local environmental regulations.

12.0 Blasting

A. Demolition by blasting required specific written permission from COMPANY.

B. Blasting must be conducted by certified blasters in compliance with all safety standards for the type of blasting performed.
1.0 Purpose
This section addresses some specific safety rules for the different craft disciplines and is to be used at the project SH&E new hire orientation and should be used at the Weekly Safety Tool Box Meetings when retraining is necessary.

2.0 Welding and Cutting
A. Welding current return circuits or grounds must carry their current without hot or sparking contacts 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 any of the following materials:
   1. Acetylene, fuel gas, oxygen or other compressed gas cylinders.
   2. Tanks or containers used for gasoline, oil or other flammable or combustible material.
   3. Pipes carrying compressed air, steam, gases or flammable or combustible liquids.
   5. Chains, wire ropes, metal hand railings or ladders, machines, shafts, bearings, motors, etc.
B. Fire resistant screens to protect other employees from flash burns and from flying objects shall shield arc welding and cutting operations. Fire blankets shall be used to protect cable trays, conduits, employees, equipment, piping, and material when welding and/or cutting overhead.
C. A fire-resistant bucket or container shall be provided for disposal of electrode studs.

D. The ground for the welding circuit shall be mechanically strong and electrically adequate for the service required.

E. Where it is necessary to couple or uncouple several lengths of cable for use as a welding circuit, insulated cable connectors or boots over the connections shall be used on both the ground line and the electrode holder line. Soldered and taped splices may be used for permanent connections.

F. An electrode holder of adequate rated current capacity, insulated to protect the operator against possible shock and to prevent a short or flash when laid on grounded material, shall be used.

G. Flashback arrestors shall be used for oxygen fuel gas welding and cutting operations and these devices shall be used and maintained in accordance with the manufacturer's instructions.

H. Personnel Protection.
   1. All safety procedures described in the SH&E Manual, specific projects safety procedures and the Employee Safety Handbook will be followed as it pertains to welding and cutting operations.
   2. When arc welding is performed near other employees, protection from the arc rays by screens or adequate individual eye protection shall be provided and worn.
   3. Protective clothing and safety equipment for any welding operation will depend on the size, nature, and location of the work.
   4. Mandatory and suggested protective measures for welders and helpers are:
      a. Proper and approved eye and head protection shall be worn.
      b. Combination of ANSI approved hard hats-welding helmets are required in special situations where welders may be exposed to hazards of falling objects from overhead.
      c. Heavy work may require flame-resistant gauntlet gloves, fire-resistant leggings, high boots, and flame-resistant aprons.
      d. For overhead work fire-resistant caps and shoulder covers shall be worn. Leather caps and ear protection will prevent head and ear burns.
      e. Clothing shall be free of oil, grease and other flammable material. Collars and cuffs will be buttoned and pant leg cuffs shall be turned up inside the pant legs. Pockets shall be covered with flaps and buttoned or eliminated from the front of vests, shirts, and aprons.
   5. Workers engaged on oxyacetylene welding or cutting must wear a welding hood or safety goggles equipped with suitable filter lenses.
   6. Workers engaged in electric arc welding must wear welding hood equipped with suitable filter lenses.
   7. All employees whose eyes are exposed to flying objects, resulting from chipping grinding or similar operations, shall wear approved eye protection such as face shield or goggles. Employees doing arc welding shall wear approved eye protection under the welding hood for protection when the welding hood is raised.

I. No welding, burning, or open flame work shall be performed on any staging suspended by means of fiber or synthetic rope.

J. An approved and proper fire extinguisher shall be placed near all welding and cutting operations. In some locations a fire watch may have to be employed to stand by with an extinguisher.
K. Approved and adequate ventilation meeting applicable regulations shall be provided whenever welding, cutting, or heating is performed in a confined space.

L. Craft Superintendents shall thoroughly instruct employees in the safe use of fuel gas, as follows:

1. Before a regulator is attached to a cylinder valve, the valve shall be opened slightly and closed immediately. (This action is termed as “cracking” and is intended to clear the valve of dust or dirt that might otherwise enter the regulator.) The person cracking the valve shall stand behind or to one side of the outlet, not in front of it. The valve of a fuel gas cylinder shall not be cracked where gas would reach welding work, sparks, flames, or other sources of ignition.

2. The cylinder valve shall always be opened slowly to prevent damage to the regulator. For quick closing, valves on fuel gas cylinders shall not be opened more than 1-½ turns. When a special wrench is required, it shall be left in position on the stem of the valve while the cylinder is in use so that the fuel gas flow can be shut off quickly in case of an emergency. In the case of a manifold or coupled cylinders at least one wrench shall be placed on top of a fuel gas cylinder, when in use, for quick closing of the valve in case of an emergency.

3. Fuel gas shall not be used from cylinders through torches or other devices, which are equipped with shutoff valves without reducing the pressure through a suitable regulator, attached to the cylinder valve or manifold.

4. Before a regulator is removed from a cylinder valve, the cylinder valve shall always be closed and the gas released from the regulator.

5. If, when the valve on a fuel gas cylinder is opened, there is found to be a leak around the valve stem, the valve shall be closed, and the gland nut tightened. If this action does not stop the leak, use of the cylinder shall be discontinued, and it shall be properly tagged and removed from the work area.

6. In the event that gas should leak from the cylinder valve, rather than from the valve stem, and the gas cannot be shut off, the cylinder shall be properly tagged and removed from the work area. If the regulator attached to a cylinder valve will effectively stop a leak through the valve seat, the cylinder need not be removed from the work area.

7. If the leak should develop at the fuse plug or other safety device, the cylinder shall be removed from the work area.

8. A hammer or wrench shall not be used to open cylinder valves, if valves cannot be opened by hand, the supplier shall be notified.

9. Oxygen reacts violently in the presence of oil or grease. Oxygen fittings, cylinders, caps, couplings, regulators, hose, and other apparatus shall be kept away from and free of oil and grease. Do not handle oxygen cylinders while wearing oily gloves.

10. Oxygen shall not be used as a substitute for compressed air.

3.0 Carpenters

A. Clean-up

A clean and neat work area is extremely important in all phases of carpentry. Portable equipment, lumber scrap, nails and spikes, paints, and tools can create tripping, puncture and fire hazards unless properly handled and stored.
B. **Gloves**  
When handling rough and unfinished lumber or other building materials, wear suitable gloves to avoid hand and finger injuries. Do not wear gloves while using power machinery.

C. **Handling Material**  
Any board or other material being handled must have a person at each end if it is sufficiently long, heavy, or awkward enough to be hazardous.

D. **Handrails**  
Handrails will be installed at all scaffolds, elevated platforms, ramps and stairways and the following will be followed:

1. Platform and scaffold handrails shall be a minimum of 42 inches above the walk area; a midrail shall be installed midway between the top rail and the walking surface.
2. Ramps and stairways shall have a handrail a minimum of 36 inches above the walk area or nose of tread.
3. All handrails must be securely braced and all cross rails are to be placed on the side toward walkway or platform.
4. Toeboards shall be at least 4 inches high.

E. **Slippery Conditions**  
Workers shall not be permitted on scaffolds, elevated platforms, or walkways if the surface is covered with any substance that presents a slipping hazard.

F. **Ladders**

1. Ladders must meet accepted standards.
2. Ladders must be tied off or otherwise secured against slippage or falling.
3. When climbing or descending a ladder, always face the ladder and maintain a secure handhold.
4. Do not attempt to carry heavy or awkward material up or down ladders. Use pulleys, hoists, manila, or poly ropes as necessary.

G. **Nails**  
Be constantly alert for projecting nails, screws or other metal objects protruding out of lumber or other building materials and immediately remove or bend them over.

H. **Operators**  
Do not talk to operator of power driven woodworking machines while machines are in use.

I. **Portable Electrical Tools**  
Disconnect all portable electric equipment when not in use and do not leave them lying around where they may cause injury. All portable electric tools must be adequately grounded or double insulated.

J. **Power Saws And Grinders**

1. Use extreme caution when operating power saws and grinders. If the equipment is unfamiliar to you, ask for help.
2. Do not operate any power equipment unless all guards are installed and in place.
3. When using power driven ripsaw, stand to the side of the material being cut. A push stick shall be used to feed material into the saw.
4. Always stand by high speed rotating equipment until rotation completely ceases.
K. **Safety Harnesses And Shock Absorbent Lanyards**
When carpentry work must be carried out where a falling hazard is present, safety harnesses and secured safety lanyards, safety nets, protective railing and other protective devices will be used as appropriate.

L. **Eye Protection**
All grinding and power sawing operations are considered eye hazardous tasks and safety glasses or goggle must be worn.

M. **Scaffolds**
1. Scaffolds must be built according to or meet accepted standards.
2. Scaffold planks will be at least 2" x 10" scaffold rated planks and must be secured against slipping, separating, or tipping. At least two planks wide will be used.
3. Whenever required, toeboards will be installed on all platforms and scaffolds.

N. **Storage**
Use extreme caution in stacking or storing lumber and other building materials and equipment. The following is required:
1. Use sturdy, adequate footings.
2. Keep stacks even and not high enough to present a tipping or falling hazard.
3. Store away from hazardous materials and areas.
4. Leave adequate workspace between piles.

O. **Tools**
Do not use defective tools and only use tools for their intended purpose; i.e., screwdrivers are not intended for use as a chisel or a pry tool.

4.0 **Cement and Concrete**

A. **Bathing**
Take a bath or shower thoroughly at the end of each day to prevent cement burns.

B. **Cement Dust**
When cement dust gets into the eyes **DO NOT RUB THEM.** Wash them immediately in boric acid solution or saline solution or an accepted eyewash or water, then report to first aid.

C. **Buckets And Loads**
Keep clear of moving buckets and loads, completely close concrete bucket doors before returning for refills and the riding of buckets, loads, or hooks is **STRICTLY FORBIDDEN.**

D. **Clean Up**
Keep buildings and yard areas clean. Dispose of empty cement bags immediately.

E. **Clothing**
When working with cement or in concrete wear durable, close fitting clothing and appropriate work gloves. Do not wear clothing soiled with cement, as this will irritate the skin. Whenever clothes or boots become wet with cement, change clothes as soon as possible and flush clothes, boots and skin with water to remove cement.

F. **Concrete Placement**
Effective communication and coordination are an absolute necessity among crewmembers of concrete pouring crews. Be alert to all hazards and warn co-workers of an approaching bucket and other hazards.

G. **Forms**
Never throw or drop material or debris over the side of forms or from elevated areas
without posting a worker to warn other employees of the danger or setting up barricades and posting warning signs.

H. **Hoses And Lines**
   Secure all hose connections by wire or chain. Use care in pulling on a hose to prevent disconnection of hose under pressure. Do not run hose or lines across an access or walkway so as to obstruct clearance and cause extreme hazard. Whenever possible, run hose and vibrator lines under ladders and walkways and never over handrails.

I. **Safety Glasses**
   Approved safety glasses shall be worn when working with cement and/or concrete.

J. **Safety Goggles**
   Approved safety goggles and/or blasting helmets shall be worn when engaged in sandblasting, chipping, grinding, cutting, or working with cement dust.

K. **Respirators**
   Approved respirators shall be worn with approved filters when working with cement dust. Checks filters regularly and change as necessary.

L. **Sand Blasting**
   Approved airline hood and protective clothing shall be worn whenever sandblasting operations are being performed. Other personnel in the area need to be protected from dust particles.

M. **Skin Protection**
   Protective cream or oil should be applied to hands, face and other exposed skin areas prior to handling cement and/or working with concrete.

N. **Storage**
   Use extreme caution in stacking or storing cement bags making sure the pallets or footings are adequate and the piles are neat and not too high so as to present a falling or tripping hazard.

O. **Vibrators**
   Do not attempt to repair vibrators; Send them to the repair shops.

5.0 **Electricians**

A. **Artificial Respiration**
   Due to the constant danger or electrical shock, all electricians should be familiar with approved artificial respiration techniques.

B. **Codes**
   Selection of materials and methods of installation and maintenance shall follow standards prescribed by the National Electrical Code and by applicable local, state, and federal laws. Know the electrical code.

C. **De-energizing**
   Use proper clearance and grounding procedures. When possible, all electrical circuits and equipment will be de-energized before maintenance or repair work is started.

D. **Flammables**
   Volatile liquids and cleaning solvents such as gasoline, naphtha, and oil shall be kept in approved "Safety Cans" bearing the label of the Underwriter’s Laboratories. Use extreme care when handling these liquids and do not use where a fire hazard exists.

E. **Fuses**
   Never use a fuse heavier than the capacity of the circuit. Only use standard fuse pullers when removing fuses.
F. Gloves
Leather gloves should be worn while handling materials such as wire and while doing cold line work. Hot line work requires approved rubber gloves and other protective equipment.

G. Hard Hats
Never wear hard hats or caps made of metal or having metal parts. Only approved hard hats for electricians shall be worn.

H. Hot Work
1. No electrical work should be done "hot" if it can be done "cold".
2. Hot line work will be done only under specific authorization and direction from your craft supervisor.
3. Approved rubber protection and "hotsticks" will be used as specified by your craft supervisor.

I. Identification
Wiring circuits shall be identified with clear markings (at control panels, switches, fuse boxes and plugs) to indicate the type of service they provide or control.

J. Inspections
Inspect all temporary and permanent electrical equipment, lighting, power lines, and circuitry periodically for frayed, worn, weathered, or bare spots.

K. Protect Others
Protect those who will operate or utilize the equipment or electrical facilities you install. Never allow inadequate insulation, insufficient circuit protection, incorrect grounding or polarity, faulty connections or other unsafe conditions, which might later result in shock or fire.

L. Safety Harness
When working above the ground or water where a falling hazard is present, safety harnesses and lanyards will be used.

M. Eye Protection
Appropriate face shields and safety glasses or goggles must be worn whenever using hot metals, corrosive liquids (such as battery acid) or working on energized switchboards, welding, grinding, chipping, soldering or burning.

N. Safety Lanyards
Fall Protection lanyards worn around electrically energized units or areas will be of nonconductive or insulated materials.

O. Switches
Before closing a switch, have full knowledge of the circuit and why the switch was opened. Make sure no one is in a position to be injured.

P. Tags And Locks
Remove fuses, lock when possible, and use danger tags on boxed or switches before working on any motor or circuit. When work is completed, remove tag and lock and replace all protective covers and guards.

Q. Unauthorized Persons
Do not allow unauthorized persons to work on or tamper with electrical equipment, wiring, or other apparatus.

6.0 Survey Crews
A. Electrical Hazards
Be alert for and avoid overhead power lines when carrying or using leveling or grade rods.

B. **Mobile Equipment**
   Always watch for moving equipment when working in the construction areas.

C. **Signs / Flag Person**
   When working on or near access or haul roads, public roads, or streets post appropriate warning signs and devices. Flag persons should be used whenever heavy traffic or hazardous conditions exist.

D. **Transportation**
   Only ride on equipment or vehicles equipped with proper seats and designed for transporting personnel. Do not ride on the sides of trucks or other equipment.

E. **Vehicles**
   Always park vehicles in a location, which does not present a hazard to other vehicles or equipment. If this is not possible, be sure to place appropriate warning devices and if appropriate, use a flag person. Chock wheels of vehicle when parking on an incline.

F. **Vests**
   All survey and field engineering personnel shall wear high visibility (orange or red) vests. This will also be mandatory during night operations around heavy equipment.

7.0 **Scrapers, Dozers, Tractors and Other Heavy Equipment Operators**

A. **Clothing**
   Operators must be careful not to wear loose or torn clothing, which can get caught in tracks or other moving parts of the machinery.

B. **Coasting**
   Never coast with any type of equipment. Always keep the power on and the equipment in gear.

C. **Dozer Blade**
   Do not use the dozer blade as a brake when coming down a slope or hill, except in case of brake failure.

D. **Hydraulic Or Winch Driven Equipment**
   Dozer and grader blades, ripper teeth, scraper gates and beds and other similar equipment must always be lowered to the ground or blocked when equipment stops or is secured for the shift.

E. **Inclined Surface**
   Never leave equipment on an inclined surface or on loose material with the motor idling as the vibration may put the machine in motion.

F. **Riders**
   Operators will not allow riders to ride draw bar, buckets, running boards, fenders, clutch housing, boom, winch or any other area on mobile equipment not specifically designed to transport personnel. Only specifically authorized persons will be allowed to ride seats, if equipment is so equipped.

G. **Running Wire**
   Inspect all cables periodically for wear. When spooling or reeling cable, never guide moving cable with the hands.

H. **Safety Equipment**
   Check and insure all guards, canopies, safety bars and other safety equipment are installed and in good order prior to operating equipment.
I. **Traveling**  
When moving equipment, keep dozer blade and scraper bowl close to the ground but high enough to avoid rocks and other obstacles.

J. **Winches**  
Inspect winch brakes, cables, and pins periodically. When indicated, have repairs made before using.

### 8.0 Equipment and Vehicle Operators

A. **Air And Hose Couplings**  
Periodically check air hose and couplings and compressor hoses for worn or damaged parts. Do not crimp air hose to disconnect couplings or shut off air at the valve.

B. **Backing Up**  
Never start or back up equipment or vehicles until you are sure the way is clear. If necessary, have another person guide you safely. Back up alarms must be working and audible over the surrounding noise.

C. **Boots And Shoes**  
Wear sturdy work shoes or boots. Hobnailed boots or shoes should not be worn due to the slipping and snagging hazard they present.

D. **Cranking**  
When crank starting a motor, place thumbs next to the index fingers and not around the crank handle. Pull up on the crank—never push down. This method avoids injury in case of engine kickback.

E. **Ear Protection**  
Earplugs or other approved ear protection shall be worn when necessary.

F. **Emergency Vehicles**  
Give ambulances, fire-fighting equipment, and other vehicles the right-of-way during emergencies and lend assistance if requested.

G. **Fueling And Repair**  
No fueling or repair shall be made to equipment while it is in operation. The motor shall be turned off and the bucket, blade, gate or boom shall he lowered to the ground or blocks.

H. **Gasoline**  
Gasoline and other combustible liquids shall not be carried in or on vehicles other than in permanent gas tanks or in approved safety cans.

I. **Gloves**  
Heavy gloves shall be worn when handling wire rope and other rough materials.

J. **Housekeeping**  
Operators shall keep deck plates, steps, rung and hand rails on equipment free of grease, oil, and mud.

K. **Inspections**  
Inspect the unit to which you are assigned to make sure it is in safe operating condition. These inspections shall be made at least at the start of each shift and defects or discrepancies shall be reported to the supervisor immediately. Equipment forms will be available to record this data. Equipment and vehicles shall not be used until defects or discrepancies are repaired unless they do not affect the safe operation of the equipment or vehicle.
L. **Jumping**  
Jumping on or off equipment is prohibited. When climbing on or off equipment or vehicles, face the unit and use secure hand and foot holds to prevent slips and falls. Always look where you are stepping.

M. **Know Your Equipment Or Vehicle**  
It is your responsibility to be thoroughly familiar with all features plates and manuals and if you are in doubt as to correct operating techniques or safety features, ask your supervisor at once.

N. **Laws And Regulations**  
Learn and obey all local, state, and federal laws.

O. **Moving Equipment**  
Do not attempt to get off or on any equipment or vehicle while it is in motion.

P. **Overloading**  
Avoid overloading vehicle beds and equipment buckets or beds. Excessive material can damage the unit and falling material can cause serious injury.

Q. **P.**  
Equipment and vehicles shall be parked off roads and highways whenever possible. When it is not possible, red lights or flares shall mark the unit at night and red flag during the day. Wheels shall be blocked or chocked.

R. **Passing**  
Do not pass when visibility is restricted for any reason.

S. **Pedestrians**  
Be constantly alert for pedestrians. Remember they have the right-of-way.

T. **Power Lines**  
When operating high trucks, cranes, shovels, or other units, always use caution around power lines and maintain a safe clearance of 10 feet or more depending upon the voltage.

U. **Qualifications**  
Only fully qualified and authorized personnel shall operate construction equipment or vehicles.

V. **Riders**  
Only authorized persons will be permitted to ride in equipment or vehicles.

W. **Seat Belts**  
If unit is equipped with seat belts, operator and passengers must keep seat belts fastened at all times during operations.

X. **Securing Equipment And Vehicles**  
1. All units shall be secured so that they cannot be started or moved by any unauthorized person during off-work hours.
2. All mobile units shall be secured in some way whereby they cannot move freely after they are parked.
3. The key should be removed after securing equipment or vehicle and turned over to an authorized supervisor.

Y. **Shoulders And Ditches**  
Do not operate too close to the edge of shoulders, cuts or fills and ditches.

Z. **Slow Down**  
Slow down and use caution at blind intersections and crossings when visibility is limited or when passing work crews.
AA. Smoking
Smoking will not be allowed during refueling or servicing operations. Do not throw lighted material from vehicles or equipment.

BB. Speeding
Speeding is dangerous and is strictly prohibited.

CC. Thumbs Up
Keep thumbs up when driving. Do not grasp the steering wheel with thumbs inside the spokes.

DD. Visibility
Make sure all windshields; side and rear windows, mirrors and lights are clean before moving the unit.

EE. Warning Signs And Traffic Signals
Be alert for strictly obey all directional and warning signs and signals.

FF. Trucks, Pickups And Other Vehicle Operators
1. Driver’s License: Always carry your driver’s license with you when operating a vehicle and make sure it is current.
2. Heavy Rock and Other Material: Do not remain in an open cab truck while being loaded with heavy rock or other material presenting a falling hazard. Dismount and move to a safe distance and observe the loading.
3. Hooks: Hooks or calipers on the "A" frame of trucks should be securely fastened to prevent swinging when not in use. Stand clear of the "A" frame.
4. Loading: Materials and equipment shall be properly loaded and secured to prevent shifting loads or loss of material during transit.
5. Safety Chains: Safety chains of sufficient size and strength shall be installed on all trailers being towed.
7. Stopping: Do not stop vehicles in the middle of the road to talk to occupants in another vehicle. Always pull to the side or off the road to maintain a clear, safe road.
8. Turn signals: Always use turn signals, emergency, and other signals as appropriate when turning, stopping, passing, or performing other vehicle operations.
9. Vehicle Maintenance: It is the driver’s responsibility to see that his/her vehicle is in good mechanical condition before and during operation. Special emphasis will be placed on ensuring the brakes; lights, horn, windshield wiper, tires, and steering assembly are in good working order. Defects must be reported and corrected immediately.

GG. Hoist Operators
1. Communications: Learn and abide by the approved signal system. Have proper communications with all floors as necessary and the ground before operating hoist.
2. Hoist Platform: Never move the hoist platform unless you understand the proper signal and you are sure the way is clear.
3. Riders: Do not haul riders on material hoist and do not haul riders and material together on a personnel hoist.
9.0 Rigging

A. The following is the minimum safety requirements for rigging:
   1. The safe rigging practices listed in the Riggers Bible shall be followed.
   2. All rigging equipment for material handling must be inspected prior to use and at
      frequent intervals and shall be removed from service if defective.
   3. Rigging equipment shall not be loaded in excess of its recommended safe
      working load.
   4. Rigging equipment not in use shall be stored in a safe place so as not to present a
      hazard to employees.
   5. Chains, Shackles and Hooks.
      a. The manufacturers recommended safe working loads for chains, shackles
         and hooks shall not be exceeded. If this information is not available, the
         shackle or hook shall be tested by a qualified person and approved before
         putting into use.
      b. Job or shop hooks and links or makeshift fasteners, formed from bolts,
         rebar, rods, etc., are prohibited.

B. Wire Rope.
   1. All wire rope must be inspected before being used. Any rope showing excessive
      wear, corrosion, rust, or breakage of ten percent or more of the number of wires
      in any length of eight diameters shall not be used.
   2. Kinking and untwisting of the wire rope shall be carefully avoided. At no time
      shall a load be applied to a kinked rope.
   3. Wire ropes shall be lubricated with the lubricant recommended by the wire rope
      manufacturer.
   4. Wherever necessary, wire ropes shall be guarded to prevent persons or materials
      coming in contact with them.
   5. Friction of wire ropes with other objects causing chaffing or breaking of wires
      shall be prevented.
   6. Protruding ends of strands in splices on slings and bridles shall be covered or
      blunted.
   7. The U-bolt of all wire rope clips must be applied on the dead end of the rope.
   8. The recommended number and spacing of wire clips is illustrated in the
      following table:

<table>
<thead>
<tr>
<th>Improved Plow Steel, Rope Diameter Inches</th>
<th>Number of Clips</th>
<th>Min. Spacing (Inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Drop Forged</td>
<td>Other Material</td>
</tr>
<tr>
<td>½</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5/8</td>
<td>3</td>
<td>4</td>
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<tr>
<td>¾</td>
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<td>5</td>
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<tr>
<td>7/8</td>
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<td>1</td>
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</tr>
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<td>7</td>
</tr>
<tr>
<td>1-1/2</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>
9. Examples of good and bad rigging practices can be found in the Corporate SH&E Manual in Section 30 Pages 8 and 9. Other rigging examples can be found in the Safety and Health Employee Handbook on pages 19 through 23.

10. Wire rope with wire clips is prohibited for lifting loads.

C. Chain Falls and Come-a-Longs
   1. Chain falls and come-a-ongs or pull-lifts shall be clearly marked to show the capacity and the capacity shall not be exceeded.

   2. Chain falls shall be regularly inspected to ensure that they are safe, particular attention being given to the lift chain, pinion, sheaves and hooks for distortion and wear. Pull-lifts shall be regularly inspected to ensure that they are safe, particular attention being given to the ratchet, pawl, chain and hooks for distortion and wear.

   3. Straps, shackles and the beam or overhead structure to which a chain fall or pull-lift is secured shall be of adequate strength to support the weight of load plus gear.

   4. Both hooks on the chain fall or come-a-long must be equipped with a safety latch.

   5. Chain falls and come-a-long hoist load chains are not to be wrapped around piping or other loads and hooked back to itself.

   6. Scaffolding shall not be used as a point of attachment for lifting devices such as tackles, chain falls, and pull-lifts unless the scaffolding is specifically designed for that purpose.

10.0 Ironworkers
A. Connectors
   1. Never cut loose a connecting piece of steel until it has been properly bolted or secured at both ends.

   2. Must be tied off 100% of the time in excess of 6 feet.

   3. Never ride loads or crane headache ball.

   4. When setting steel trusses, they shall be securely tied or cross-braced until permanent braces are in place.

   5. Tag line(s) shall be attached to loads.

B. Fire Precautions
Riveters and rivet heaters shall take necessary precautions to prevent fires. Each rivet heater shall have a pail of water or suitable fire extinguisher available for emergency use in quenching fires.

C. Housekeeping
   1. Areas where welding and cutting operations are performed shall be kept clean and all accumulations of trash, rags, and other flammable/combustible materials shall be removed. Consideration must be given to the distance that sparks and slag can travel.

   2. All scaffold platforms shall be kept clear of bolts, nuts, pieces of angle iron and other materials. This material must be kept in secured containers so that they will not present a tripping or falling hazard.
3. Structural steel shall be piled safely prior to use so it will not fall and injure someone.
4. Piled material shall not be stored along structures so as to obstruct the vision of hoist and crane operators or in such a manner as to create a falling hazard.
5. Tools and other equipment shall be kept in their proper place.
6. Bolts, nuts, and rivets shall be collected daily and placed in kegs.

D. **Personnel Hoists**
   Only approved personnel hoists will be used to hoist employees. Workers will not be hoisted in tackle and runner lines, on material loads or on hooks.

E. **Power Lines And Sources**
   Extreme care must be taken when working near power lines or other electrical power sources.

F. **Reinforcing Rods**
   Reinforcing rods must be bent over or covered with rebar caps.

G. **Safety Harnesses And Lifelines**
   All projects are a 100% tie off including connectors. Safety harnesses and lanyards shall be used by all workers engaged in securing or shifting thrust outs, inspecting or working on overhead machinery or other high rigging and working on steeply pitched roof. They shall also be used by all workers exposed to the hazard of falling, steel frame construction when nets are not used or from swing stage scaffolds and boatswain’s chairs.

H. **Scaffolds**
   Adequate scaffolds of a safe and practical type shall be provided for all work, which cannot be performed safely from a permanent or solid structure.

I. **Footwear**
   Durable heavy work boots/shoes shall be worn on the project and shall be in good condition. Employees are encouraged to purchase and wear boots/shoes with steel toes, sole penetration protection, and ankle support.

J. **Temporary Floors**
   Temporary flooring shall be provided not less than two tiers below the tier of beams on which bolting, riveting, welding or painting is being done whenever nets or 100% tie offs are not being employed.

K. **Throwing Material**
   Throwing or dropping bolts, washers, pins, tools etc., is not permitted. Use bolt baskets, kegs, or other approved containers.

L. **Trusses**
   All trusses must be braced laterally. The first truss shall be guyed and succeeding trusses shall be braced to prevent overturning.

M. **Safety Nets**
   Safety nets are to be inspected at the beginning of each shift for damage from abrasion, chemical or heat and repairs shall be made before work above the net is to begin or resume. Also make sure the forged steel safety hooks or shackles are properly secured to the supports.

11.0 **Trenching And Excavations**
(Refer to the SH&E Manual (Section 23) for specific requirements on Excavations)

A. General Requirements
   1. Prior to opening a trench or excavation, an effort shall be made to determine
whether underground installations; i.e., sewer, water, fuel, electric lines, etc., will be encountered and if so, where such underground installations are located. Utility companies shall be contacted and advised of proposed work prior to the start of actual trench or excavation. When the trench or excavation approaches the estimated location of such installation, carefully probing or hand digging shall determine the exact location, and when it is uncovered, proper supports shall be provided for the existing installation.

2. Necessary barricades, posting and lighting shall be provided for the protection of the public and employees at the trench or excavation.

3. In locations where oxygen deficiency or gaseous conditions are possible, air in the trench or excavation shall be tested. Controls shall be established to assure acceptable atmospheric conditions. When flammable gases are present, adequate ventilation shall be provided and sources of ignition shall be eliminated. Attended emergency rescue equipment, such as breathing apparatus, a safety harness and line, basket stretcher, etc., shall be readily available where adverse atmospheric conditions may exist or develop in a trench or excavation. A log shall be maintained of all test results.

4. In trenches and excavations in which employees may be required to enter, excavated or other material shall be effectively stored and retained at least 2 feet or more from the edge of the trench or excavation.

5. As an alternative to the clearance prescribed in paragraph 4, effective barriers or other effective retaining devices may be used in order to prevent excavated or other materials from falling into the trench or excavation.

6. Additional precautions by way of shoring and bracing shall be taken to prevent slides or cave-ins when trenches or excavations are made in locations adjacent to backfilled excavations or where excavations are subjected to vibrations from railroad or highway traffic, the operation of equipment/machinery, or any other source.

7. When personnel are required to work in trenches or excavated areas, all slopes shall be excavated to at least the angle of repose or otherwise safely supported to prevent cave-ins.

8. The determination of the angle of repose and design of the supporting system shall be based on careful evaluation of pertinent factors such as:
   a. Depth of cut.
   b. Possible variation in water content of the material while the excavation is open.
   c. Anticipated changes in materials from exposure to air, sun, water, or freezing.
   d. Loading imposed by structures, equipment, overlying material, or stored material.
   e. Vibration from equipment, blasting, traffic, or other sources.

   (Refer to the SH&E Manual for angles of repose for various soil conditions Section 23 Page 14.)

9. A competent person shall make daily inspections of trenches and excavations. If evidence of possible cave-ins or slides is apparent, all work in the trench or excavation shall cease until the necessary precautions have been taken to safeguard the employees.
10. Walkways, runways, and sidewalks shall be kept clear of excavated material or other obstructions and sidewalks shall not be undermined unless shored to carry a minimum live load of one hundred and twenty-five (125) pounds per square foot.

11. Only experienced crews under the direct supervision of a competent supervisor shall perform scaling operations. The scalars shall be provided with scalars lifelines, safety belts, boatswain chair, and/or other safety equipment necessary for their protection.

B. Trenching

1. Banks more than five (5) feet high shall be shored, laid back to a stable slope or other equivalent means of protection shall be provided where employees may be exposed to moving ground or cave-ins. Trenches less than five (5) feet in depth shall also be effectively protected when examination of the ground indicated hazardous ground movement may be expected.

2. Sides of trenches in unstable or soft material, five (5) feet or more in depth, shall be shored, sheeted, braced, sloped, or otherwise supported by means of sufficient strength to protect the employees working within them. See minimum requirements in Section 23 Page 21 of the SH&E Manual.

3. Portable trench boxes or sliding trench shields may be used for the protection of personnel in lieu of a shoring system or sloping. Where such trench boxes or shields are used, they shall be designed, constructed, and maintained in a manner, which will provide protection equal to or greater than the sheeting or shoring required for the trench.

4. Employees shall be safely spaced out in the trench and shall not be permitted in the immediate area of the excavating equipment.

5. When employees are required to be in trenches four (4) feet deep or more, an adequate means of exit, such as a ladder, steps, or ramp shall be provided and located so as to require no more than twenty-five (25) feet of lateral travel.

6. Bracing or shoring of trenches shall be carried along with the excavation.

7. Cross braces or trench jacks shall be placed in true horizontal position, be spaced vertically, and be secured to prevent sliding, falling or kick outs.

8. Backfilling and removal of trench supports shall progress together from the bottom of the trench. Jack or braces shall be released slowly and, in unstable soil, ropes shall be used to pull out the jacks or braces from above after employees have cleared the trench.

C. Excavation

1. The walls and faces of all excavations in which employees are exposed to danger from moving ground shall be guarded by a shoring system, sloping of the ground or some other equivalent means.

2. Sides, slopes, and faces of all excavations shall meet accepted engineering requirements by scaling, benching, barricading, rock bolting, wire meshing or other equally effective means. Special attention shall be given to slopes, which may be adversely affected, by weather or moisture content.

3. Materials used for sheeting, sheet piling, cribbing, bracing, shoring and underpinning shall be in good serviceable condition and timbers shall be sound, free from large or loose knots and of proper dimensions.

4. If it is necessary to place or operate power shovels, derricks, trucks, materials, or
other heavy objects on a level above and near any excavation, the side of the excavation shall be sheet piled, shored, and braced as necessary to resist the extra pressure due to such superimposed loads.

5. Adequate barrier physical protection shall be provided at all remotely located excavations. All wells, pits shafts, etc., shall be barricaded, or covered. Upon completion of exploration and similar operations, temporary wells, pits, shafts, etc., shall be backfilled or covered.

6. Supporting systems; i.e., piling, cribbing, shoring, etc. shall be designed by a qualified person and meet accepted engineering requirements. When tie rods are used to restrain the top of sheeting or other retaining systems, the rods shall be securely anchored well back of the angle of repose. When tight sheeting or sheet piling is used, full loading due to ground water table shall be assumed, unless prevented by weep holes, drains or other means. Additional stringers, ties, and bracing shall be provided to allow for any necessary temporary removal of individual supports. The Project Superintendent must approve any excavation or trench before any digging can be started and appropriate training completed by the assigned Competent Person. The Foreman is required to complete the JSA and conduct the safety meeting covering the JSA prior to the start of work.
# 35.2 - Hazard Communication Program

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### 1.0 Policy

To protect the safety and health of our employees, contractors and subcontractors Preferred Industrial Contractors, Inc., Inc. has developed this Hazard Communication Program.
A. As a company we intend to provide information about chemicals hazards and other hazardous substances, and the control of hazards via our comprehensive Hazard Communication Program which includes container Labeling, Material Safety Data Sheets (MSDS's) and Training.

B. This written Hazard Communication Program applies to all operations, which MAY expose employees to hazardous substances as a result of normal work conditions or as the result of a reasonably foreseeable emergency.

C. This written Hazard Communication Program is available, upon request, to employees, contractors, subcontractors, and clients and/or to appropriate representatives of state and/or federal safety and health agencies.

2.0 Scope
This program is part of the Preferred Industrial Contractors, Inc.’s comprehensive Safety, Health and Environmental Program (SH&E) and shall be applied in conjunction with that overall program.

3.0 Responsibilities
A. The Project Superintendent is responsible for implementing and ensuring compliance with this written Hazard Communication Program. The Hazard Communication Employee Training Program found in SAF-35.2-4 is provided to assist the Project Superintendent in carrying out this responsibility.

B. The Corporate SH&E Department is responsible for assisting in the coordination and administration of the program, in developing and assisting in the presentation of training materials and in providing technical assistance to project management.

C. Each Superintendent/Supervisor shall become familiar with the Hazard Communication Program/Procedures and shall supervise the application of these procedures to tasks for which they are responsible.

4.0 Identification of Hazardous Substances
A. "Hazardous Substances" are materials or mixtures, which are physical hazards or are included on state or federal lists of hazardous substances. (See SAF-35.2-1).

B. "Exposure" is any situation arising from work conditions where an employee MAY ingest, inhale, absorb or otherwise come in contact with a hazardous substance.

C. A list of the hazardous chemicals and the appropriate MSDS's known to be present on the project to which employees may be exposed shall be maintained by the Project Superintendent in the project office and the individual subcontractors in their project office. (The list may be compiled for the workplace as a whole or for individual work areas)

5.0 Container Labeling
A. When hazardous substances are received, the Project Superintendent or his/her designee shall examine the containers to determine if the labels provide the following information:

1. Identity of the hazardous material
2. Identify the name of the material as it appears on the associated MSDS to enable employees to easily locate the relevant MSDS.
3. Appropriate warnings of the physical and health hazards associated with identified hazardous substances.
4. The name and address of the chemical manufacturer or distributor or other person responsible for the hazardous material and from whom more information about the material can be obtained.

B. Existing labels on incoming containers of hazardous chemicals shall not be removed or defaced, unless the container is immediately marked with the required information. If a label is missing from a container, the relevant supervisory personnel will isolate the container to prevent its use and contact the site safety supervisor for the appropriate steps to take to identify the material. Once the material is accurately identified, labels must be obtained and placed on the container prior to its use.

C. Chemicals may be transferred from a bulk container to a portable container for immediate use by a worker during only their shift. When hazardous substances are transferred into portable containers, appropriate labels must be attached to the portable container. The Project Superintendent or his/her designee shall ensure that the portable containers are properly labeled which includes the information listed in #1, #2, and #3 above.

D. Containers without complete labels or with defaced labels will not be used on the project.

E. The Corporate SH&E Department shall review the project labeling procedure at least quarterly and update as required.

F. Pipes and piping systems, engines, fuel tanks, and operating systems in vehicles are not considered containers and therefore are not required to comply with these same labeling requirements. However, employees must be informed and trained about the hazards of the materials used in such systems.

G. Individual stationary containers (e.g., storage tanks) shall have signs, placards, or other appropriate signage attached to them that contain the same information as a
6.0 Hazardous Material Inventory and MSDS

A. The Hazardous Materials Inventory (SAF-35.2-8) is the master list developed for all potentially hazardous materials on site. A Hazardous Material Inventory shall be developed and maintained for all hazardous materials received, stored, or used on site.

1. The Hazardous Material Inventory list shall be updated by the Project Superintendent, site safety supervisor or designee each time a potentially hazardous material is brought onsite, or when through periodic visual inspections a new hazardous material is identified that needs an MSDS.

2. This list serves as an index to the MSDS book and as a tool for updating the training program. The Hazardous Materials Inventory list will contain the following information:
   a. Product name
   b. Manufacturer/supplier
   c. Location stored
   d. Quantity on hand
   e. MSDS received

3. The following list contains examples of the type of hazardous materials typically found on a Construction site:
   Cleaners
   Bonding agents
   Concrete, additives, mixtures
   Compressed air and gases
   Epoxy
   Fuels
   Fiberglass
   Flux Form oil
   Grease and oil
   Grout
   Paint and Primers
   Pipe glue
   Pipe dope
   Pitch (tar)
   Solvents
   Testing solutions
   Thinners
   Welding rods
   Wire pulling compound

4. Chemicals exempted from the Hazardous Materials Inventory list include:
   a. Tobacco products
   b. Wood or wood products and treated wood (e.g., CCA)
   c. Consumer products used in the workplace in the same form and concentration as a product packaged for use by the general public.

B. Material Safety Data Sheets (MSDS)

1. Material Safety Data (MSDS's) are documents, which supply information about a particular hazardous substance or mixture. Manufacturers are required to provide
MSDS's when the hazardous substances are sold to distributors or purchasers.

2. The Project Superintendent, site safety supervisor or designee will be responsible for obtaining and maintaining a master set of MSDS's and other information on all hazardous substances used on site. This information must be readily available in case of an emergency. MSDS’s must also be made available, upon request to employees, their designated representatives, the Assistant Secretary and the Director in accordance with 29 CFR 1910.1020(e).

3. MSDS’s must be made available to all employees for review prior to the start of work. If MSDS’s are not available or new hazardous substance(s) in use do not have MSDS's, Do Not Use the Hazardous Product until MSDS is Available and the Information has been communicated with the Employees!

4. The Project Superintendent and his/her Supervisors shall be alert to other employers (such as subcontractors) whose work on the project may expose employees to additional hazardous substances. When it appears such exposure will occur MSDS's for the substances must be obtained before any work is allowed.

5. When doing renovation or remodeling work, the Project Superintendent, and his/her Supervisors shall be alert to the dangers, which might exist for the employees, and subcontractors who work under or near unlabeled pipes, which contain hazardous substances, and shall take proper precautions.

7.0 Employee Training and Information

A. Prior to starting work, each new employee must attend a SH&E Project Orientation which includes the items listed in the Hazard Communication Program. An interpreter will be furnished for non-English speaking employees. Information may be presented in languages other than English.

B. Onsite personnel are provided with information and training on the Hazard Communication Program. New employees and those changing work assignments are given training as they arrive on site or before commencing the new assignment.

C. Training shall be provided before employees are assigned duties, which may cause exposure to hazardous substances. Training shall also be given when new hazardous substances are introduced into the work area or when an MSDS is changed. In general, this training shall include:

1. The requirements of the Hazard Communication Program
2. Information on which hazardous substances are in the work area, including any physical or health hazards associated with the use of a hazardous substance or mixture being used in the work area.
3. The location and availability of the written hazard communication program, including the required list(s) of hazardous chemicals, and material safety data sheets for the chemicals.
4. The methods and observations that can be used to detect the presence of a hazardous substance in the work place (odor, visual appearance, or monitoring).
5. The physical and health hazards of the chemicals in the work area.
6. The measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work
practices, emergency procedures, and personal protective equipment to be used.

7. The details of the hazard company’s communication program how to read and interpret information on MSDS's and labels and how employees can obtain and use the appropriate hazard information.

8. Proper precautions for handling, including specific procedures the company has implemented to protect workers from exposure such as personal protective equipment and work practices.

9. Proper procedures for reporting of releases or threatened releases of hazardous substances.

10. Emergency procedures for spills, fires, disposal, and first aid.

11. The right of employees or their physicians to receive information on hazardous substances to which they may be exposed.

12. The right against discharge or discrimination due to an employee's exercise of the rights afforded by law.

D. Document the training on the Training Certificate. (See SAF-35.2-6).

E. Additional training shall be provided as needed during the weekly safety and health training (toolbox) meetings in order to emphasize the safe handling, use, and storage of any hazardous substances on the project.

8.0 Non-Routine Task Training

A. When employees are assigned to a non-routine task that may expose them to a hazardous substance for which they have not been trained, they shall be trained in the manner required in this program.

B. Some examples of non-routine tasks are:
   1. Confined space entry.
   2. Tank cleaning.
   3. Painting reactor vessels.
   4. Repair of unlabeled pipes containing hazardous substances.

C. Prior to starting work on any job, each affected employee will be given information about the hazardous chemicals he/she may encounter during such activity. This information will include specific chemical hazards, protective and safety measures the employee will use and steps the project is using to reduce the hazards, including ventilation, respirators, and presence of another employee and emergency procedures.

9.0 Access to Information by Other Employers

A. It is the responsibility of the Project Superintendent to furnish to the facility owner and all other contractors and subcontractors all information about hazardous chemicals associated with our work, including MSDS’s, the labeling system in place, methods of protection to be used and recommend precautions for the their employees.

B. All Subcontractors will be required to submit for review copies of MSDS’s for all hazardous materials to be brought onto site. Subcontracts will also state that the subcontractors are bound by the requirements of the Hazardous Material Communication Program.

C. Contractors and subcontractors will be contacted before work is started to gather and distribute information concerning any chemical hazard that they may use or be exposed to on this project.

D. In work areas where employees must travel between workplaces during a work shift, i.e., their work is carried out at more than one geographical location; the written hazard communication
program may be kept at the primary workplace office trailer. If there is no primary workplace or office trailer, the written program and all documentation must accompany the workers.

E. Copies of the written hazard communication program will be made available, upon request, to employees, their designated representatives, the Assistant Secretary and the Director, in accordance with the requirements of 29 CFR 1910.1020 (e).

10.0 Forms
A. SAF-35.2-1 – List of Potentially Hazardous Substances
B. SAF-35.2-2 - Sample Label
C. SAF-35.2-3 - MSDS Letter Request
D. SAF-35.2-4 - Hazard Communication Employee Training Program
E. SAF-35.2-5 - Terms Commonly Found On the MSDS
F. SAF-35.2-6 - Hazard Communication Training Certificate
G. SAF-35.2-7 - Hazard Communication Program - Cover Sheet
H. SAF-35.2-8 – Chemical Inventory and MSDS Log
The following is a current list of substances typically found on construction projects. This list uses the chemical name referenced on MSDS Sheets.

*List of Potentially Hazardous Substances Which May Be Found on Construction Projects*

- Acetone
- Acetylene
- Acrylate Chemical Grout
- Acrylic Emulsion
- Addiment Ar13
- Aerosol Spray Paint
- Alkaline Cleaner
- Alkyd Gray Primer
- Alkyd Resin-High Gloss Enamel
- Already Pine Cleaner
- Ammonium Hydroxide
- Ammonium Nitrate And Fuel Mixtures
- Ammonium Peroxdisulfate
- Aqueous Acrylic Emulsion
- Arcair Alclean
- Arcopave Mc-30 Cut-Back Asphalt
- A.T. Concentrate Release Compound
- 1012 Black Dry Ink (Toner)
- 3m Brand Fire Barrier Caulk Cf-25
- Bwe 3000 Asbestos Penetrating Encapsulant
- Cast Boosters
- Ceramic Fiber
- Certanium 247 ½ Hardfacing
- Cibro Asphalt Flux
- 38 Clear Finish Gloss & Satin Dull
- Compound Boiler Cleansing Preserving Scale Removing Liquid
- Confilm
- Conspec #21
- Corro-Sheild Aerosol Coating
- Wb-309 Curing Compound
- Dap 2000 Construction Adhesive
- D-Blaze Fire Retardent Solution
- Delcrete
- Diesel Fuel Additive
- Diesel Fuel/Fuel Oil #2
- Dry Block Admix
- Du Pont Delay Electric Detonators
- Dural 104
- Duralcrete Gel
- Effected Enamel High Hiding White
- Electro Clean li 19 Oz Net Wt
- Elfoam (Foamed Polyurethane And Polyisocyanurate)
• #563 Enamel Blend
• Etp Cutting Fluid
• Euco Kurez E-100 And Kurez Dr
• Eucosil
• Everweld
• Freshly Mixed Unhardened Concrete
• Fly Ash
• Fyre Putty
• Galvanized Metal Latex Primer White
• Genon Bc-460a
• #79-10 Gray Nubelar Ad
• Grinding Wheels, Resinoid
• Hea Helti A epoxy Anchor
• Heavy Duty Cleaner No. 211-M5
• Heavy Duty Cleaner No. 150
• Hfrs-2, Rs-2 And Rs-1
• Hornbond
• Hydrochloric Acid
• Hydroguard #160h Mastic
• Hydroguard #80 Primer
• Industrial Finisher
• Lacquer Thinner
• Leaded Gasoline
• Limestone
• Liquid Hardener
• Lyt-All Double Duty Primer White
• Mc-30 Cut Back Asphalt
• Metal Bonds For Diamond Blades & Bits
• Methanol
• Metro Cs Cleaner #35
• Monokote Mkk-4 And Mk-5
• Nbec Nonshrink Grout
• Nitropel, Tnt And Trinitrotoluene
• Oatey Safe - Flo Lead-Free Solder
• Astey #95 Tinning Flux
• Olio, Nomco, Magic And Bufco (Sweeping Compound)
• One-Part Polyurethane
• Ontario Hydro (Fly Ash, Silo Ash And Coal Ash)
• Oxygen
• Palguard Epoxy Coating Clear
• Palguard Epoxy Coating Tint Base
• Panel Lock Constr Adh
• Penetrating Rustic Stain Wood Preservative Base
• Plastocrete 161
• Plastocrete 161 R
• Polyurethane
- Portland Cement
- Portland Cement, Hydraulic Cen
- Premier Etp, Cutting Fluid
- Persto Industrial Liquid Hand Cleaner
- Primacord
- Pro-Hide Plus Alkyd House Paint Pro-White
- Pro-Hide Plus Alkyd Satin Enamel Pro-White
- Pro-Hide Plus Latex Block Filler White
- Pro-Hide Plus Latex House Paint Pro-White
- Pro-Hide Plus Pva Wall Primer White
- Propane
- Psi-301 Butyl Sealant
- 3-Purpose B-I-N Primer Sealer
- Rigid Dark Thread Cutting Oil
- Rx Insulation
- Safety Boosters
- Safety-Kleen 105 Solvent-Ms
- Sealtight Hi Spec Joint Sealing Compound
- Sikament 300
- Slip-On Booster, Sob
- Sodium Nitrate
- Sonneborn Kure-N-Seal 0800
- Sonneborn Sonosil
- Sonneborn Utility (Grout)
- Sonomeric Ct Sealant
- 61 Spar Varnish
- Spectra-Glaze, li Masonry Units
- Standard Blanket (Nf Or Non-Nf)
- Sure-Kleen 600 Detergent (Ma)
- Sure-Kleen No. 101 Lime Solvent
- Tech-Guard General Purpose Aluminum Paint
- Tech-Guard Heavy Duty Coating Pro White
- Tech-Guard Zinc Chromate Primer
- Tonetic Architectural Wood Stain Walnut
- Triethanolamine 85
- Unsaturated Ployester Resin 6390
- Unsaturated Polyester Resin 6339
- Vapex Latex Floor Paint Stone
- Varsol 1
- Vinsol Resin No. 170
- Wood Dust
- Xylene Solvent
Sample Labels

ACETONE
(Dimethyl Ketone, CAS 67-64-1)

DANGER!  EXTREMELY FLAMMABLE

Acute: CAUSES IRRITATION OF EYES, SKIN AND MUCOUS MEMBRANES.
Chronic: EXPOSURE TO LIQUID MAY CAUSE DERMATITIS.

Keep away from heat, sparks and flame. Avoid contact with eyes, skin, and clothing.
Keep container closed. Use with adequate ventilation. Wash thoroughly after handling.

FIRST AID:
IMMEDIATELY CALL POISON CONTROL CENTER OR HOSPITAL EMERGENCY ROOM.

IF CONTACTED: immediately flush eyes with plenty of water for at least 15 minutes. Wash skin with
soap and plenty of water. GET MEDICAL ATTENTION for eyes. Wash clothing before reuse.
IF INHALED: Remove to fresh air. If not breathing, give artificial resuscitation.
IF SWALLOWED: Give water to dilute. CONSULT POISON CONTROL CENTER OR HOSPITAL
EMERGENCY ROOM. Never give anything by mouth to an unconscious or convulsive person.
Preferred Industrial Contractors, Inc.

Address

City and State

Phone Number: (___) - ________________

Date: ________________________________

Manufacturer/Distributor ________________________________

Address ________________________________

City, State ____________________________  Zip Code __________________

Reference: Material Safety Data Sheets (MSDS's)

Dear:

Please send us a Material Safety Data Sheet (MSDS) for the product(s) listed below:

1. __________________________________________

2. __________________________________________

3. __________________________________________

4. __________________________________________

This information is for our Hazard Communication Program as required by State and/or Federal Safety and Health Regulations.

Thank you for your assistance.

Sincerely,

________________________________________

Project Superintendent
Hazard Communication Employee Training Program

Preferred Industrial Contractors, Inc.'s employee training program has been developed on the basis of groups (types) of hazardous substance (s) used and the common hazards associated with them.

1.0 Overview Of The Hazard Communication Regulation

The Hazard Communication Regulation is intended to ensure that both employers and employees are aware of the dangers associated with hazardous substances in their workplaces. The following information is a review of the specific requirements of a hazard communication program, including container labeling, MSDS's, and training.

2.0 Written Hazard Communication Program

A. The Company has a written program that outlines how we will provide information and control the exposure to hazardous substances. This plan is available for review during our training and at the project office for review during all working shifts.

B. Hazardous Substances Used On The Project

On this project, we use a variety of products. Many of these products contain one or more hazardous substances. Let's review the Hazardous Substance Inventory List in your work area.

C. Reading Labels And MSDS's

1. A product label on both the original and secondary containers must be reviewed prior to working with the material. Each label will have two important pieces of information you must be familiar with:
   a. The identity of the Hazardous Substance.
   b. Hazard Warnings.

2. The label on the original container will also state the name and address of the manufacturer.

3. The label should act as a visual reminder of the information we have presented in this training session and of the information found in more detail on the MSDS.

4. It is essential for your safety that you read the Hazard Warning and only use the Hazardous Substance(s) within the guidelines prescribed on the label. Questions concerning the label contact your Supervisor or the Project Superintendent.

D. Material Safety Data Sheets (MSDS's)

The MSDS is the primary means we will use to convey the necessary information about the hazards of the substances we use. The manufacturers and distributors are responsible for providing us with the MSDS. The manufacturer must provide us with adequate information to use the substance safely.

E. Physical And Health Hazards Of The Hazardous Substance (s) Used

1. Employees are to be trained specifically about the hazards of the substances in their work areas. This may be done by specific Hazardous Substance (s) or by categories of hazards, but in any case, the employee is to be aware that information is available on the specific hazards of individual Hazardous Substances through MSDS's.

2. Employees may be trained using the common type or generic chemical group or by reviewing the specific MSDS as long as the training includes the following information:
a. Measures to protect employee from the hazards (such as, work practices, engineering controls, and the use of personal protective equipment).

b. The physical and health hazards of the Hazardous Substance(s).

c. Detection of release of the substance; emergency and first aid procedures.

3.0 Example Of General Hazardous Substance Group Type Training

Product / Chemical Group: Hydrocarbon Solvents.

A. Health Effects  
Effects of Overexposure: High concentrations of solvent vapors are irritating to the eyes, nose, throat and lungs, may cause headaches and dizziness and sleepiness. Even higher levels may cause unconsciousness and may have other brain and central nervous system effects.

B. Prolonged or repeated liquid contact with the skin may cause defatting of the skin, leading to dryness, possible irritation, and dermatitis (reddening and inflamed skin). Each organic solvent's possible long term health effects will vary; however, prolonged solvent exposures are related to possible liver, kidney and central nervous system and brain damage (Note: The Variety of Solvent Types Shall Be Reviewed).

C. Physical Hazards - Hydrocarbon solvents are flammable and combustible and represent fire and explosion hazards if the materials are not handled correctly. Hydrocarbon solvents are generally stable and will not react violently with water. Review the MSDS section on Fire and Explosion Hazard information. Most solvents will vaporize rapidly and become airborne.

4.0 Appropriate Emergency And First Aid Procedures

A. Eye Contact - If splashed into the eyes, flush with water for 15 minutes or until irritation subsides. If irritation continues, call a physician.

B. Skin Contact - In case of skin contact, remove any contaminated clothing and wash skin thoroughly with water and soap.

C. Inhalation - If overcome by vapors, remove from exposure and call a physician immediately. If breathing is irregular or has stopped, start resuscitation.

D. Ingestion - If ingested DO NOT induce vomiting, call emergency medical aid immediately.

5.0 Protection Starts With Knowledge

A. State and Federal laws gives the employee the "Right to Know" about chemical hazards found on the project, But no law will protect the employee, if the employee fails to use the information, the training and the protective systems that the law affords and which the company has put in place the employee is at risk to be injured.

1. Yes, the employee has the "Right to Know" what affects their health on the project, but they also have a responsibility to participate in using what they have learned.

2. Ultimately, the employee is the one who is responsible for protecting themselves. It is imperative that they accept, understand, and use the information provided to them.

3. Active and knowledgeable participation is the best protection against the hazards posed by construction industry chemicals.
B. The Company has the responsibility as a result of these right-to-know laws to ensure that the following actions are taken:
1. Collect and compile all relevant chemical information.
2. Keep chemical exposures within acceptable limits.
3. Recommend safe chemical usage practices.
4. Provide personal protective equipment for the employees.

C. Company information and education efforts are also mandatory. As a result, the Company must schedule training sessions under the right-to-know laws.

D. Teamwork is the key to the development of a safe and healthy work environment. The Company will provide the tools and systems necessary to keep employees safe. The employees need to understand the hazards of the work, utilize the information provided by the Company in a responsible manner which will be a partnership resulting in a safe and healthy place to work. It is to the employee’s Safety and Health to which this Partnership for Protection is dedicated.

6.0 How Toxics Enter The Body

A. Chemicals can get into the body in three ways or routes of entry. The terms used to describe the three routes chemicals may take are Inhalation (breathing), absorption (through the skin), and ingestion (swallowing).

B. Inhalation - This is the most common route of entry. Simply stated, this occurs when you breathe the substance into the body. Chemical dusts as well as chemical vapors, when inhaled, can cause an irritation or injury to the nose, mouth, or lungs.
   1. Some chemical vapors, gases, or solid particulates (dust and fume), when inhaled, can cause lung damage. Once in the lungs, the chemical can enter the bloodstream. Once in the bloodstream, the body's circulatory system can transport the chemical to internal organs.
   2. As a result of inhalation of chemicals, certain "target" organs can be poisoned or the nervous system can be depressed. Breathing highly toxic chemicals can result in paralysis of the breathing center.
   3. If a person can smell a chemical, chances are that it is being inhaled. Unfortunately, not all chemicals can be smelled, nor do they have an odor or distinctive taste.
   4. As a result, not all chemicals warn of their presence. Carbon Monoxide, for example, is one gaseous chemical, which has no odor or taste. It is a silent killer.

C. Absorption - Enters the body through the skin. This is important, Skin Contact with chemicals frequently happens all too often in the construction industry. The skin is normally an excellent barrier for keeping chemical contaminants from entering the body. But if the skin is cut or broken, if the skin's protective oils or cell structure is damaged, or if the chemicals being used are not stopped by healthy skin, then acids, alkalines, solvents or even small amounts of solids can enter the body through this "opening".

D. Ingestion - Swallowing of toxic materials is the least common method of bodily entry. Except in those construction situations where highly toxic substances such as lead, arsenic, or mercury are present, ingestion of chemicals is rare.
   1. In areas where chemicals are present, it is good practice not to eat or smoke. Meals and breaks should be taken in a separate clean area, only AFTER washing the hands and face. (In addition, proper respiratory protection will reduce the potential for ingesting airborne chemicals).
2. If employees snack throughout the day or use tobacco products, they should be especially aware of the potential for ingesting of chemicals.

E. Injection - Substances may enter the body if the skin is penetrated or punctured by contaminated objects. Injection can also occur from contact with releases from pressurized systems such as air or other gases, hydraulic fluids, paint, or other similar systems that if released under pressure could contact and enter the body through the skin. Effects can then occur as the substance is circulated in the blood and deposited in the target organs. Injection of poisons from animals or insects may also be included in this category.

F. To recap, there are three routes chemicals can take to enter your body:
   1. Inhalation (breathing)
   2. Absorption (skin contact)
   3. Ingestion (swallowing)
   4. Injection (punctures, cuts)

7.0 Types Of Exposures

A. Two terms frequently appear on labels, Material Safety Data Sheets (MSDS) and in hazardous chemical training programs. The terms are: "ACUTE" and "CHRONIC". Employees must become familiar with the meaning and usage of these two terms.
   1. Acute - Exposure to a chemical involves a single exposure to a chemical over a short period of time.
      
      Example - A cement mason accidentally pours muriatic acid onto his ungloved hand. Such an exposure to a caustic chemical may produce an acute effect on the hand. The skin may become irritated and red. The acid may chemically burn the skin. However, within a few days, the skin will repair itself and usually there is no long–term impact on the cement mason’s health.

   2. Chronic - Exposure to chemicals involves repeated exposure to chemical over a long period of time.
      
      a. Example - Each day, before finishing the shift, a glazier uses a solvent to removed sealant from his hands and arms. Every day he inhales some solvent vapors, each day some of the solvent is absorbed through his skin.

      b. Such a chronic exposure to a solvent may adversely affect the health of the glazier. The range of injury, called a chronic effect, is varied. The chronic effect can be as simple as a skin irritation, or as serious as damage to organs, mutation or even cancer and death.

B. In summary, employees need to understand the difference between acute (short term) and chronic (long-term) exposures to chemicals. They need to be alert to the acute (immediate) and chronic (delayed) effects chemicals can have on their health.

8.0 How To Control Your Chemical Exposures

A. Considering previous discussions, the subject of chemical hazards may be rather frightening. But, there are ways the employee and the Company can control the employee’s exposure to chemicals in the workplace.

B. Controlling chemical exposures is accomplished in several ways.
   1. Engineering Controls - Engineering controls are the preferred method of controlling chemical exposures. Typically, these take the form of ventilation systems or mechanical
means, which reduce or eliminate the exposure problem. Examples - Exhaust fans, laboratory exhaust hoods, blowers, and/or tank lids.

2. Personal Protective Equipment (PPE) - PPE does not remove the chemical exposure. However, if properly selected for the hazard, properly worn and maintained PPE minimizes your exposure.

*Examples - Chemical resistant gloves, chemical safety goggles, respirators, face shields and/or coveralls.*

3. Administrative Controls - Administrative controls may often be overlooked, but can be a cost efficient and simple chemical control substitution of a nonhazardous (or less hazardous chemical) for the hazardous chemical currently in use.

4. Another example of an administrative control could be a worker rotation schedule, which would reduce the amount of time a worker would spend during a workday in the problem area.

5. Personal Hygiene - Personal hygiene is the simplest control measure. For example, meals and breaks should occur in a separate clean area, only after washing your hands and face.

6. Other examples - Frequent washing of work clothing, insuring that your PPE is clean, and "working clean" (keeping chemicals off your skin and clothing).

9.0 The Material Safety Data Sheets

A. Material Safety Data Sheets or MSDS, if read and followed, are a powerful means of controlling chemical exposures.

B. MSDS are written by chemical manufacturers for the chemicals they produce or import. The purpose of the MSDS is to communicate information on the recommended safe use and handling procedures for that chemical.

C. MSDS may look different, yet the Occupational Safety and Health Administration (OSHA) require that all MSDS must provide certain categories of information about the chemical substance or mixture.

1. Identification (physical and chemical).
2. Hazardous ingredients.
3. Emergency and first aid procedures.
4. Recommended control measures.
5. Physical and health hazards.
6. Safe handling precautions.
7. Date of preparation/revision.
8. Manufacturer's name, address and phone number.

D. The Company is required to assemble and provide unhindered access to a MSDS collection for all of the chemicals found on the project as it relates to the work activity. The location of the MSDS’s must be communicated to the employees. The employees are to read and follow the MSDS recommendations.

E. A typical MSDS is shown on the next page. MSDS’s for the chemicals may look different, but in one way or another, they all should provide the required information. Each employee needs to take a few minutes to become familiar with the MSDS.
Terms Commonly Found on The MSDS

- **Hazardous Materials:** Any substance, which is potentially toxic, incompatible with other substances, corrosive, explosive, flammable (or combustible), poses unusual physical hazards such as radioactivity or extreme cold, under normal use conditions and foreseeable emergencies.

- **Toxicity:** Basic biological property of a chemical and reflects the chemical's inherent capacity to produce injury or adverse effect as a result of exposure or overexposure.

- **Carcinogen:** A chemical capable of causing cancer.

- **Mutagen:** Term applied to a chemical, which can change the genetic material in a parent's reproductive cells. These changes can be passed to their children and children's children.

- **Sensitizer:** A chemical, which upon first exposure causes little or no reaction, but on subsequent exposure(s), may cause a greater response, not necessarily limited to the site of the chemical contact.

- **Sterility:** The inability to reproduce. Some chemicals can cause in male or female reproductive systems, resulting in sterility.

- **Teratogen:** Term applied to a chemical, which upon exposure of the parent causes teratogenic changes (malformations and/or alterations in the appearance or function of the developing baby).

- **Permissible Exposure Limit (PEL):** A legally allowable average concentration of a substance to which a worker can be exposed for an eight hour workday, 40 hours/week, without suffering adverse health effects. A PEL for a chemical substance is set by the Occupational Safety and Health Administration (OSHA). Also see "Threshold Limit Value".

- **Short Term Exposure Limit (STEL):** Refers to the allowable maximum concentration of a substance to which a worker can be exposed for a continuous 15-minute exposure period (maximum of four such periods per day, with at least 60 minutes between exposures).

- **Threshold Limit Value (TLV):** Similar to PEL: a recommended allowable average concentration of a substance to which a worker can be exposed for an eight hour workday, 40 hours/week, without suffering adverse health effects. The TLV for a chemical is set by the American Conference of Governmental Industrial Hygienists (ACGIH), which is an independent, non-governmental organization.

- **Flash Point:** Minimum temperature at which a liquid gives off sufficient vapor to form, with air, an ignitable mixture.

- **Flammable:** A liquid is classified as "flammable" if it has a flash point less than 100 degrees F (38 degrees C).

- **Combustible:** A liquid is classified as "combustible" if it has a flash point equal to/greater than 100 degrees F (38 degrees C).

- **Vapor Pressure:** The pressure exerted by a saturated vapor above its own liquid in a closed container.

- **Vapor Density:** Relative density or weight of a vapor or gas compared to the weight of an equal volume of air. Vapors or gases lighter than air, such as acetylene, have vapor densities less than 1.0 vapors or gases heavier than air, such as propane, have vapor densities greater than 1.0. All vapors and gases mix with air, but the lighter gases and vapors will tend to rise and dissipate (unless confined). Heavier vapors and gases are likely to concentrate in low places and may create fire, explosion, or health hazards.

- **Incompatible:** Incompatible materials are those chemicals, which, if placed in direct contact with each other, could cause a dangerous reaction.
- **Dust**: Solid particles generated by some mechanical process, such as crushing, grinding, blasting or abrasion.
- **Fume**: Fumes are formed by processes such as combustion, sublimation, or condensation and is the term generally applied to the metal oxides of zinc, magnesium, iron, and lead.
- **Vapor**: The gaseous form of a substance (at standard temperature and pressure).

**Remember:**

1. When working with chemicals, keep exposure to minimum. That is, don't breathe the chemical; don't get it on the skin.
2. Know what you are working with, its hazards, and what to do if it gets in your eyes, on your skin or if it catches fire.
3. Clean up all spills and leaks promptly with recommended materials.
4. Read and follow container label precautions.
5. Keep your personal protective equipment (PPE), exposed skin, and work clothing clean.
6. Report chemical problems to your foreman immediately. Take all questions about chemicals to your foreman before starting working with the chemicals.
7. Know where the Material Safety Data Sheet (MSDS) collection and the workplace chemical inventory are kept.
8. Use the MSDS to get more information about the chemicals you work with.
9. Know your site's fire evacuation routes and emergency procedures.
10. Dispose of chemicals properly. Never pour chemicals down a drain or into a sewer.
11. Keep products in their original containers. If you transfer chemicals to other containers, make sure the new container is properly labeled.
12. If you have questions about the chemicals you use, read the MSDS, ask your foreman.
13. Follow the Company's established safety and health practices.
Hazard Communication Training Certificate

I have received Hazard Communication Training as described in the Preferred Industrial Contractors, Inc.’s Hazard Communication Program.

______________________________   ______________________________
Employee Name (Print)               Employee Signature

______________________________   ______________________________
Social Security Number               Date of Training

I hereby certify that the above named employee has been provided with Hazard Communication Training.

______________________________   ______________________________
Project Superintendent Name (Print)   Project Superintendent Signature
Hazard Communication Program

Project Name: _________________________________

Project Number: _________________________________

Project Address: _________________________________

City: _________________________________

State: _________________________________

Zip: _________________________________

Project Telephone Number: _________________________________

Responsible Official: _________________________________

(Print)

Client Name: _________________________________

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PIC  Rev 12/12/11
1.0 Purpose

A. Fatalities and injuries constantly occur among construction workers who, during the course of their jobs, are required to enter confined spaces. In some circumstances, these workers are exposed to multiple hazards, any of which may cause bodily injury, illness, or death. Throughout the construction jobsite, contractors and workers encounter both inherent and induced hazards within confined workspaces.
B. Confined space entry is one of the most potentially hazardous activities that can occur at any project. The risks to employees are great unless proper work practices, procedures, controls, and training are strictly enforced. The following procedures are designed to reduce the possibility of injury when work is performed in or around a confined space.

C. An effective confined space program has two basic goals. The first is to identify and control confined space hazards by using good engineering and work practice controls. The second is to verify the safety of each confined space by an aggressive program of atmospheric testing, monitoring, and inspection. This procedure provides guidance for both permit confined space entry and non-permit space entry as defined by OSHA.

2.0 Applicability
This procedure is applicable to all personnel who perform confined space entry work or act as attendants to confined space entry work. This procedure applies to general industry and construction operations occurring in an owner’s facilities. Preferred Industrial Contractors, Inc. field construction operations, as a matter of policy, will require the following as an adoptable minimum:

A. Isolation of the working environment as defined by Section 35.3.2.
B. Atmosphere testing as defined by SAF-35.3–3.
C. Worksite evaluation, coordination, and information exchange between plant or facility owner and other contractors.
D. Classification of the space based upon the worksite evaluation, atmospheric or physical hazards, and work to be performed in the space.
E. Completion and posting of a confined space entry permit as defined in Section 35.3.2.
F. An attendant as defined in Section .35.3.2.
G. A means of rescue and retrieval as defined by Sections 35.3.2 - Y, Z and AA.
H. Compliance with 29 CFR 1926.1200
I. Contractors and their employees are not allowed entry into a Project Permit Required Confined Space.

3.0 Authority
B. The subject material in this procedure is based on a requirement of federal law and criteria established by the National Institute of Occupational Safety and Health (NIOSH).

4.0 Program Review
A. The EHS Department will revise the program when necessary to correct any deficiencies and/or procedures identified prior to authorizing any subsequent entries.
B. Entry operations will be reviewed whenever there is reason to believe that any measures taken under the program may not protect the employees.
C. Examples of circumstances requiring review of the program include the following:
   1. Any unauthorized entry into a permit space.
   2. The detection of a condition prohibited by the permit.
   3. The occurrence of an injury or near miss during entry.
   4. Notification by an employee of program ineffectiveness.
   5. Changes in applicable regulations or related procedures.
D. Annual Review - The program will be evaluated by the EHS Department at least once a year to ensure that it is effective and that employees who are participating in entry operations are
protected from confined space hazards. The annual evaluation will consist of a review of regulations, procedure content, and canceled permits. Canceled permits must be maintained for a period of 1 year.

5.0 References
A. 29 CFR 1910.146, “Permit-required Confined Spaces”
B. 29 CFR 1926.1200 “Confined Spaces in Construction”

6.0 Definitions
A. **Alternate Entry Confined Space** - A confined space, initially classified as a permit-required confined space that only has an atmosphere hazard that can be completely controlled through ventilation.
B. **Attendant** - At least one employee, trained to this procedure, which is stationed on the outside of a confined space. This employee shall tend lifelines and stay in contact with those working inside by means of voice, sight, radio, or signal. This employee shall also be trained in first aid/CPR and be able to give assistance in case of an emergency. This person shall not be someone who is working in the confined space. This person shall be able to account for all persons in the confined space at all times.
C. **Authorized Entrant** - An employee designated by the employer to enter a permit space. The duties and training for an authorized entrant are specified in the permit space program.
D. **Blanking Or Blinding** - The absolute closure of a pipe, line or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line or duct with no leakage beyond the plate.
E. **Confined Space** - Confined spaces include, but not limited to, storage tanks; vessels; manholes; pits; bins; boilers; digesters; ventilation ducts; utility vaults; pipelines; trenches; vats; open top spaces more than 4 feet deep, such pits as; tanks; and excavations; or any space with limited ventilation or atmosphere. Spaces large enough and configured that an employee can bodily enter and perform assigned work; has limited or restricted means for entry and exit, and is not designed for continuous employee occupancy. Tanks and other structures under construction are not considered confined spaces until completely closed.
F. **Double Block And Bleed** - The closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.
G. **Emergency** - Any failure of hazard control or monitoring equipment or other event(s) inside or outside a confined space that could endanger entrants within the space.
H. **Engulfment** - The surrounding and effective capture of a person by a fluid (i.e., liquid or finely-divided particulate) substance that can be aspirated and cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction or crushing.
I. **Entry** - The action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work an activity in that space and is considered to have occurs as soon as any part of the entrant’s body breaks the plane of an opening into the space.
J. **Entry Permit** - Permit means the written or printed document that is provided by the employer to allow and control entry into a permit space and that the permit contains the specified information.

K. **Entry Supervisor** - An entry supervisor is an employee, foreman, or crew chief who authorizes and/or supervises confined space entry operations. After initial entry authorization, the duties of an entry supervisor may be passed from one individual to another during the course of an entry operation. Entry supervisors can serve as attendants or as authorized entrants, so long as they are properly trained.

L. **Flammable Atmosphere** - Any atmosphere that contains a concentration of flammable or combustible material in excess of 10% of the lower explosive limit (LEL) or lower flammable limit (LFL).

M. **Hazardous Atmosphere** - Hazardous atmosphere means an atmosphere that can expose employees to the risk of death, incapacitation, and impairment of ability to self-rescue (i.e., that is escape unaided from a permit space), injury, or acute illness from one or more of the following causes:
   1. Flammable gas, vapor, or mist in excess of 10% of its LFL.
   2. Airborne combustible dust at a concentration that meets or exceeds its’ LFL or obscures vision at 5 feet.
   3. Atmospheric oxygen concentration that is below 19.5% or above 23.5%
   4. Atmospheric concentration of any substance for which a threshold limit value (TLV) or permissible exposure limit (PEL) is exceeded.
   5. Any other atmospheric condition that is immediately dangerous to life or health. The material safety Data Sheet (MSDS) can provide guidance in establishing acceptable atmospheric conditions when a TLV or PEL is not given.

N. **Hot Work Permit** - The employer’s written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

O. **Immediately Dangerous To Life Or Health** - Any condition that poses an immediate threat to life or health or conditions that pose an immediate threat of severe exposure to contaminants such as radioactive materials which are likely to have adverse cumulative or delayed effects on health or interfere with an individual’s ability to escape unaided and without severe eye or respiratory irritation or other reactions that could inhibit escape from a permit space. Examples of delayed effects might be upper respiratory problems or breathing difficulties that occur hours or possibly days after entry into a confined space. IDLH atmospheres require ventilation, purging, flushing and use of a self-contained breathing apparatus (SCBA) or airline respirator.

P. **Inerting** - The displacement of the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible. This procedure produces an IDLH oxygen-deficient atmosphere.

Q. **Isolation** - The process by which a permit is removed from service and completely protected against the release of energy and material into the space by such means as: blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed; lockout or tagout of all source energy; or blocking or disconnecting all mechanical linkages.

R. **Line Breaking** - The intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure or temperature capable of causing injury.
S. **Lockout/Tag-out** - A method for keeping equipment from being set in motion and endangering workers. A disconnect switch, circuit breaker, valve or other energy-isolating mechanism is put in the safe or off position, and a written warning is attached to it. Tag-out is always to be used in conjunction with lockout. A device is often place over the energy isolating mechanism to hold it in the safe position. A lock is attached so that the equipment can’t be energized.

T. **Non-permit Required Confined Space** - A confined space that does not contain or have the potential to contain any hazard or hazardous atmosphere capable of causing death or serious physical harm. If it can be demonstrated that the only hazard posed by the permit space is an actual or potentially hazardous atmosphere and continuous forced air ventilation can safely maintain the permit space, then the space can be considered non-permit required pending satisfactory air monitoring results.

U. **Oxygen-Deficient Atmosphere** - Any atmosphere having less than equal to 19.5% available oxygen content should not be entered without wearing SCBA or approved supplied air and a full-face respirator.

V. **Oxygen-Enriched Atmosphere** - Any atmosphere having 23.5% or more available oxygen content. Oxygen enriched atmospheres will cause flammable materials to burn violently when ignited. Never use pure oxygen when ventilating a confined space. Always ventilate with a clean source of air.

W. **Permit - Required Confined Space**
   1. Any space having the following characteristics:
      a. Its primary function is something other than human occupancy and is large enough and is so confined that an employee can enter and perform assigned work.
      b. Limited openings for entry and exit.
      c. Not designed for continuous worker occupancy
   2. The following can also be characteristics of a confined space:
      a. Unfavorable natural ventilation.
      b. Has potential for a toxic or an oxygen deficient atmosphere, etc.
      c. Potential for engulfment, such as hoppers, and silos for sand and gravel.
      d. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section.

   *Note: Permit-Required Confined Spaces may contain or produce dangerous concentrations of airborne contaminants that can cause serious injury or death.*

X. **Prohibited Condition** - Any condition in a permit space that is not allowed by the permit during the period in which entry is authorized.

Y. **Rescue Service** - The personnel designated to rescue employees from permit spaces. Arrangements will be made for self-rescue, lifelines, personnel hoist and/or with plant or outside emergency rescue services prior to entry into confines spaces.

Z. **Retrieval System** - The term “retrieval system” includes equipment such as retrieval lines, harnesses, wristlets (if appropriate), lifting devices, and anchors used for non-entry rescue of persons from permit spaces. Note that a retrieval system differs from a lifeline, which is a type of fall-arrest system.

AA. **Self-Rescue** - The act of escaping unaided from a hazardous atmosphere or IDLH situation in a permit space.
BB. Testing - The process by which the hazards that may be exposed entrants of a permit space are identified and evaluated. Testing includes specifying the tests to be performed in the permit space.

CC. Toxic Atmospheres - Toxic atmospheres have poisonous physical effects, which may be immediately delayed, or a combination of both. Substances such as poisonous liquids, vapors, gases, mists, dusts, fumes, and biological agents in the air should be considered hazardous in a confined space. Hydrogen sulfide and carbon monoxide are the most common toxic agents that can be found in a confined space.

7.0 Requirements

A. Prerequisites
1. Follow decisions process
2. Permit completed and approved
3. Area monitored
4. Personnel trained

B. Tools, Materials and Equipment
1. TMX-410, BW Gas alert, MSA 5 Star combustible gas monitor or equivalent to monitor for Oxygen, Combustibles, Hydrogen Sulfide, and Carbon Monoxide continuously.
2. SCBA equipment, such as MSA, Scott Air Packs, or an approved supplied air system with full-face respirators and five-minute escape packs approved for IDLH situations.
3. Adequate access/egress equipment.
4. Rescue and emergency equipment, such as body harnesses, backboards and 5-minute escape air systems, when applicable.
5. Appropriate real-time or other monitors as indicated by the contents of the confined space.

C. Precautions and Limits
1. The confined space entrant and entry supervisor shall consider all potential physical and health hazards, such as flammable, combustible, reactive, corrosive, caustic, toxic and radioactive materials; oxygen content; electrical or mechanical equipment; and fire suppression system (CO2 and Halon).
2. Nobody will enter a confined space until all hazards have been identified, the confined space classified and all necessary precautions have been taken.
3. All workers engaged in a confined space operation shall be knowledgeable of the potential hazards they may encounter.
4. All permit entry spaces in the workplace must be posted with a sign reading “Danger, Permit-Required Confined Space, “Do Not Enter”, or similar language.
5. Effective measures shall be taken to prevent employees from entering permit spaces without proper training.

D. Acceptable Criteria
This procedure shall be reviewed by the Corporate SH&E Department within one year the first permit-required confined space entry, and shall be revised as necessary, to ensure that employees are protected from permit space hazards.
8.0 Procedure
A. First, it must be determined whether there are any confined spaces, which will require entry. Then, confined spaces must be classified as permit-required or non-permit required. Follow the decision logic of SAF-35.3-1 “Types of Confined Space Decision Flow Chart” and SAF35.3-2 “Permit Required – confined Space Flow Chart”. When the confined spaces have been identified and entry is not expected, then effective measures shall be taken to prevent entry.

1. Hazard Detection
   If a hazardous atmosphere or other potential condition is detected during entry:
   a. Each employee must evacuate the space immediately.
   b. The space must be evaluated to determine how the hazardous atmosphere developed.
   c. Measures must be implemented to protect employees from the hazardous atmosphere before further entry is allowed. If atmospheric hazards cannot be controlled, alternate entry procedures are invalid.

2. Hazard Identification
B. Following the evaluation of the workplace and identification of all permit-required confined spaces the nature and severity of the hazards present in each space must be determined before employees can enter the space. Some or all of the spaces may present the same hazards, but hazardous characteristics of each space must be determined individually.

9.0 Hazard Control
A. If it is necessary to enter the permit space to eliminate hazards, the permit-required confined space program shall be followed. If any of the control measures to correct the hazard fail or prove less than totally effective, entry must be terminated immediately and not resumed until all hazards are again adequately controlled.

B. When all existing and potential hazards have been identified, appropriate measures must be developed and implemented to protect confined space entrants.

C. Control Measures
   1. To prevent sudden changes in air quality without warning, atmospheric tests must be conducted before entry is approved.
   2. Examples of other hazard control measures include:
      a. Cleaning, purging or inerting the atmosphere in the space.
      b. Isolation of the permit space from hazardous energy and materials.
      c. Institute lockout/tag-out programs to prevent unexpected operation of equipment inside the space.
      d. Blanking or blinding of pipes that carry materials into the space to prevent accidental entry of hazardous materials.
      e. Mechanical ventilation of the space to control toxic or flammable gases and vapors or to ensure adequate oxygen supply.
      f. Personal protective equipment, such as hard hats, safety shoes, respirators, eye and face protection.
      g. Communication equipment to allow attendants to maintain contact with entrants when they are not in direct view of each other.
      h. Hot work permits and additional procedures.

D. Responding To Unacceptable Atmospheres
   1. Persons performing initial or periodic monitoring should not rely on a single air
sample. If the atmosphere in any part of the confined space should become unsafe during entry, safe exit requires a quick and correct response.

2. Evacuate the space immediately if the alarm on a testing device goes off, or if tests show the atmosphere has become hazardous. Stop all hot work at once if there is any possibility of a flammable atmosphere. Evacuate the space immediately if toxic concentrations raise above the preset action levels.

3. After evacuation, identify and control the source of the hazard. Then retest the atmosphere before reentering the space. One important method for controlling hazardous atmospheres is appropriate ventilation.

E. Preventing Unauthorized Entry

1. Unauthorized personnel who enter a confined space expose themselves to potentially life-threatening dangers and threaten the safety of authorized entrants.

2. Actions to be taken to prevent unauthorized entry include training all employees and providing necessary information to all visitors. Other options are posting warning signs, erecting barriers, installing covers with locks at entry points.

3. A system will be developed for documenting the implementation of these measures and ensuring that they remain in place as necessary. A survey conducted during routine safety inspections is a good means to check that all areas are covered and that signs or barriers have not been removed or damaged.

F. Ventilation

No hazardous atmosphere can be allowed to develop within a space at any time an employee is inside that space. To ensure that this condition is met, the following procedures for continuous forced-air ventilation must be used:

1. No employee may enter the space until continuous forced-air ventilation has controlled any hazardous atmosphere.

2. Blowers, vents, or ducts must be placed and directed in manner that will ventilate immediate areas where workers will be present. Forced-air ventilation must continue until all employees have left the space.

3. The air supply for the forced-air ventilation must originate from a clean source and may not increase the atmospheric hazards in the space.

4. The atmosphere within the space must be periodically tested to ensure that continuous forced-air ventilation is preventing the accumulation of atmospheric hazards.

5. Non-permit confined spaces must be re-evaluated whenever changes in the use or configuration of the space (including ventilation might increase hazards to entrants).

G. Alternate Entry Confined Space Procedure

1. The confined space standard specifies the conditions to be met before an employer may use the OSHA Alternate Procedures for entering a permit space with a potentially hazardous atmosphere. If it is determined after initial entry that all hazards within the space-including actual or potential atmospheric hazards can be completely eliminated, rather than merely controlled, the employer may reclassify the permit space to a non-permit confined space.

2. If, however, testing and monitoring results show controllable hazardous atmosphere as the only hazard, the space must remain a permit space but may be entered using alternate procedures. To justify the use of alternate entry procedures, monitoring and inspection data must demonstrate both of the following:
a. Actual or potentially hazardous atmosphere is the only hazard posed by the permit-required confined space.
b. Continuous forced-air ventilation alone is sufficient to maintain the permit space safe for entry.
3. To ensure that the entrant will have sufficient time to escape the space should the ventilation fail for any reason, such as loss of power, the atmosphere within the space cannot be expected to ever approach a hazardous level. As a guideline, it is suggested that no more than 50% of the level of flammable or toxic substances that would be considered hazardous be used in making this determination. For example, if the acceptable LEL for hydrogen sulfide (H2S) is 5%, to ensure this non-permit space safety factor, the atmosphere must be expected to remain at no more than 2.5%.

H. Permit-Required Confined Space Program
1. Employees shall not enter a permit-required confined space until a confined space entry permit has been issued and properly completed.
2. Permits must be requested from the Project Superintendent or his/her designee for any permit-required confined space-related work.
3. The Company permit includes, but is not limited to, location of work, description of work, employee(s) allowed to enter, entry date and time, work practice and proper controls checklist, hazardous work, hazards expected, safety precautions, atmospheric testing, proper authorizations, expiration.
4. Permit training includes coverage of this procedure, as well as instruction on the atmospheric testing performed on the confined space. Training must also include all items covered on the permit and the proper use of equipment to be used in the confined space. A quiz is included to show understanding after training is completed. All of the questions must be answered correctly.

I. Permit Cancellation
1. Upon completion of the entry covered by the permit, and after all entrants have exited the permit space, the entry supervisor (designated by the Contractor) must cancel the permit. While the permit must be canceled upon completion of the work, it may also be canceled anytime situations develop that are in violation of the permit.
2. The cancellation of the permit after all entrants have exited requires that each authorized entrant be accounted for, so no one is inadvertently left in the space.

J. Records / Reports
Confined Space Entry Permits shall be completed as appropriate, kept at the area of operation, and filed when the permitted job is finished as per project requirements. Training records shall be maintained in the project files, and copies sent to the corporate office for permanent records.

10.0 Multi Employer Confined Space Entry Procedure
A. At certain times it may be necessary for employees from multiple crafts and/or employers to work inside a confined space, performing different tasks, which could pose additional hazards to other entrants working in the confined space. In such cases the plant or facility owner is required to provide the following:
1. Advise all contractors as to the location and entry requirements for the confined spaces to be entered.
2. Provide the contractors with any information regarding the plant or facility owner’s experience with the confined space and any special problems or procedures taken by the plant or facility owner to protect their employees when working in or around the confined space.
3. Coordinate entry operations when more than one contractor will be working in the space simultaneously to prevent employees of different employers from endangering each other.
4. Conduct a debriefing session at the end of the project to discuss any hazards encountered during the entry.

B. It is the entry supervisor’s responsibilities to coordinate all work activities with the plant or facility owner in order to adequately safeguard the health and safety of our employees. The entry supervisor shall be responsible for the following:
1. Obtaining any information available from the plant or facility owner regarding the permit space hazards and entry procedures.
2. Coordinate all work activities with the plant or facility owner whenever employees from multiple crafts and/or employers will be working in or near a confined space.
3. Provide the plant or facility owner with the contents of our company confined space entry program, which will be used to safeguard our employees. In some cases the plant or facility owner may require that their permits and plant specific program be used. This is permissible provided that the plant or facility owner’s confined space entry requirements will provide for the health and safety of our employees.
4. Advise the plant or facility owner of any hazards encountered in the confined space, either when the hazards arise, or at the debriefing session.

C. Preferred Industrial Contractors Inc.’s EHS department will review the Confined Space Entry program periodically with plant and operations personnel to identify any deficiencies and make revisions as necessary to ensure the safety of employees working in Confined Spaces.

11.0 Hazard Characteristics
A. A thorough inspection of a confined space must be performed to verify acceptable entry conditions. This frequently includes a physical inspection not only of the space to be entered, but also of adjacent and connected spaces that might pose a threat to entrants. The hazards of greatest concern are those considered to be immediately dangerous to life or health (IDLH), which poses one or more of the following threats:
1. An immediate or delayed threat to life (see definition of IDLH).
2. A threat that would cause irreversible adverse health effects.
3. A threat that would interfere with an individual’s ability to escape unaided from a permit space.

B. The major IDLH hazards that workers can encounter when they enter confined spaces include:
1. Atmospheric hazards
2. Thermal or chemical hazards
3. Mechanical force or electrical hazards
4. Engulfment in liquids or finely-divided solid particles

C. Atmospheric Hazards
A hazardous atmosphere in a confined space can expose workers to the risk of death, injury, acute illness, incapacitation, or impairment of their ability to escape unaided from the permit
space (self-rescue). A hazardous atmosphere can be caused by one or more of the following:

1. A flammable gas, vapor or mist in excess of 10 percent of its lower flammable limit (LFL).
2. An airborne combustible dust at a concentration that meets or exceeds its LFL (approximated as a condition in which the dust obscures vision at a distance of five feet [1.52m] or less).
3. An atmospheric oxygen concentration below 19.5 percent (oxygen-deficient) or above 23.5 percent (oxygen-enriched).
4. An atmospheric concentration of any substance that could result in employee exposure to toxic air contaminants in excess of permissible exposure limits (PEL) or threshold limit values (TLV).
5. Any other atmospheric condition that is immediately dangerous to life or health.

D. Atmospheric Testing Of Confined Spaces

1. Prior to entering a confined space, the work environment shall be tested using properly calibrated and approved equipment to determine potential hazards.
2. Oxygen must be at greater than 19.5%, and less than 23.5%.
3. Flammables must be less than 10% of the lower flammable limits of chemicals involved.
4. Toxic gases must be less than the OSHA PEL or ACGIH TLV, whichever is used.
5. If contamination or generation of toxic hazards is suspected while workers are in a confined space, testing the confined space atmosphere for oxygen content, flammability, toxicity and carbon monoxide will perform prior to entry and on a continuous basis.
6. Testing shall be done to ensure detection of heavier-than-air and lighter-than-air contaminants.

Important - If the atmosphere cannot be tested, then it will be considered an IDLH situation. IDLH requires ventilation, purging, or flushing and the use of a SCBA or airline respirator.

E. Procedures for Atmospheric Testing In Confined Spaces

1. Atmospheric testing is required to evaluate possible hazards of the permit space and to verify that acceptable conditions exist in the space. Prior to entry of a confined space the atmosphere inside shall be tested with a calibrated direct reading instrument for oxygen level, flammable gases or vapors and toxic contaminants. Employees or their representatives shall be provided the opportunity to observe the pre-entry testing. Results of the pre-entry testing shall be recorded on the permit and reviewed with all entrants. The testing of actual or potentially hazardous atmospheres is accomplished by:
   a. Safely removing entrance covers.
   b. Guarding the entrance with a barrier.
   c. Testing the internal atmosphere with a calibrated, direct-reading instrument, in the following order given:
   d. Oxygen content (lack of oxygen will cause erroneous readings of flammable and toxic gases).
   e. Flammable gases and vapors.
   f. Potential toxic air contaminants.
2. Testing methods are:
   a. Evaluation Testing- The atmosphere of a confined space should be analyzed using equipment of sufficient sensitivity and specificity to identify and evaluate any existing or potentially hazardous atmospheres, so that appropriate permit entry procedures can be developed and acceptable entry conditions stipulated for that space. Evaluation and interpretation of this data and development of the entry procedure should be performed and reviewed by the project safety representative.
   b. Verification Testing- Any residual concentrations of contaminants identified in a permit space should be verified to be within the range of acceptable entry conditions. Results of testing (i.e., actual concentrations) should be recorded on the permit.
   c. Testing Stratified Atmospheres- When monitoring for entries involving a descent into stratified atmospheres, the atmospheric envelope should be tested, as a minimum, approximately every four (4) feet (1.22 meters) in the direction of travel and to each side. If a sampling probe is used, the entrant’s rate of progress should be slowed to accommodate the sampling speed and the detector’s response.

*NOTE: Gases have different densities and may stratify in layers. Test spaces before entering and at least at four-foot intervals in the direction of travel and side to side.*

3. Retesting
   a. Periodically retest to verify and document that the atmosphere remains within acceptable entry conditions.
   b. Eliminate hazardous atmosphere by continuous forced air ventilation from a clean source. Testing should be redone periodically to ensure that ventilation is sufficient. If continuous monitoring of the space is not being performed, employees and their representatives may request additional monitoring at any time.

F. Oxygen-Deficient Atmospheres
   1. Oxygen deficiency within confined spaces can be caused when oxygen is:
      a. Absorbed by other substances, such as activated charcoal.
      b. Consumed by chemical reactions, such as rusting and burning, or biological processes, such as bacterial decomposition.
      c. Displaced by another gas, such as when a confined space is intentionally inerted by a nitrogen blanket or other non-reactive atmosphere that contains no oxygen.
   2. Breathing oxygen-deficient air causes poor judgment, loss of coordination, fatigue, vomiting, unconsciousness, and ultimately death. Asphyxiation from insufficient oxygen frequently occurs when victims, unaware of the problem, reach the point where they can’t save themselves or call for help.

G. Oxygen-Enriched Atmospheres
   The atmosphere in a confined space can also have too much oxygen. An oxygen-enriched atmosphere is not an asphyxiation hazard; however, a concentration of oxygen greater than 23.5 percent in a confined space can be a serious fire hazard, since oxygen-enriched
atmospheres can cause combustible materials to burn violently.

H. Toxic Atmospheres
1. Toxic atmospheres in confined spaces can cause serious health problems and even death. Their poisonous physical effects may be immediate, delayed or a combination of both.
2. Toxic contaminants can be gases, vapors, fumes, or airborne dusts. The most common gases encountered in confined spaces are carbon monoxide and hydrogen sulfide. Other sources of toxic atmospheres in confined spaces include fuel vapors, protective tank coatings, inerting media, fumigants, and residue from previous tank contents.

I. Engulfment Hazards
1. Engulfment in a confined space occurs when a victim is immersed in liquid or trapped and enveloped by finely divided dry bulk material, such as grain or sawdust.
2. Engulfment hazards include asphyxiation from aspiring (inhaling) the engulfing material, which causes death by filling or plugging the respiratory system. Another asphyxiating effect of engulfment is compression of the torso by the weight of the engulfing material, preventing the victim’s diaphragm from moving.

J. Noise Hazards
1. Work performed inside a confined space can be deafening. Scaling, chipping, grinding, hammering, riveting, power scrubbing, the use of power and pneumatic tools, and airline leaks create hazards noise levels. When the work is done inside a vessel, tank, or other space with non-absorbing surfaces, the noise increases when it bounces off the walls.
2. Even ventilation adds sound and noises outside the space, which can sound louder inside. KA tank or vessel can become a health hazard to the entrant if the heat is allowed to climb too high. The sun on a metal tank or lack of air circulation and hot work, can contribute to an entrant becoming overcome by heat stress. If the pre-entry hazards identification indicates heat stress can become a problem, it is a safe practice to plan periodic temperature testing.

L. Electrical Energy
The effect of electrical energy is a frequent contributor to confined space accidents. It is difficult in confined spaces to avoid contact with electrical components. An effective lockout / tag-out program can prevent almost all electrical hazards.

M. Flammable and Explosive Atmospheres
1. Flammable and explosive atmospheres contain gases, vapors, or airborne dusts at concentrations great enough to burn rapidly upon contact with ignition sources such as heat, open flames or electrical sparks.
2. The LFL is the lower limit at which a flammable substance will ignite into sustained combustion.
3. Changes in oxygen concentrations must also be monitored. While it is not flammable itself, oxygen is necessary for all combustion to take place. Materials that are normally nonflammable, such as clothing, can burst into flames at the smallest spark in a confined space containing a high volume of oxygen.

N. Mechanical Hazards
The effects of mechanical energy are also frequent contributors to confined space accidents. An effective lockout / tag-out program can prevent almost all mechanical hazards.
12.0 Non-Permit Required Confined Space Work Procedure

A. Non-Permit Space Re-Evaluation
   1. If hazards arise within a permit space that had been reclassified to a non-permit space, each employee in the space must immediately exit the space.
   2. The space must then be re-evaluated to determine whether it should be reclassified as a permit space under the program.
   3. If there is a possibility for the development of hazardous atmosphere conditions within the space either naturally or from any activity conducted during entry and work, OSHA does not allow reclassification as a non-permit space.

B. Record Keeping
   1. To document that all hazards in a permit space are eliminated complete SAF-35.3-3 “Non-Permit Required Confined Space Work Form”, including:
      a. Date of the determination. Heat Stress Hazards
      b. Location of the space
      c. Signature of the person making the determination.
   2. This form becomes a permanent part of the written permit space program and must be made available to each employee entering the space.

C. Training
   Training for non-permit confined spaces is found in Section 17.0.

D. Reclassification
   1. Reclassification is valid only while hazards are eliminated. So long as the space remains safe, employee entry into that space is not subject to the employer’s permit space program. However, the space must be identified and periodically tested to ensure that it continues to meet the requirements of the non-permit space.
   2. The first procedure toward reclassification of the hazardous confined space is to eliminate all its hazards without entering the space. If every hazard can be completely eliminated in this manner, the permit space may be reclassified as a non-permit confined space. If the first procedure is not practical and it becomes necessary for an employee to enter a permit space in order to eliminate its hazards, the entry must occur in accordance with the written permit-required confined space program.
   3. If the space requires cleaning, determine if the cleaning activities performed in the space would create a hazardous atmosphere. Determine whether activities outside the space would negatively affect the atmosphere inside the space. If not, the employer is permitted to reclassify the space as a non-permit confined space.
   4. A non-permit confined space is neither hazardous nor potentially hazardous and would not cause death or serious physical harm to the entrant. If testing and inspection confirm one or more hazards in a permit space, but these hazards can be completely eliminated, the OSHA standard includes approved procedures for the employer to reclassify it as a non-permit confined space.
   5. If testing and inspection during entry demonstrate there are no actual or potential atmospheric hazards and all other hazards within the permit space have been eliminated, the permit space may be reclassified as a no-permit confined space.
   6. Permit spaces with actual or potential atmospheric hazards that can be controlled but not eliminated by ventilation and cannot be downgrade to non-permit confined spaces.
7. OSHA states that control of the atmosphere hazards using forced air ventilation does not constitute elimination of those hazards and thus cannot be downgraded to a non-permit space. OSHA does, however, provide less restrictive alternate procedures for entering permit-required confined spaces containing atmospheric hazards if it can be demonstrated that forced air ventilation will control all hazards in the space.

13.0 Alternate Entry Confined Space Work Procedure

A. Record Keeping
   1. Monitoring and inspecting data are to be documented in writing on SAF-35.3-4 and made available to each entrant. When alternate procedures are used for entering a permit space, verify that the space is safe for entry and that all required procedures and safety measures have been taken.
   2. OSHA requires a written statement with the date, location of the space and the signature of the person providing the verification. The verification is made before each entry and must be made available to each employee entering the space.

B. Training
   Training for alternate entry of a confined space shall be as that for a permit-required confined space, see Section 18.0.

C. Alternate Entry Criteria
   1. Any conditions making it unsafe to remove an entrance cover shall be eliminated before the cover is removed.
   2. When entrance covers are removed, the opening shall be promptly guarded by a railing, temporary cover, or other temporary barrier that will prevent an accidental fall through the opening and that will protect each employee working in the space from foreign objects entering the space.
   3. There may be not be a hazardous atmosphere within the space whenever any employee is inside the space.
   4. Continuous forced air ventilation shall be used as follows:
      a. An employee may not enter the space until the forced air ventilation has eliminated any hazardous atmospheres.
      b. The forced air ventilation shall be so directed that as to ventilate the immediate areas where an employee is or will be present within the space and shall continue until all employees have left the space.
      c. The air supply for the forced air ventilation shall be from a clean source and may not increase the hazards in the space.
      d. The atmosphere within the space shall be periodically tested necessary to ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere.
   5. If a hazardous atmosphere is detected during entry:
      a. Each employee shall leave the space immediately.
      b. The space shall be evaluated to determine how the hazardous atmosphere developed.
      c. Measures shall be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place.
14.0 Permit Required Confined Space Entry Procedure

A. Confined Space Permit

1. Prevent unauthorized entry with signs, barriers, etc.
2. Identify and evaluate hazards before employees enter permit areas.
3. Specify acceptable entry conditions.
   a. Isolate unwanted forms of energy; blanking or blinding, removal of pipe sections, double block and bleed; lockout and tag-out.
   b. Purge, inert, flush, or ventilate to eliminate or control atmospheric hazards. *NOTE: Inerting will create an IDLH atmosphere.*
   c. Provide pedestrian, vehicle or other barriers to protect entrants from external hazards
   d. Verify that conditions remain acceptable during authorized entry.
4. Provide the equipment and ensure that it is used properly.
   a. Testing and monitoring equipment; i.e., check oxygen, flammable gas, and toxic gas as well as applicable radiation, noise, temperature, etc.
   b. Ventilating equipment needed to establish acceptable entry conditions.
   c. Communications equipment necessary to maintain contact with entrants.
   d. Personal protective equipment, e.g., appropriate respiratory protection and clothing, where engineering controls do not adequately protect employees shall be used. For IDLH atmospheres a self-contained breathing apparatus, or supplied air respirator (SCBA/SAR) with auxiliary escape bottle for egress must be used.
   e. Lighting (low voltage explosion-proof) to provide a safe, illuminated working environment.
   f. Barriers and shields to protect entrants from external hazards.
   g. Equipment necessary for safe ingress and egress, e.g., ladders.
   h. Rescue and emergency equipment, when required i.e., retrieval equipment for non-entry rescues.
   i. Any other equipment necessary for safe entry and rescue from permit spaces.
5. Evaluate permit spaces:
   a. Test to determine if acceptable conditions exist. If isolation of the space is infeasible because the space is large or part of a continuous system (sewer), pre-entry and continuous testing will be performed.
   b. Test permit space to determine if acceptable entry conditions are maintained. Test first for oxygen, combustible gases and vapors then for toxic gases and vapors.
   c. Provide an attendant for the duration of the entry operations.
   d. Designate and train all persons who have duties in confined spaces. Training shall cover all aspects of required tasks and cover any changes in these tasks and/or entries and documented. Training is essential and shall be provided for all employees by their employees so that the safe performance of the entry may be performed. Training shall include a quiz to document proficiency, with a passing score of, at least, 70%.
6. Arrange for:
   a. Onsite or offsite rescue services.
b. Emergency services for rescued employees.
c. Preventing unauthorized personnel from attempting rescue.

7. Develop and implement permit and permit procedure preparation, issuance, closing of permit space, and canceling of the permit. Retain canceled entry permits for one year. The entry permit authorizes entry into a permit space. It must contain all applicable documentation of the space.

Identification of the permit space.
   a. Purpose of the entry
   b. Date and duration of the entry
   c. Entrants
   d. Attendants
   e. Entry supervisors
   f. Hazards of the permit space
   g. Measures used for isolation
   h. Acceptable entry conditions
   i. Results of testing (initial and periodic)
   j. Rescue and emergency services
   k. Communication equipment
   l. Safety equipment
   m. Any additional pertinent information to ensure employee safety
   n. Any other permits, such as for hot work (riveting, welding, cutting, heating, and other spark producing operations).

B. Confined Space Preparations
   1. Before confined spaces are entered, they shall be emptied, purged, flushed, ventilated with air, or otherwise made free of hazardous substances.
   2. Lines, pipes, or other connections that convey materials to the confined space shall be disconnected or other means used to prevent such materials from entering the confined space while work is in progress.
   3. Lockout/tag-out procedures shall be followed in securing electrical systems, machinery, pressure systems and rotating equipment.
   4. Isolate and lockout/tag-out energized sources of hazardous energy such as electrical and mechanical equipment. Use low voltage of GFCI-protected electrical equipment in wet locations. Make sure that explosion-proof equipment is used when required.

C. Protective Controls
   1. Mechanical ventilation sufficient to maintain a non-hazardous atmosphere shall be provided. Exhaust air shall be tested to make sure the oxygen content is no lower than 19.5%.
   2. Respiratory protection shall be required when a hazardous atmosphere is suspected. Oxygen-deficient atmospheres and most hazardous atmosphere require the use of a SCBA or a pressure-demand supplied-air respirator. Air purifying respirators are adequate for some contaminants but care must be taken in selecting the proper type (see ANSI Z88.2-1992 for the further information).
   3. An approved safety belt, safety harness, or wrist harness with tended lifeline is required for each person entering a confined space, especially if the person is wearing respiratory equipment or the work requires climbing or descending inside the confined space.
4. Ensure that gloves, hard hats, face and eye protection, etc. are worn when necessary.

D. Authorized Persons - Specific Responsibilities

1. Entry Supervisor (ES):
   a. Verifies that all pre-entry tests specified by the permit have been conducted and that acceptable entry conditions exist.
   b. Ensures that all procedures and equipment specified by the permit are in place prior to entry.
   c. Endorses the permit and authorizes entry.
   d. Terminates the entry and cancels the permit as necessary.
   e. Verifies that rescue services are available and that the means for summoning them are in place and operable.
   f. Removes unauthorized individuals who enter or attempt to enter the space during entry operations.
   g. Determines that entry operations remain consistent with terms of the permit and that acceptable entry conditions are maintained.
   h. Ensures safe closure and maintains control of the confined space.

2. Attendant
   a. Continuously maintains an accurate count of authorized entrants.
   b. Remains outside the permit space during entry and/or rescue operations until relieved by another attendant.
   c. Communicates with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space.
   d. Monitors activities inside and outside the space to determine if it is safe for entrants to remain inside the space or non-entry personnel to remain outside the space nearby.
   e. Orders evacuation under the following conditions:
      (1.) Upon detection of a prohibited condition;
      (2.) Upon detection of the behavioral effects of hazard exposure to authorized entrants;
      (3.) Upon detection of a situation outside the space that could endanger the entrants;
      (4.) Upon noting that the attendant cannot effectively or safely perform required duties.
   f. Summons rescue/emergency services upon determination that authorized entrants may require assistance to escape from the space.
   g. Takes the following actions when unauthorized persons approach or enter the space:
      (1.) Warns the unauthorized person to stay away;
      (2.) Advises an unauthorized person to exit the space;
      (3.) Advises authorized entrants and the entry supervisor that an unauthorized person has entered the space;
      (4.) Performs non-entry rescues as per this project instruction;
      (5.) Performs no duties that might interfere with the primary duty (i.e., monitoring and protecting authorized entrants).
   h. At least one employee (attendant), trained to this procedure, shall be stationed on the outside of a confined space. This employee shall tend
lifelines and stay in contact with those working inside by means of voice, sight, radio, or signal. This employee shall also be trained in first aid/CPR and be able to give assistance in case of an emergency. This person shall not be someone who is working in the confined space. This person shall be able to account for all persons in the confined space at all times.

i. When conditions require the use of respiratory protection, the attendant and at least two other employees, trained in rescue operations, will be within sight and available with approved respiratory protection should emergency entry be necessary. THE ATTENDANT MUST NOT ENTER THE CONFINED SPACE.

j. If multiple confined spaces are to be entered a separate attendant must be located at each confined space entry points to ensure that each attendant is able to perform all of the required duties and responsibilities.

k. In the event of an emergency in a single confined space, all other confined spaces are to be evacuated and the permits cancelled until such time that the emergency has been cleared.

3. Authorized Entrants:
   a. Review and sign the confined space entry permit.
   b. Properly use all of the required equipment (i.e., ventilation, communication, lighting, PPE).
   c. Maintain communication with the attendant to enable the attendant to monitor entrant status and alert entrants of the need to evacuate the space.
   d. Alert the Attendant when:
      (1.) Entrant recognizes any warning sign, symptom of exposure, or the presence of a dangerous situation;
      (2.) A prohibited condition is detected.
   e. Exit the space as quickly as possible when:
      (1.) An order to evacuate is given;
      (2.) The entrant recognizes a warning sign or symptom of exposure to a dangerous situation;
      (3.) The entrant detects a prohibited condition;
      (4.) An evacuation alarm is activated.

E. Rescue
   1. The confined space Attendant or other unauthorized personnel are not to enter a confined space to rescue worker(s).
   2. The Attendant must immediately notify by radio the Entry Supervisor that rescue is required. The Entry Supervisor will immediately respond with assistance to supervise the implementation of the retrieval systems that have been installed, by authorized confined space personnel.
   3. Where feasible, and provided by contract, entry rescues will be performed by qualified onsite emergency/rescue personnel. Preferred Industrial Contractors, Inc., will coordinate with the plant or facility personnel to evaluate the capabilities of any emergency/rescue services to determine whether adequate rescue services can be provided by the location. Onsite rescue services can be used as long as all OSHA requirements for rescue are met. Otherwise, arrangements will be made to have contract or municipal rescue services perform permit space rescue.
4. If onsite rescue services are unavailable or inadequate, entry rescues will be performed by qualified offsite emergency/rescue personnel. Verification must be received from these services on qualification of confined space and high angle rescue. The time frame of the response by off-site agency must be examined to determine if a project rescue team needs to be established and trained. A confined space rescue drill must be performed at least annually using both retrieval systems and the use of off-site rescue agencies.

5. Before the start of work activities at any project, the EHS representative will contact offsite rescue personnel to determine the following:
   a. Ability and extent of services;
   b. Backup arrangements;
   c. Response time;
   d. Personnel qualifications;
   e. Emergency phone numbers and personnel contacts;
   f. Availability of standby services for complicated entries;
   g. Any special requirements of the agency.

6. The ES&H representative will provide the selected offsite rescue service with at least the following:
   a. The hazards they may confront if called on to perform entry rescue;
   b. Provide the rescue service with access to all permit spaces from which rescue may be necessary so that the rescue service can develop appropriate rescue plans and practice rescue operations.
   c. Cooperation with the development of appropriate rescue plans and practice rescue operations;
   d. The opportunity to participate in annual emergency drills.
   e. Inform the rescue service of the hazards they may confront including MSDS if warranted.

7. All Entry Supervisors and Attendants will be trained and qualified to operate non-entry emergency retrieval systems.

8. Preferred Industrial Contractors, Inc. will take whatever engineering and control methods necessary to eliminate the need to enter IDLH atmospheres, however, should it be necessary to enter an IDLH atmosphere the following procedures shall be followed:
   a. Workers inside the IDLH atmosphere will be equipped with pressure demand or other positive pressure SCBAs, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA
   b. Outside standby person(s) will be located outside the IDLH atmosphere;
   c. The standby persons(s) located outside the IDLH atmosphere will be trained and equipped to provide effective emergency rescue as necessary;
   d. Employee(s) located outside the IDLH atmospheres are equipped with:
      (1.) Pressure demand or other positive pressure SCBAs, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA
      (2.) Appropriate retrieval or rescue equipment for removing the employee(s) who enter the hazardous atmospheres.
   e. Constant visual, voice, or signal communication will be maintained between the employee(s) in the IDLH atmosphere and the employee(s) located

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outside the IDLH atmosphere;
f. Project security or the plant rescue team shall be notified before the standby person(s) located outside the IDLH atmosphere enter the IDLH atmosphere to provide emergency rescue;

F. Retrieval Systems
1. To facilitate non-entry rescue, use retrieval systems or methods whenever an authorized entrant enters a permit space. This requirement applies in all cases, except when retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. Retrieval systems must meet the following requirements:
   a. Each entrant must use a chest or full-body harness with a retrieval line attached at the center of the entrant’s back near shoulder level or above the entrant’s head.
   b. The other end of each entrant’s retrieval line must be attached to a mechanical device or fixed point outside the permit space so that non-entry rescue can begin as soon as the attendant becomes aware that rescue is necessary.
   c. Wristlets may not be used unless it can be demonstrated that the use of a chest or full-body harness is not feasible or unsafe and that the use of wristlets are the most effective alternative.
   d. A mechanical device must be available to retrieve personnel from vertical type permit spaces more than five (5) feet deep.

G. Tools and Equipment
1. Only explosion-proof lighting/equipment shall be used in confined or enclosed spaces unless atmospheric tests have proven the space to be non-explosive.
2. When welding or cutting is to be performed in any confined space, the gas cylinders and welding machines shall be outside the space. Local exhaust ventilation, adequate eye and skin protection, and fire protection are required.
3. In order to eliminate the possibility of gas escaping through leaks or improperly closed valves during welding or cutting, torch valves and cylinder valves shall be closed whenever the torch is not being used for a substantial period of time, such as during lunch break. Torches and leads shall be removed from the confined space at the end of the shift.
4. Use air-driven whenever possible. Use grounded or double insulated power tools along with ground fault circuit interrupters.
5. The nozzles of air hoses, inert gas hoses and steam line hoses, when used in the cleaning or ventilation of tanks and vessels that contain explosive concentrations of flammable gases or vapors, shall be bonded to the tank or vessel shell. Bonding devices shall not be attached or detached in the presence of hazardous concentrations of flammable gases or vapors.
6. Ladders, scaffolds, working platforms and rigging must be completely secured.

H. Hazardous Materials
If hazardous materials, such as paints, thinners, etc., are to be used in confined spaces, the safety and health information from the MSDS shall be incorporated in the Confined Space Entry Procedure.
I. Review of Entry Operations
Confined space entry procedures shall be reviewed and deficiencies to the program corrected at the time it is believed that the measures taken under the existing program may not adequately protect the employees. Examples of circumstances requiring program review include:
1. Any unauthorized entry of a permitted space.
2. A hazard not identified by the entry permit.
3. The detection of any condition or practice prohibited.
4. The occurrence of an injury or near miss during entry of a permitted space.
5. Any employee complaints about the effectiveness of the program.

J. Training for permit-confined spaces is found in Section 18.0.

15.0 Training Guidelines
A. Prior to performing any work which involves confined spaces or prior to assignment or changes in tasks or duties which involve confined space hazards, all affected employees shall receive training on the following items:
1. Permit-required space hazards.
2. Hazards of the job site, location or entry operation.
3. Proper use and limitations of PPE and other safety equipment.
4. The permit system and other procedural requirements including any new hazards that have been created or deviations from the permit space entry procedures.
5. Response to emergencies.
6. Duties and responsibilities of each member of the permit-required confined space team.
7. How to recognize air contaminant over-exposure symptoms to themselves and coworkers.

B. Certification of employee proficiency shall be documented through testing and completion of SAF-35.3-7 - Acknowledgment of Permit Required Confined Space Training. Training certification must be made available to employees and their authorized representatives and shall include the following:
1. Employee’s name and signature.
2. Instructor’s name and signature.
3. Date(s) of training.

16.0 Non-Permit Confined Space Training
A. If you are one of 1.6 million Americans who work in confined spaces each year, you know your job is dangerous. Serious injury or death in a confined space can be the result of asphyxiation, engulfment, electrical shock, falls, and heat stress. The Occupational Safety and Health Administration (OSHA) believe 85 percent of these accidents can be prevented if you learn about the hazards you face on the job.
1. A confined space has the following characteristics:
   a. Its size and shape allow a person to enter it.
   b. It has limited openings for workers to enter and exit.
   c. It is not designed for continuous occupancy.
2. A permit-required confined space has one or more of the following characteristics:
   a. Contains or has potential to contain a hazardous atmosphere.
b. Contains a material that has the potential for engulfing an entrant.
c. Has an internal configuration such that the entrant could be trapped or
asphyxiated by inwardly converging walls or by a floor, which slopes downward
and tapers to a smaller cross-section.
d. Contains any other recognized serious safety or health hazard.
*NOTE: Some examples of confined spaces are reactor vessels, tanks, silos, boilers,
sewers, and pipelines.

B. Permit Hazards
1. Hazardous atmosphere: The air might not have enough oxygen or might be flammable
or toxic.
2. Entry is defined as placing any part of your body in the permit space.
3. Engulfment- being trapped in liquid or solid material.
4. Danger from unexpected movement of machinery.
5. Electrocution.
7. Becoming wedged into part of the space and suffocating
8. Physical dangers such as falls, debris, slipping ladders
*NOTE: Each of these hazards is more serious in a confined space, since rescuers can have a
difficult time reaching you if you need help.

C. The work being done can cause conditions in a confined space to become more hazardous.
1. Hot work uses up oxygen and can release hazardous materials. Any hot work in a permit
space requires special authorization and a Hot work Permit.
2. Sanding, scraping and loosening residue can stir up hazardous materials.
3. Workers sometimes bring hazardous, such as solvents, into the permit space.
4. Work outside a permit space can produce harmful vapors that can collect inside.
5. The confined space entry permit tells what hazards are in the permit space and how to
control them. It usually includes a checklist of necessary safety measures.
6. Before anyone enters the permit space, the entry supervisor goes through the permit to
make sure all necessary hazard controls are in place and signs the permit. Reevaluation
of the conditions by the entry supervisor is required at intervals and when a
replacement entry supervisor takes over.

D. Equipment Required For Entry and Work
1. Appropriate personal protective equipment, such as hard hats, and face shields must be
made available at the site and listed.
2. List any special light sources and other electrical equipment that must be on hand
before entry begins.
3. Make sure this equipment is intrinsically safe and in good condition.
4. List any measures needed to guard against shock, such as ground fault circuit
interrupters (GFCI).
5. List devices such as ladders, and work platforms. Test this equipment before entry
begins.

E. Pre-Entry Planning
1. Preparing for entry
2. Check for completion of permit.
*NOTE: Safe confined space entry takes teamwork between all personnel. Everyone must do his or her part, so that any worker who goes into a non-permit confined space will one out of it in good health.

17.0 Permit-Required Confined Space Training

A. If you are one of 1.6 million Americans who work in confined spaces each year, you know your job is dangerous. Serious injury or death in a confined space can be the result of asphyxiation, engulfment, electrical shock, falls, and heat stress. The Occupational Safety and Health Administration (OSHA) believe 85 percent of these accidents can be prevented if you learn about the hazards you face on the job.

A confined space has the following characteristics:
1. Its size and shape allow a person to enter it.
2. It has limited openings for workers to enter and exit.
3. It is not designed for continuous occupancy.

B. A permit-required confined space has one or more of the following characteristics:
1. Contains or has potential to contain a hazardous atmosphere.
2. Contains a material that has the potential for engulfing an entrant.
3. Has an internal configuration such that the entrant could be trapped or asphyxiated by inwardly converging walls or by a floor, which slopes downward and tapers to a smaller cross-section.
4. Contains any other recognized serious safety or health hazard.

*NOTE: Some examples of confined spaces are reactor vessels, tanks, silos, boilers, sewers, and pipelines.

C. Permit Hazard
1. Hazardous atmosphere: The air might not have enough oxygen or might be flammable or toxic.
2. Entry is defined as placing any part of your body in the permit space.
3. Engulfment- being trapped in liquid or solid material.
4. Danger from unexpected movement of machinery.
5. Electrocution.
7. Becoming wedged into part of the space and suffocating.
8. Physical dangers such as falls, debris, slipping ladders.

*NOTE: Each of these hazards is more serious in a confined space, since rescuers can have a difficult time reaching you if you need help.

9. The work being done can cause conditions in a confined space to become more hazardous.
   a. Hot work uses up oxygen and can release hazardous materials. Any hot work in a permit space requires special authorization and a Hot work Permit.
   b. Sanding, scraping and loosening residue can stir up hazardous materials.
   c. Workers sometimes bring hazardous, such as solvents, into the permit space.
   d. Work outside a permit space can produce harmful vapors that can collect inside.

10. The confined space entry permit tells what hazards are in the permit space and how to control them. It usually includes a checklist of necessary safety measures.

11. Before anyone enters the permit space, the entry supervisor goes through the permit to make sure all necessary hazard controls are in place and signs the permit.
Reevaluation of the conditions by the entry supervisor is required at intervals and when a replacement entry supervisor takes over.

D. General Information
1. Safe confined space entry takes teamwork between the entrant, the attendant, and the entry supervisor. Everyone must do his or her part, so that any worker who goes into a permit-required confined space will come out of it in good health.
2. Although permits vary in size, length, and number of conditions covered, complete information is very important.
3. Permits should include:
   a. Specific permit space identification
   b. Purpose and date of entry
   c. Duration of authorization
   d. Authorized entrants by name
   e. Names of authorized attendant and entry supervisor
   f. Actual hazards of the identified space
   g. Control and isolation methods to be used
   h. Acceptable entry conditions
   i. Results of initial and periodic atmospheric testing
   j. Rescue and emergency services to be summoned
   k. Communication procedures authorized between attendant and entrants
   l. Equipment to be provided
   m. Other information as necessary
   n. Other permits, such as hot work

E. Preparation Of The Permit Space
This section lists the steps required to prepare the space before anyone enters it. The entry supervisor checks to see that each required precaution has been taken.
1. All departments likely to be affected by service interruption must be notified.
2. Post signs and put up barriers to protect entrants from vehicle traffic and pedestrians from falling into the space.
3. Blind or disconnect and cap all input lines, so that no hazardous materials can enter the space.
4. Make sure no hazardous energy can be released. Follow your company’s lockout/tag-out rules.
5. Empty the space of any materials that may be hazardous. If necessary, clean, purge or inert hazardous residue in the space.
6. When ventilation is needed, begin long enough in advance so that the air will be safe before anyone enters. Verify breathable atmospheres by measuring oxygen content, flammable gasses, etc.
7. Assignment and training of an entry supervisor, an attendant, and entrants is required to comply with the employer’s Permit Space Entry Program and Emergency Response Plan.
8. Attach a completed Hot work Permit, if required, to the Confined Space Permit.
9. Add emergency contact telephone numbers.

F. Atmospheric Testing
1. Test the air in all areas and levels of the space before entry. Monitor continuously or
retest periodically for as long as the space is occupied and as is appropriate for the hazard involved.

2. For most items, allowable limits should be given on the permit. After tests are conducted, results are entered on the permit.
   a. First, test to make sure the oxygen content is between 19.5 and 23.5 percent.
   b. Test the concentration of flammable gases, which must be less than 10 percent of the lower flammable limit (LEL).
   c. Airborne combustible dust cannot meet or exceed its LEL.

*NOTE: THE CONFINED SPACE IS NEVER ENTERED TO DETERMINE AIR QUALITY UNLESS SCBA OR AIRLINE RESPIRATORS ARE USED.

d. Toxicity: List any toxic materials that could be present and their permissible exposure limits (PEL). Test to make sure none of these materials has a concentration greater than its PEL.

e. If the air is unsafe according to any of these tests, the hazard must be controlled before entry is allowed.

f. If the air becomes hazardous later on, the permit must be canceled and everyone must leave the space.

g. Evaluate for heat stress potential. When testing is required enter the degree reading according to the Wet Bulb Globe Thermometer. Note F for Fahrenheit or C for Centigrade.

h. The person performing the atmospheric tests signs or initials the permit after each test result.

G. Equipment Required For Entry And Work
   1. Appropriate personal protective equipment, such as hard hats, face shields, and encapsulated suits must be made available at the site and listed on the permit.

   2. Decide whether respirators and portable air monitors are required and which types match the hazard.

   3. If continuous communication between the attendant and entrant will be difficult, choose and list communication devices to be used, such as radios, hand signals, camera equipment, etc. Test this equipment before entry.

   4. List any special light sources, spark-proof tools and other electrical equipment that must be on hand before entry begins and make sure this equipment is intrinsically safe and in good condition.

   5. List any measures needed to guard against shock, such as ground-fault circuit interrupters (GFCI), grounding, or bonding straps, etc.

   6. List devices such as ladders, scaffolding and work platforms. Test this equipment before entry begins.

H. Permit Authorization
   1. The entry supervisor types or prints a description of the entry on the entry permit.

   2. After verifying that acceptable entry conditions exist, the entry supervisor signs and dates the permit.

   3. Only then are workers allowed to enter the permit space.

I. Emergency And Rescue Procedures
   1. The safest method of rescue from a confined space when conditions deteriorate is:
Self-rescue, when an entrant evacuates the space with no help at the first sign of trouble and non-entry rescue.

2. Only workers trained and qualified in rescue operations or procedures can enter the space for emergency and rescue operations.

3. Notify the rescue service, they must be notified in advance of the entry to ensure that they are available for an emergency.

4. List the name and phone number of the rescue service must be made available to the Entry Supervisor and attendant for their use in case of a rescue emergency.

5. Refer to Page 31 Item E on confined space rescue.

J. Entry Supervisor

1. Any individual empowered by the empowered to authorize or to directly supervise entry operations in a permit pace is designated an entry supervisor.

2. The entry supervisor makes sure conditions are safe.
   a. Before entry, the supervisor verifies that the permit is filled out completely and all safety steps listed on it are taken, and then signs the form.
   b. If conditions become unsafe, the permit is canceled and everyone is ordered out of the space.
   c. The entry supervisor sees that any unauthorized people are removed.
   d. Every entry supervisor is responsible for canceling the entry authorization and terminating entry whenever acceptable entry conditions are not present.
   e. The entry supervisor directly in charge of entry operations at the time the work authorized by the permit is completed, must terminate the entry and cancel the entry permit. This includes taking necessary measures for concluding the entry operation and closing off the permit space.
   f. The entry supervisor on each shift must determine, at appropriate intervals dictated by the hazards and operations performed within the space that entry operations remain consistent with the terms of the entry permit and that acceptable entry conditions are maintained.
   g. Whenever responsibility for a permit space entry operation is transferred, the outgoing entry supervisor determines that entry operations are still consistent with the terms of the permit and that acceptable entry conditions are present, before turning operations over to the incoming entry supervisor.

K. Duties Of The Entry Supervisor

1. Persons acting as the entry supervisor may also serve as authorized entrants or attendants for an entry if they have the proper training.

2. Each entry supervisor:
   a. Knows the potential hazards during entry and work
   b. Determines if acceptable entry conditions are present at a permit space where entry is planned by monitoring and testing the atmosphere.
   c. Authorizes entry and oversees entry operations
   d. Terminates entry as required by the OSHA standard
   e. Verifies that rescue services are readily available and the means for summoning them are operable
   f. Removes unauthorized individuals who enter or try to enter the permit space during entry and work
g. Determines that entry and work operations remain consistent with entry permit terms and that acceptable entry conditions are maintained.

L. Attendant
The attendant stays at his or her post to observe conditions and support the entrant.
1. As an attendant, you must know the hazards of the permit space and the signs of exposure.
2. Keep a current count and be able to identify all entrants.
3. Stay in continuous contact with the entrants.
4. Be sure only authorized people enter the space or the area surrounding the space. Order all workers out of the space in any of these situations:
   5. You see a condition not allowed by the entry permit.
   6. You notice signs of exposure in any entrant.
   7. You see something outside the permit space that could cause danger inside.
   8. You must focus your attention on the rescue of entrants from another permit space.
   9. An attendant must never leave the observation post for any reason and remains outside the permit space.
10. If the entrants need to escape, call the rescue team at once.
11. In case of emergency, do not enter the permit space unless you are trained in confined space rescue, have proper emergency equipment and another attendant is there to replace you.
12. Knows behavioral effects of exposure
13. Performs no conflicting duties.

M. Duties Of The Attendant
1. The attendant continuously maintains an accurate count of authorized entrants in the permit space and ensures that the means used to identify authorized entrants can accurately identify those in the permit space. This requires that the attendant keep track of entrants as they enter and exit the space.
2. The attendant must know the exact count at all times so that no one is accidentally left in a confined space. During emergencies, an accurate count also ensures that no useless searches are made to find entrants no longer in the permit space.
3. The attendant must remain outside the permit space during entry operations until relieved by another attendant. Keeping unauthorized persons out of the space, being alert for hazards and providing information to rescue services are three duties requiring the attendant to remain posted until actually replaced by another attendant.
4. A well-trained attendant always monitors and tests the permit space itself as well as the immediate area around the space to detect potential hazards. Knowing that all attendants have adequate training frees up an entrant's attention for work and ensures the entrant's confidence that hazards will be detected.
5. The attendant orders entrants to evacuate the permit space immediately whenever the attendant:
   a. Detects a prohibited condition.
   b. Detects the behavioral effects of hazard exposure in an entrant.
   c. Detects a situation outside the permit space that could endanger entrants in the space.
   d. Cannot effectively and safely perform all the duties required.
6. The attendant must summon rescue and other emergency services as soon as he or
she has any concern for an entrant who may need assistance escaping from permit space hazards.

7. The attendant takes the following actions when unauthorized persons approach or enter a permit space while entry is underway:
   a. Warn unauthorized persons to stay away from the permit space.
   b. Advise unauthorized persons to exit immediately if they have entered the permit space.
   c. Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space.

8. Attendants can be permitted to perform any type of rescue, including non-entry rescue, as long as they are still acting as attendants. The attendant can respond to an emergency affecting one or more of the other permit spaces being monitored if it does not distract from the attendant's responsibilities.

9. The attendant may perform no other duties that might interfere with the attendant's primary duty to monitor and protect authorized entrants.

N. Entrant
1. The entrant must do his part to control the hazards of confined space entry.
   a. As an entrant, be sure you know the hazards of the space and the signs of exposure. For example, lack of oxygen can cause:
      (1.) Loss of muscle control
      (2.) Mental confusion
      (3.) Breathing difficulty
      (4.) Misguided feeling of well-being
      (5.) Ringing in the ears
      (6.) Death.
   b. Follow your personal protective equipment training carefully.
      a. Keep in contact with the attendant, and leave the space at once if you are ordered to evacuate.
      b. Always be ready to evacuate quickly and, if possible, without help.
      c. If you see that you are in danger, leave the space and tell the attendant.
      d. List necessary equipment or devices such as rescue equipment, whistles, phones, and radios. Rescue equipment, which may be required, should be on the job site. Make sure it is in working order before entry begins.
      e. It is a safe practice to ensure that all affected employees review the company's written Emergency Response Plan before entry.
      f. Positive pressure, self-contained breathing apparatus must be available on the site for rescuers if a respiratory hazard is potentially present.
      g. It is a safe practice to wear an emergency escape breathing system, sometimes called an egress bottle, into a permit space whenever supplied air is required for entry. Should the supplied air fail, your emergency breathing apparatus must provide enough air to allow you to escape to breathable air.

2. Those of you working in or around confined spaces are aware of the danger. Yet, if you are familiar with pre-entry planning and with simple safety measures, most dangers can be avoided.

O. Duties Of Authorized Entrants
1. Authorized entrants must maintain contact with their attendant to improve their
chances of safe exit. Such systems as two-way radios, television, or other continuous electronic monitoring equipment in combination with alarms and voice contact are considered effective methods of communication between attendant and entrant.

2. Entrants must communicate with the attendant to enable the attendant to:
   a. Monitor entrant status, especially subtle behavioral changes in entrant speech or deviation from set communication procedures
   b. Alert entrants of the need to evacuate the space.

3. In addition to an entrant's responsibility for self-rescue, the assigned attendant likewise may make an independent decision to terminate entry, based on:
   a. The entrant's failure to maintain contact
   b. Changes in the entrant's communications behavior
   c. Other changes in or outside the space, which endanger the entrant.

4. Authorized entrants must be trained to alert the attendant whenever:
   a. The entrant recognizes any warning sign or symptom of exposure to a dangerous situation
   b. The entrant detects a prohibited condition. A prohibited condition is any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

5. Authorized entrants must exit the permit space as quickly as possible when:
   a. An order to evacuate is given by the attendant or the entry supervisor
   b. The entrant recognizes any warning sign or symptom of exposure to a dangerous situation
   c. The entrant detects a prohibited condition
   d. An evacuation alarm is activated

P. Pre-Entry Planning
Preparing for entry
1. Check for completion of permit.
2. Erect barriers around the space.
3. Cap, blind or disconnect all input lines.
4. Clear and ventilate the space of harmful vapors and residue.
5. Make sure all participants understand the Emergency Action Plan.

Q. Ventilating Air Quality
1. Person testing or monitoring must use respiratory protection or test from outside.
2. Periodic testing must be continued as long as space is occupied.
3. Oxygen level must be between 19.5 and 23.5 percent.
4. Flammable gasses must not exceed 10 percent of LFL/LEL.
5. Toxic concentrations must not be over PEL/TLV.
6. Test for heat stress with Wet Bulb Globe Thermometer.
7. All tests must be complete, accurate and documented before entry.

R. Safety Measures
1. Equipment
   All personal protective equipment and emergency escape breathing systems must be available on site.

2. Emergency situation
   a. Emergency services must be notified well in advance of time, date, and place of entrance.
b. The attendant may enter only if trained in rescue and if a second attendant is present.

18.0 Forms

A. SAF-35.3-1 – Type of Confined Space Decision Flow Chart
B. SAF-35.3-2 - Permit-Required Confined Space Flow Chart
C. SAF-35.3-3 - Non- Permit Required Confined Space Work Form
D. SAF-35.3-4 - Alternate Entry Confined Space Work Form
E. SAF-35.3-5 - Confined Space Entry Permit
F. SAF-35.3-6 – Permit – Required Confined Space Quiz and Answers
G. SAF-35.3-7 – Acknowledgment of Permit Required Confined Space Training
Type Of Confined Space - Decision Flow Chart

Does the size and shape allow a person to bodily enter to perform work? Are openings limited or restricted, making entry, and egress difficult? Is the space designed for continuous human occupancy?

No → This is not confined space.
Yes → This is a confined

Can the hazards be eliminated?
- By purging or insertion?
- By isolation from hazardous energy and materials?
- By lockout/tag-out?
- By blanking or binding?
- By ventilation?

Yes → This is a permit-required confined space.
No → This is a non-permit or alternate-entry confined space.

Does the space contain any of the following?
- Thermal burn hazard.
- Chemical burn hazard.
- Mechanical force hazards.
- Engulfment hazards.
- Noise hazards.
- Heat stress hazards.
- Atmospheric hazards.

Yes → This is a non-permit confined space.
No → This is a permit-required confined space.

Will employees enter this confined space?

No → Follow Permit Required Confined Space Entry Requirements. Provide training to employees. Correct or prevent IDLH situations. Ensure entrants can escape unaided. Provide necessary PPE for hazards. Ensure proper equipment is used. Prepare permit for entry. Post an attendant to monitor the workers inside the space. Provide atmospheric testing or continuous air monitoring.
Yes → Post signs and place barricades to prevent entry. Provide training as necessary.

Is the only remaining hazard, an atmospheric hazard that is controlled by ventilation?

No → This is an alternate-entry.
Yes → This is a non-permit confined space.

Provide inspections and surveys to ensure postings and barricades remain in place.
Permit Required – Confined Space Flow Chart

Does the workplace contain permit required confined spaces?

- No → Consult other applicable OSHA standards.

- Yes → Will permit spaces be entered?

- No → Prevent employee entry. Do task from outside of space.

- Yes → Informed employees?

- No → Prevent unauthorized entry. Do task from outside of space. Inform Contractor that Contractor’s employees will do the task. Contractor obtains required information.

- Yes → Will contractors enter?

- No → Will host employees enter to perform entry task?

- No → Coordinate entry operations. Prevent unauthorized entry.

- Yes → Prepare for entry via permit

Verify acceptable entry conditions (test results recorded, space isolated if needed, entrants properly equipped, etc.)

- Yes → Permit issued by authorizing signature. Acceptable entry conditions maintained

Entry tasks completed. Permit returned and canceled.

Evaluate permit program and permit based on evaluation of entry by entrants, attendants, etc.

- No → Note 1 - Spaces may have to be evacuated and re-evaluated if hazards arise during entry.

- Yes → Does space have known or potential

- No → Not a permit required confined space. Consult other OSHA standards.

- Yes → Can hazards be eliminated?

- No → Employer may choose to reclassify space to non-permit required confined space.

- Yes → Can space be maintained in a condition safe to enter by continuous forced air ventilation only?

- No → Space may be entered under alternate methods.

- Yes → Prepare for entry via permit

Verify acceptable entry conditions (test results recorded, space isolated if needed, entrants properly equipped, etc.)

- Yes → Permit issued by authorizing signature. Acceptable entry conditions maintained

Entry tasks completed. Permit returned and canceled.

Evaluate permit program and permit based on evaluation of entry by entrants, attendants, etc.

- No → Emergency exists (prohibited condition.) Evacuate entrants. Abort entry. (Call rescuers if needed.) Permit is void. Reevaluate program to correct/prevent prohibited condition. Occurrence of emergency (usually) is proof of deficient program. No re-entry until program (and permit) is amended. (May require new program.)

CONTINUE
**NON-PERMIT REQUIRED CONFINED SPACE WORK FORM**

Space to be entered: ________________________ Location / Description: ________________________

Purpose of entry: ________________________ Permit Valid for ________________________

Supervisor Authorizing Work: ________________________ (Print) ________________________ (Signature)

Individuals Authorized to Perform Work:
________________________
________________________
________________________
________________________
________________________

(Print) ________________________ (Signature)

I have evaluated the hazards of the above confined space and have determined that there are no hazards present. I have also made the required safety equipment available and instructed the authorized individuals accordingly as required by 29 CFR 1926.21.

Hazard Evaluator: ________________________ Date of Evaluation: ________________________

### ATMOSPHERIC TESTING

<table>
<thead>
<tr>
<th>Hazard</th>
<th>YES</th>
<th>NO</th>
<th>Results (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen Deficiency Enriched</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrogen Sulfide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hazardous Vapors / Gases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO Level within Limits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explosive Atmosphere</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results (%):

This part of the permit is required to be completed prior to all work to be performed inside or above loading or unloading bins and hoppers. Permit expires at the end of the shift on which it was issued. A new permit must be issued for work, which continues into the next shift. The proposed work requires the following:

- Safety belt, lanyard, and separate lifeline (29 CFR 1926.104):
  - YES [ ] NO [ ]
- System lockout/tagout (29 CFR 1926.417)
  - YES [ ] NO [ ]
- Other personal protective equipment (29 CFR 1926.28)
  - YES [ ] NO [ ]
- If Yes, list:

- Fire protection (if hotwork) 29 CFR 1926.352:
  - YES [ ] NO [ ]
- Attendant:
  - YES [ ] NO [ ]
- Other requirements:

- Comments:

---

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# Alternate Entry Confined Space Work Form

<table>
<thead>
<tr>
<th>Space to be entered:</th>
<th>Location / Description:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Purpose of entry:</th>
<th>Permit Valid for:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Supervisor Authorizing Work:</th>
<th>(Print)</th>
<th>(Signature)</th>
</tr>
</thead>
</table>

| Individuals Authorized to Perform Work: | |
|------------------------------------------||

<table>
<thead>
<tr>
<th>(Print)</th>
<th>(Signature)</th>
</tr>
</thead>
</table>

I have evaluated the hazards of the above confined space and have determined that there are no hazards present. I have also made the required safety equipment available and instructed the authorized individuals accordingly as required by 29 CFR 1926.21.

Hazard Evaluator: ___________________________ Date of Evaluation: ___________________________

## Atmospheric Testing

<table>
<thead>
<tr>
<th>Hazard tested</th>
<th>YES</th>
<th>NO</th>
<th>Results (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen Deficiency Enriched</td>
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<td></td>
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</tr>
<tr>
<td>CO Level within Limits</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>Explosive Atmosphere</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
</tbody>
</table>

Ventilation Required to Control Atmospheric Hazard(s): 

Comments:

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**CONFINED SPACE ENTRY PERMIT**

**GENERAL INFORMATION:**
- Permit No. __________________________
- Space to be Entered: __________________________
- Authorized Duration of Permit: ___ to ___
- Location / Description: __________________________
- Date: ___ to ___
- Time: ___ to ___

**PERMIT SPACE HAZARDS (Indicate specific hazards)**
- Oxygen deficiency (less than 19.5%)
- Oxygen enriched (greater than 23.5%)
- Flammable gases or vapors (greater than 10% of LFL)
- Airborne combustible dust (meets or exceeds LFL)
- Toxic gases or vapors (greater than PEL or TLV)
- Mechanical Hazards
- Electrical Hazards
- Chemical Hazards (material harmful to skin, eyes, respiratory tract, etc.)
- Engulfment
- Other: __________________________________________

**EQUIPMENT REQUIRED FOR ENTRY AND WORK**
- Specify as required:
  - Personal protective equipment: __________________________
  - Respiratory Protection: __________________________
  - Atmospheric Testing / Monitoring __________________________
  - Communication: __________________________
  - First Aid / CPR Responders: __________________________

**PREPARATION FOR ENTRY (Check after steps have been taken)**
- Notification of affected groups of service interruption:
  - Isolation Method: Lockout / Tagout
  - Purge / Clean: Inert
  - Atmosphere Test: Barriers
  - Personnel Awareness:
    - Pre-entry briefing on specific hazards and control methods
    - Notify contractors of permit and hazards conditions
    - Other: __________________________

**RESOURCES OF EXPOSURE**
- Inhalation
- Ingestion
- Skin Absorption

- Authorized Entrants (List by name or attached roster):

**Authorized Attendants (List by name or attached roster):**

**Atmosphere Test Frequency:**

**TESTING**
- ACCEPTABLE CONDITIONS
- Result
- Result
- Result
- Result
- Result
- Result
- Time
- Oxygen Level: >19.5%<23.5%
- Flammability: <10% LEL/LFL
- CO: <35 ppm
- Hydrogen sulfide: <10 ppm
- Cl₂: <0.5%
- Toxic – (specify)
- SO₂: <2 ppm
- Heat: In degrees
- Other: __________________________

**Tester Initials**

**AUTHORIZED BY ENTRY SUPERVISORS**

I verify review of this permit and verify that all necessary precautions have been taken to provide entry work in this confined space.

**Printed Name**

**Signature**

**Date**

**Time**

**THIS PERMIT MUST BE POSTED AT THE CONFINED SPACE AND IS GOOD ONLY ON INDICATED DATES**
PERMIT - REQUIRED CONFINED SPACE QUIZ

Name: ___________________________ Date: ______/_____/_____

Employee #: ___________________________

Write True or False ALL QUESTIONS MUST BE ANSWERED CORRECTLY

1. _____ One feature of permit-required confined spaces is that they have small or obstructed ways of getting in and out.
2. _____ The only serious hazard of permit spaces is that the air might not have enough oxygen.
3. _____ Hazards in permit spaces are more serious because it can be difficult for rescuers to reach workers who need help.
4. _____ The employer identifies all permit spaces in the workplace and their hazards.
5. _____ If conditions are safe before anyone enters a permit space, they will stay safe throughout the work.
6. _____ After workers enter a permit space, the entry supervisor verifies and signs the permit.
7. _____ Whenever the air in a permit space may be oxygen deficient or IDLH, an emergency escape breathing system to back up supplied air must be worn.
8. _____ Before anyone enters a permit space, it is necessary to make sure no hazardous energy or material will be released into the space.
9. _____ Permit spaces must sometimes be cleaned before entry to get rid of hazardous materials.
10. _____ If ventilation is needed, it should be started prior to the space being entered.
11. _____ The air must be tested in only one part of the permit space, since it will be the same in all areas of the space.
12. _____ The three basic atmospheric tests check the air’s oxygen level, flammability, and toxicity.
13. _____ A permit space can be entered if two of the three atmospheric tests show the air is safe.
14. _____ Special equipment is sometimes needed in permit spaces to guard against falls and electric shocks.
15. _____ When respiratory protection is needed, any type of respirator can be used.
16. _____ In some cases, permit space entrants and attendants need radio or video equipment to stay in contact with each other.
17. _____ Rescue equipment should be tested before entry begins.
18. _____ One duty of the entry supervisor is to make sure conditions stay safe after the permit space has been entered.
19. _____ If the attendant sees a dangerous condition, he must ask the entrant supervisor to order the entrants to leave the permit space.
20. _____ In an emergency, the entrant should wait inside the permit space for help to arrive.
PERMIT - REQUIRED CONFINED SPACE QUIZ ANSWERS

1. True
2. False
3. True
4. True
5. False
6. False
7. True
8. True
9. True
10. True
11. False
12. True
13. False
14. True
15. False
16. True
17. True
18. True
19. False
20. False
Acknowledgment Of Permit - Required Confined Space Training

I ______________________________ Have read and understand the training
(Print Name)

Packet, permit – required confined space entry. I have also completed and answered all the questions correctly
on the permit – required confined space quiz.

(Employee Signature) (Date) (Division or Subcontractor)

(Instructor’s Name Printed) (Date) (Instructor’s Signature)
1.0 Scope

   A. Purpose

      1. The purpose of this procedure is to establish a basis for an effective and defensible Project Respiratory Protection Program.

      2. This procedure establishes the minimum standard for respirator training, selection, and use during the performance of all work requiring such protection.

      3. This procedure shall apply to all project personnel who are required to use respiratory protective devices.
4. This procedure shall not be used in lieu of generally accepted engineering practices for air contaminant control where they are feasible.

B. Applicability
Respiratory protection approved by the National Institute of Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA) shall be provided to all employees subject to harmful concentrations of dusts, gases, fumes, mists, toxic materials or atmospheres deficient in oxygen.

C. Authority
The subject material in this procedure is based on the requirements of the Occupational Safety and Health Administration (OSHA), the Mine Safety and Health Administration (MSHA), generally recognized industrial hygiene practice and/or the recommendations of the National Institute of Occupational Safety and Health (NIOSH).

2.0 References
A. Safety and Health Regulations for Construction; 29 CFR 1926.103, 1926.55 and 1926.353.
B. Occupational Safety and Health Standards for General Industry; 29 CFR 1910.134. (Revised 2/1/99)

3.0 Requirements
Prerequisites
A. All personnel who are required to wear respirators will be properly trained, fit tested and given medical clearance by a medical physician at initial job assignment and periodically thereafter, in accordance with the requirements of this procedure. Respirators, medical tests, and training required under this section are to be provided at no cost to the employee.
B. Employee training and fit testing of the respirator will be conducted for each type of respirators to be used.
C. All personnel who may be required to wear a respirator must complete a Medical Evaluation as required by 29CFR 1910.134. An evaluation by a medical physician will be conducted which will include a release statement from that physician authorizing the worker’s use of a respirator before the employee is fit tested or required to use the respirator in the workplace.
D. The Medical Evaluation required under this section must remain confidential and performed during normal working hours or at a time convenient to the employee.
E. The employee shall be given the opportunity to discuss the questionnaire and examination results with the Physician Licensed Health Care Provider (PLHCP) or other licensed health care provider.
F. Once the questionnaire has been completed by the worker, the following tests may be administered at the direction of the examining physician:
1. Pulmonary function testing (PFT). If necessary, a PFT should be performed using NIOSH standards and include forced expiratory volume in one (1) second (FEV1), forced vital capacity (FVC), and FEV1-to-FVC ratio, with an interpretation and comparison to normal predicted values corrected for age, height, race and sex. A permanent record of flow curves shall be placed in the
worker’s medical records. The tests shall be conducted by a NIOSH certified technician and the results interpreted by a physician.

2. Blood pressure.
3. Electrocardiogram (EKG). A standard, 12-lead resting EKG may be performed at the discretion of the examining physician. A “stress test” (graded exercise) may be considered particularly where heat stress may occur.
4. Any other test that the examining physician deems appropriate toward determining the worker’s capability of wearing a respirator.

G. In order to ensure that the physician or other PLHCP adequately evaluates the employee’s ability to safely wear a respirator the following information must be provided to the PLHCP:
1. Respirator type and weight.
2. Duration or frequency of use.
3. Expected physical work effort.
4. Other protective work clothing.
5. Temperature and humidity extremes.

H. Facial hair, which may interfere with a proper respirator face piece to face seal or exhalation valves, shall be removed before a respirator is allowed to be worn.

I. Eyeglass temples will interfere with the proper sealing of a full-face respirator. Personnel who wear eyeglasses and are required to wear full-face respirators will be fitted with respirators modified with special eyeglass kits.

J. All respirator, cartridges, and canisters shall be approved by the National Institute of Occupational Safety and Health (NIOSH), and / or the Mine Safety and Health Administration (MSHA).

K. Records generated in support of any of the above shall be retained in accordance with 29 CFR 1910.20.

4.0 Responsibilities
A. Project Superintendent
The Project Superintendent is responsible for identifying specific work site conditions / operations that will require the implementation of the Respiratory Protection Procedure for the protection of the worker’s health, which includes the responsibilities listed below:
1. Ensure that all workers that will be required to wear respirators have been adequately trained in the use and limitations of respirators and ensure that all respirators are selected based upon respiratory hazards to which the worker is exposed.
2. Identify respiratory hazards.
   a. Oxygen Deficiency
   b. Air Contaminants
   c. Particulates
   d. Toxic Gases
3. Trained and qualified technical personnel shall perform assessment of the degree of respiratory hazards through sampling and testing of the work environment.
Problems requiring special respiratory protection should be discussed with Safety Health and Environmental Department

4. Each Project shall establish procedures to control respiratory hazards through engineering or administrative controls, product/material substitution, respiratory protective devices, or a combination of these methods.

5. The Project Superintendent shall select and provide adequate respiratory protective devices for use on the project site. This selection shall be based upon the specific type of air contaminant(s), the concentration of the contaminant(s), or oxygen deficiency in the work environment.

6. The Project Superintendent shall communicate to the employees that the respirators, medicals, and training are furnished by the company.

7. Preferred Industrial Contractors, Inc. will conduct evaluations of the workplace as necessary to ensure that the provisions of the current written program are being effectively implemented and that the Respiratory Protection Programs are effective.

B. All Workers Who Wear Respirators Will:

1. Use the provided respiratory protection in accordance with instructions and training described in this procedure.
2. Maintain the devices in proper working order.
3. Immediately report any malfunction of the device to his/her supervisor.

C. Training Of Supervisors

1. Persons who have the responsibility of overseeing the work activities of one or more workers, who must wear respirators, should be given adequate training to ensure that the respirators are properly used. SAF-35.4-6 “Respiratory Protection Qualification Sheet” shall be filled out and kept on file. Adequate supervisory training should include, but not necessarily be limited to the following:
   a. The nature and extent of respiratory hazards to which persons under their supervision may be exposed.
   b. The principles and criteria of selecting respirators.
   c. The issuance and inspection of respirators.
   d. The maintenance and storage of respirators.
   e. The location of the rules concerning respirator use.

D. Training Of Person(s) Issuing Respirators

A person assigned the task of issuing respirators to persons who must wear respirators for protection against harmful atmospheres should be given adequate training to ensure that the correct respirator is issued for each application. This training should include, but not necessarily be limited to, the following:

1. Establishment of a working knowledge of the specific types of respirators to be issued, their limitations and the importance of issuing only the respirators for which each user is specifically approved.
2. Be sufficiently familiar with the respirator maintenance and repair procedure in order to be able to identify any respirator that is improperly cleaned or needs repair.
3. Be familiar with the procedures for respirator issue. Only persons trained to ensure that proper respirators are issued shall be permitted to issue respirators to persons needing them.

E. Employee Training
The Project Superintendent shall ensure that the workers are given the proper training for the type of respirator to be worn, and that the indoctrination and training forms have been completed. The following are topics of the training:

1. The hazards and consequences of improper respirator use.
2. The engineering and administrative controls being used and the need for respirators.
3. The reason for selecting the particular type of respirator.
4. The function, capabilities, and limitations of the selected respirator.
5. The method of donning, checking the fit and operation of the respirator.
6. The proper wearing of the respirator and maintenance requirements.
7. How to recognize and handle emergency situations.
8. Regulations concerning respirator use.

F. Fit Testing

1. A qualitative or quantitative fit test shall be conducted for each worker who may or will be required to wear a respirator, initially prior to work, and annually when respirators will be worn thereafter.
2. Each worker will be required to check the seal of the respirator initially when putting the respirator on and prior to entering a harmful atmosphere. (Positive and Negative Fit Checks)
3. A worker shall be allowed to use only the specific make(s) and model(s) of respirator(s) for which the worker has obtained a satisfactory fit and the respirator protection factor listed under “qualitative test” shall apply.
4. Under no circumstances shall a worker be allowed to use any respirator if the results of the qualitative fit test indicate that the worker is unable to obtain a satisfactory seal.
5. Fit testing will be performed using a Qualitative (QLFT) or Quantitative (QNFT) Protocol listed in Appendix A of OSHA 29 CFR 1910.134.

G. Training And Fit Testing Documentation

Training and fit testing performed shall be documented using SAF-35.4-4 and SAF-35.4-5.

H. Fit Testing Annually

All employees required to use respirators shall be respirator fit tested on an annual basis, unless fit tests are required more frequently. All supervisors and respirator issuers shall be trained annually.

I. Monitoring Requirements

In order to ensure that respiratory protection devices are being used properly, the Project Superintendent shall periodically monitor their use. Minimum monitoring requirements are as follows:

1. Is the respirator in use the type specified?
2. Is the respirator the make and model that has been fitted to the worker and has it been approved for use?
3. Is the respirator clean and in proper working order?
4. Is the respirator worn properly? (Straps in proper place. Correct installation of cartridges. Positive and negative fit checks made by worker before entering contaminated area?)

5.0 Respirator Selection

A. Only approved NIOSH/MSHA respirators will be used. Physical characteristics, functional capabilities, and performance limitations of various types of respirators shall be considered in the selection process.
B. Proper selection of a respirator shall require consideration of the factors listed below:
   1. Nature of the hazard. (See Respiratory Selection for Routine Use of Respirators)
   2. The operation or process creating the hazard.
   3. Location of the area with respect to a safe area having clean breathable air.
   4. Time period respiratory protection is required.
   5. Worker(s) activities.

C. Preferred Industrial Contractors, Inc. will take whatever engineering and control methods necessary to eliminate the need to enter IDLH atmospheres, however, should it be necessary to enter an IDLH atmosphere the following procedures shall be followed:
   1. Workers inside the IDLH atmosphere will be equipped with pressure demand or other positive pressure SCBAs, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA.
   2. Outside standby person(s) will be located outside the IDLH atmosphere;
   3. The standby persons(s) located outside the IDLH atmosphere will be trained and equipped to provide effective emergency rescue as necessary;
   4. Employee(s) located outside the IDLH atmospheres are equipped with:
      a. Pressure demand or other positive pressure SCBAs, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA.
      b. Appropriate retrieval or rescue equipment for removing the employee(s) who enter the hazardous atmospheres.
   5. Constant visual, voice, or signal communication will be maintained between the employee(s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere;
   6. Project security or the plant rescue team shall be notified before the standby person(s) located outside the IDLH atmosphere enter the IDLH atmosphere to provide emergency rescue;

D. Respirator evaluation for proper respirator selection shall be accomplished by evaluating the respiratory hazards in the workplace, including a reasonable estimate of employee exposures to respiratory hazards.

6.0 Respirator Maintenance

If possible, respirators are to be issued to workers for their exclusive use. The worker to ensure good hygiene for those respirators, which are used on a continuous basis, shall perform cleaning and sanitizing daily. Those that are used on a non-routine basis shall be cleaned and sanitized after every use.

A. Manual Cleaning
   1. A generalized cleaning procedure is found in the manufacturer’s manual. Read the respirator manual and follow the manufacturer’s recommendations.
      a. Remove canisters, filters, valves, straps, and speaking diaphragms from the facepiece.
      b. Wash facepiece and accessories in warm soapy water or a commercially available cleaner, following the manufacturer’s instructions. Gently scrub the respirator.
      c. Rinse parts thoroughly in clean water.
      d. Air dry in a clean place or wipe dry with a lintless cloth.
      e. When the cleaner does not contain a disinfecting agent, an approved method of disinfecting the respirators should be used.
2. Respirators which are not grossly contaminated can be cleaned and disinfected using alcohol or antiseptic towelettes, provided the respirator is properly cleaned and disinfected in a manner that does not damage the respirator and does not cause harm to the user.

B. Machine Cleaning
   1. Machines may be used to expedite the cleaning, sanitizing, rinsing, and drying of large numbers of respirators. Read the cleaning machine’s manual and follow manufacturer’s recommendations. Ultrasonic cleaners, clothes-washing machines, dishwashers, and clothes dryers have been specially adapted and successfully used for cleaning and drying respirators.
   2. After cleaning and sanitizing, each person shall examine the respirator prior to use to determine if it is in proper working condition, if it needs replacement of parts or repairs, or if it should be discarded. Respirator inspections shall include, when applicable, a check for tightness of connections; for the condition of the respiratory inlet covering, head harness, valves, connecting tubes, harness assemblies, filters, cartridges, canister, end-of-service life indicator, and shelf life date(s), and for the proper function of regulators, alarm, and other warning systems.
   3. Each rubber or other elastomeric part shall be inspected for pliability and signs of deterioration. Each air and oxygen cylinder shall be inspected to ensure that it is fully charged according to the manufacturer’s instructions.

C. Part Replacement and Repair
   Only persons trained in proper respirator assembly and correction of possible respirator malfunctions and defects shall do replacement of parts or repairs. Replacement parts shall be only those designed for the specific respirator being repaired. Reducing or admission valves, regulators, and alarms shall be returned to the manufacturer for repair or adjustment. Instrumentation for valve, regulator and alarm adjustments, and tests must be approved by the valve, regulator, or alarm manufacturer.

D. Storage
   Respirators shall be stored in a convenient, clean, and sanitary location. The purpose of good respirator storage is to ensure that the respirators will function properly when used. Respirators shall be stored in a manner that will protect them against dust, sunlight, heat, extreme cold, excessive moisture, or damaging chemicals. Respirators shall be stored to prevent distortion of rubber or other elastomeric parts. Storing the respirators in hermetically sealed plastic bags or plastic bags capable of being sealed can do this. Respirators shall not be stored in such places as lockers and toolboxes unless they are protected from contamination, distortion, and damage. Emergency and rescue use respirators that are placed in work areas shall be quickly accessible at all times and the storage cabinet or container in which they are stored shall be clearly marked. The Area Safety Supervisor will monitor respirator storage. Respirators not properly stored will be cleaned, inspected, and properly stored.

E. Procedure Evaluation
   Preferred Industrial Contractors, Inc. will conduct evaluations of the workplace as necessary to ensure that the written respiratory program is being properly implemented and consult with employees to ensure that they are using the respirators properly, and to assess the employee’s views on the Program effectiveness, and to identify any problems. Any problems identified during the assessment are to be corrected. Items to be assessed include, but are not limited to:
1. Respirator Fit
2. Appropriate respirator selection for the hazards to which an employee is exposed.
3. Proper respirator use for workplace conditions.
4. Proper respirator maintenance.

7.0 Supplied Air Respirators (SAR’s and SCBA’s)

A. Compressed air used for Supplied Air Respirators and SCBA’s shall meet the Requirements for TYPE 1 - Grade Breathing Air as described by ANSI and The Compressed Gas Association to include:
   1. Oxygen content of 19.5% - 23.5%.
   2. Condensed Hydrocarbon Content of 5mg/cc or less.
   3. Carbon Dioxide Content of 1000ppm or less.
   4. Carbon Monoxide Content of 10ppm or less.
   5. Lack of noticeable odor.

B. Compressors used to supply breathing air to respirators are to be constructed and situated to:
   1. Prevent entry of contaminated air into the air supply system.
   2. Minimize moisture content.

C. When using an air compressor or “plant” air, a breathing air box with in-line filters and a carbon monoxide monitor shall be used. The CO monitor alarm shall be set at 10ppm CO.

D. Fittings or couplings for breathing air systems shall be incompatible with non-breathable air or other gas systems.

E. Hose lengths used for supplied air respirators shall not exceed 300 feet in length.

F. Cylinders used for supplied air respirators shall contain grade “D” breathing air and meet all applicable Department of Transportation Requirements. Under no circumstances shall oxygen be used in place of grade “D” breathing air for supplied air systems.

8.0 Record Keeping

A. Preferred Industrial Contractors, Inc. shall establish and maintain written information regarding medical evaluations, Fit Testing, and the contents of the Respirator Program. Records shall include, but not limited to:
   1. Records of required medical evaluations shall be retained, and made available in accordance with OSHA 29 CFR 1910.120.
   2. Preferred Industrial Contractors, Inc. shall establish and retain records of Qualitative and Quantitative Fit Tests performed, and shall include:
      a. Name or identification of employee
      b. Type of test performed.
      c. Specific make, model, style, and size of respirator tested.
      d. Date of test.
      e. Pass/Fail results for QLFT or the Fit Factor and data for QNFT test results.
   3. Fit Test records shall be retained for respirator users until the next test is performed.

B. A written copy of the Respirator Program shall be retained by Preferred Industrial Contractors, Inc.

C. Written materials required to be retained under OSHA 19 CFR 1910.134 shall be made available to the secretary upon request.
9.0 Forms

A. SAF-35.4-1 – Respiratory Selection For Routine Use Of Respirators
B. SAF-35.4-2 - Physician’s Release Statement
C. SAF-35.4-3 - Respirator Training Record
D. SAF-35.4-4 - Training Record for Persons Issuing Respirators
E. SAF-35.4-5 – Training Record for Supervisors of Respirator Instruction
F. SAF-35.4-6 - Respiratory Protection Qualification Sheet
G. SAF-35.4-7 - Respirator Selection Worksheet
H. SAF-35.4-8 - Respirator Inspection, Cleaning Maintenance and Storage Checklist
I. SAF-35.4-9 - Respiratory Protection Training
J. SAF-35.4-10 - Respirator Protection Indoctrination and Training
K. SAF-35.4-11 - Respirator Protection Procedure Evaluation Guide
L. SAF-35.4-12 - Proper Procedures For Qualitative Respirator Fit Testing With Irritant Smoke
M. SAF-35.4-13 - Corporate Approved Respirators
SAF 35.4-2

PHYSICIAN RELEASE STATEMENT

Date: __________________________

Company: __________________________

Employee Name: __________________________

SSN: __________________________

Date Information Collected: __________________________

History: __________________________

Spirometry: __________________________

Blood Pressure: __________________________

Pulse: __________________________

Medical clearance for full-face or half-face positive and / or negative pressure respirator is given until __________________________

Medical clearance for respirator is not given.

Sincerely,

____________________________

PIC  Rev 12/12/11
RESPIRATOR TRAINING RECORD

Company: ___________________________ Date: ___________________________

Location / Unit: ___________________________

Respirator Training was given in accordance with the Corporate SH&E Department’s Respirator Protection Procedure. Qualitative fit testing was completed using an appropriate test atmosphere. NIOSH certified respirators were issued to the following individuals and each individual checked for proper fitting.

<table>
<thead>
<tr>
<th>Wearer’s Signature</th>
<th>Respirator Style &amp; No.</th>
<th>Cartridge Type &amp; No.</th>
<th>Qualitative Fit Test For Exposure To</th>
<th>Passed Fit Test</th>
<th>Yes No</th>
<th>Trainer’s Initials</th>
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</tbody>
</table>

Complete all Sections fully and Submit a copy to the Corporate SH&E Department Supervisor.

______________________________
Trainer

______________________________
Supervisor

PIC Rev 12/12/11
RAINING FOR PERSON ISSUING RESPIRATORS

Name: ____________________________________
Project Name: ____________________________________

Respirators

1. Basic Respirator Wearer Training
   Given By: ____________________________________
   Date: ____________________________________

2. Training on Respirators to be Used
   Given By: ____________________________________
   Date: ____________________________________

3. Training to Recognize Defective or Improperly Maintained Respirators
   Given By: ____________________________________
   Date: ____________________________________

4. Training for Respirator Issue
   Given By: ____________________________________
   Date: ____________________________________

5. Annual Repeat of Training
   Given By: ____________________________________
   By: _________________________________
   Date: ____________________________________
   Given By: ____________________________________
   Date: ____________________________________
<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
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</tbody>
</table>
RESPIRATORY PROTECTION QUALIFICATION SHEET

Name: ________________________________ (Print)

Trained By: ________________________________

Location/Unit: ________________________________

1. Medical Questionnaire ________________________________ Completed Date: ________________
   Trainer’s Signature

2. Respiratory Training ________________________________ Completed Date: ________________
   Trainer’s Signature

3. Respiratory Fit Test Completed

   A. Quantitative Test
      Protection Factor ________________ Date ________________
      Trainer’s Signature

   B. Qualitative Test ________________ Date ________________
      Trainer’s Signature

I, ________________________________, acknowledge the receipt and understanding of the
respiratory training and fitting.

________________________________________   ________________________________
Signature                                          Date:
**RESPIRATOR SELECTION WORKSHEET**

1. Project Name: ____________________________
   Name of Project Superintendent/SH&E Representative: ____________________________
   (Print)

   Location: ____________________________

   Prepared By: ____________________________ Date Prepared: ____________________________

2. Respirator Use Identification
   Locations and/or jobs where the respirator selected is to be used: ____________________________

3. Nature of the Hazard
   Hazardous material and/or condition being evaluated: ____________________________

   | Biological Effects | Yes | No |
   | Oxygen Deficiency  | Yes | No |
   | IDLH Atmosphere    | Yes | No |
   | Toxic Contaminant  | Yes | No |

   If Yes, Identify: ____________________________

   | Gaseous | Asphyxiant | Sensitizer | Simple | Chemical | Irritant |
   | Particulate | Relatively Inert | Systemic Poisons | Chemical | Allergy | Irritant |
   | Pulmonary Fibrosis Producing | Carcinogen |
   | Febrile-Reaction Producing |

**NOTE:**
This worksheet shall be prepared for each hazardous material where a specific type of respirator is to be selected. If the same material is present at a number of locations and the same type of respirator is to be specified, the selection should be based on the most hazardous condition reasonably expected. If the material is present at two or more places at sufficiently different concentrations to require different respirator types, a worksheet shall be prepared to cover each respirator type. The preparer is referred to ANSI standard Z 88.2-1992 or contact the Corporate SH&E Department for guidance.
Combination Gaseous and Particulate:
(Indicated in appropriate places in groupings given the previous page)

Any known additive or synergistic effects? ____________ Yes □ No □
If Yes, describe: __________________________________________________________

Respirator Selection Properties

Gaseous: Particulate:
Inert _______ Dust _______
Acidic _______ Spray _______
Alkaline _______ Fume _______
Organic _______ Mist _______
Organometallic _______ Fog _______
Hydrides _______ Smoke _______

Other physical, chemical or physiological characteristics of hazardous material including warning properties:
Odor? Yes □ No □
If Yes, give threshold _______ ppm.
(Odor is an important consideration in gaseous respirator selection)
Eye Irritant? Yes □ No □
At what concentration? ___________________________________________________
If Yes, the respiratory protection selected must be compatible with eye protection.
Skin Absorption or Irritation? Yes □ No □
At what concentration? ___________________________________________________
If Yes, the respiratory protection selected must be compatible with skin protection.

Approximate temperature of hazardous material? ________________________________
If material is liquid or volatile solid give vapor pressure at expected temperatures:

Is substance flammable? Yes □ No □
If Yes, Lower Limit: _______ Vol % Upper Limit: _______ Vol %
Immediately Dangerous to Life or Health Considerations.
IDLH Concentration: _______________________________________________________
Source of IDLH Information: _______________________________________________

4. Expected Exposure Levels
(From Industrial Hygiene monitoring program. Include copies of test data used with this worksheet)
Source and Year(s): ________________________________________________________

______________________________

21
Summary of Key Results:

<table>
<thead>
<tr>
<th>TWA1</th>
<th>STEL2</th>
<th>CEILING3</th>
</tr>
</thead>
<tbody>
<tr>
<td>(____)</td>
<td>(____)</td>
<td>(____)</td>
</tr>
<tr>
<td>(Average Range)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 - Indicate units used and the form of the compound to which they refer (e.g., Vanadium as V or V2O5).
2 - Short term exposure limits.
3 - Limit, which is never to be exceeded. (Sometimes used interchangeably with STEL).

Is there a reasonable expectation that the toxic contaminant will exceed the IDLH Concentration?

Yes □ No □

Expected Exposure Level: __________________________________________
Basis for Expected Exposure Level: __________________________________

5. Permissible Exposure Limits
Enter established permissible exposure limits (PEL):

<table>
<thead>
<tr>
<th>TWA1</th>
<th>STEL2</th>
<th>CEILING3</th>
</tr>
</thead>
<tbody>
<tr>
<td>(____)</td>
<td>(____)</td>
<td>(____)</td>
</tr>
</tbody>
</table>

MSHA (Usually ACGIH 1973)
OSHA
ACGIH (Identify Year)
Other (Identify)

A. OSHA PEL’s must be shown. The TWA’s from the other regulatory or scientific agencies should be shown in order to provide perspective and also information on possible future changes that might impact on respirator selection.
B. Indicate units used and the form of the compound of which they refer (e.g., Vanadium as V or V2O5)

6. Calculation of Respirator Protection Factor (RF) Needed

\[
RF \text{ (Needed)} = \frac{\text{Expected Exposure Level (From 4)}}{\text{Permissible Exposure Limit (From 5)}} = (_______)
\]

\[
RF \text{ TWA} = (_______) = (_______)
RF \text{ STEL} = (_______) = (_______)
RF \text{ CEILING} = (_______) = (_______)
RF \text{ MPC (DCG)} = (_______) = (_______)

22
7. Characteristics of Hazardous Operation or Process
   Provide brief description of process characteristics for each job or location where the respirator is to be used that would impact on exposure levels.

8. Location of Hazardous Area

9. Respirator Use Time Period
   Respirator use time considerations (check applicable items):

   - Routine? □
   - Non-Routine? □
   - Emergency? □
   - Rescue? □

   Describe briefly the amount of time per day and the days per week, year, or other appropriate time period that the respirator will be worn.

10. Worker Activity
    Worker activity in hazardous area (check applicable items):

    - Continuous? □
    - Intermittent? □

    Work Rate:
    - Light? □
    - Medium? □
    - Heavy? □
11. Selection of Permissible Respirator Types
List the permissible respirator types:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

12. Selection of Specific Respirators
Enter the appropriate protection factors from Item 6.

TWA
STEL
CEILING
MPC

Enter the physical or chemical characteristics from Part 3 that influence respirator selection:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Identify if it is a hazard with specific respirator approvals: (asbestos, silica, coal dust, textile fibers, cotton dust, nuisance dust, radio nuclide):

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Does it have PEL less or more than 0.005 mg/ M3 or 2 mppcf?
Above
Below

If gaseous or vapor, does it have adequate warning properties?  Yes  □  No  □

Considering the factors just given, use Table 1A or 1B as applicable to identify acceptable respirator configurations. List them below:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Within the limits of the respirators just listed, the final choice of the respirators used is largely up to the location, provided that reasonable consideration of Items 6 through 10 in this worksheet is made in the final selection. When the final choices are made, list the respirators chosen and indicate the key reasons for such choices.

Respirators chosen:____________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Reason for choice:
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
RESPIRATOR INSPECTION, CLEANING, MAINTENANCE AND STORAGE CHECKLIST

1.0 Field Inspection of an Air-Purifying Respirator - Routinely used air-purifying respirators shall be checked as follows before and after each use:

A. Examine the facepiece for:
   1. Excessive dirt.
   2. Cracks, tears, holes or physical distortions of shape from improper storage.
   3. Inflexibility of rubber facepiece (stretch and knead to restore flexibility).
   4. Cracked or badly scratched lenses in full facepieces.
   5. Incorrectly mounted full facepiece lenses, broken or missing mounting clips.
   6. Cracked or broken air-purifying element holder(s), badly worn threads or missing gasket(s) if required.

B. Examine the head straps or head harness for:
   1. Breaks.
   2. Loss of elasticity.
   3. Broken or malfunctioning buckles and attachments.
   4. Excessively worn serrations on head harness, which might permit slippage (full facepieces only).

C. Examine the exhalation valve for the following after removing its cover:
   1. Foreign material, such as detergent residue, dust particles or human hair under the valve seat.
   2. Cracks, tears or distortion in the valve material.
   3. Improper insertion of the valve body in the face pieces.
   4. Cracks, breaks or ships in the valve body, particularly in the sealing surface.
   5. Missing or defective valve cover.
   6. Improper installation of the valve in the valve body.

D. Examine the air-purifying element for:
   1. Incorrect cartridge, canister or filter for the hazard.
   2. Incorrect installation, loose connections, missing or worn gasket or cross threading in the holder.
   3. Expired shelf-life date on the cartridge or canister.
   4. Cracks or dents in the outside case of the filter, cartridge or canister, indicated by the absence of sealing material, tape, foil, etc., over the inlet.

E. If the device has a corrugated breathing tube, examine it for:
   1. Broken or missing connectors.
   2. Missing or loose hose clamps.
   3. Deterioration, determined by stretching the tube and looking for cracks.

F. Examine the harness of a front or back mounted gas mask for:
   1. Damage or wear to the canister holder, which may prevent its being held in place.
   2. Broken harness straps for fastening.

2.0 Self Contained Breathing Apparatus (SCBA)

A. Follow manufacturer specifications for storage, maintenance and cleaning of SCBA systems.
RESPIRATORY PROTECTION TRAINING

1.0 The need for respiratory protection

A. To prevent occupational diseases caused by breathing of air contaminated with harmful dusts, fumes, sprays, mists, fogs, smokes, vapors or gases, certain protective measures must be taken as required by the Occupational Safety and Health Act (OSHA) and the Department of Energy (DOE). These measures include engineering controls, for example, enclosure or confinement of the operation, ventilation and substitution of a less toxic or hazardous material. When effective engineering controls are not feasible, then administrative controls are utilized. Administrative controls might be such things as limiting work time in certain areas, establishing safe work practices, writing work procedures, etc. another type of control would be the use of personal protective equipment (PPE). Personal protective equipment includes such items as respirators, hard hats, gloves, goggles, tyvek clothing, etc. all hazards on site are evaluated and determinations are made as to whether engineering controls, administrative controls or PPE is required.

B. There are specific requirements that must be met for the respirator procedure. The references for these requirements are listed below:
   1. 29 CFR 1910.134, 1910.94
   2. 29 CFR 1926.57, 1926.103, 1926.353
   3. ANSI Z88.2-1992

2.0 Employee Responsibility

A. The employee shall use the provided respiratory protection in accordance with the instructions that follow:
   1. Shall guard against damage to the respirator.
   2. Shall clean the respirator during daily use as needed. (Sanitation towelettes will be provided)

B. A respirator cannot be worn if facial hair comes between the sealing periphery of the facepiece and the face or if facial hair interferes with valve function.

C. If glasses, face shield or goggles must be worn, then assurance must be made to not have interference with the respirator’s fit.

3.0 Selection of a Respirator

The selection of respirators will be the responsibility of the Project Superintendent or his/her designee until such time that identified individuals have been respiratory protection trained.

4.0 Respirator Types and Limits of Use

A. This section provides a description of the various types of respirators available. Respirators fall into the general classifications listed below, according to their mode of operation:
   1. Atmosphere - Supplying respirators
      a. Self-contained breathing apparatus (SCBA)
      b. Supplied-air respirators (Airline respirators)
      c. Combination self-contained and supplied-air respirators
2. Air-purifying respirators
   a. Gas and vapor
   b. Particulate (Aerosols including dust, mist, fume, smoke and spray)
   c. Combination of gases, vapors and particulates

3. Combination atmosphere-supplying and air-purifying respirators
   B. A particulate, gas and vapor cartridge can be used in the air-purifying respirator to provide protection from a combination of airborne hazards in low concentrations.
   C. The main components of the air-purifying half mask respirator are listed below:
      1. Straps and head basket - holds the respirator in place and maintains an adequate seal.
      2. Yoke - aids in maintaining an adequate seal and prevents distortion of the mask.
      3. Mask - provides a chamber for breathable air and a surface to seal with the face.
      4. Filter and filter holders - the holders provide a stable surface to mount the filters on and the filters remove the material of interest.
      5. Inhalation valves - allows a measured amount of air (calculated in the design of the mask) to enter the mask.
      6. Exhalation valve - allows fresh air to enter the mask during exhalation and prevents air from pushing back through the filter during exhalation.

D. When choosing the appropriate respirator, the nature of the hazard is carefully considered. Some of the hazards to evaluate are:
   1. Oxygen deficiency
   2. The contaminant involved
   3. Physical properties
   4. The actual concentration of toxic materials or the radioactivity levels
   5. The established permissible dose for the toxin
   6. Whether the hazard is immediately dangerous to life or health
   7. The warning properties of the hazard

*Note: The half mask air-purifying respirator does not provide protection against gases and vapors unless the correct filter cartridge is used. Air purifying respirators are not to be used in oxygen deficient atmospheres. They do not provide oxygen to the worker; they can only purify the air against limited amounts of airborne hazards.*

5.0 Care, Maintenance and Inspection of the Respirator

A. Before the respirator is worn the wearer must inspect the respirator for cleanliness, defects, filter cartridge type and any problems that may be noted with the respirator that may interfere with proper working conditions. After the respirator is removed, another general inspection shall be made. The employee is responsible for keeping the respirator clean during the day when it is worn. After cleaning and sanitizing, each respirator shall be inspected by the employee to determine if it is in proper working condition, it needs replacement parts or repairs. If the respirator is defective or dirty the employee shall contact the Project Superintendent inform him/her of the problem and then the worker needs to check out another respirator.

B. Respirator inspection shall include a check for tightness of connections, for the condition of the respirator-inlet covering, the head harness shall not be cut or torn, the valves shall
lie flat, the harness assemblies shall not be torn, the filter cartridges shall be clean and not dented and any other general defect shall be noted. The rubber or other elastomeric parts shall be inspected for pliability and signs of deterioration.

C. Respirators shall be stored in the area established by the Project Superintendent such that they are protected from extreme heat or cold, sunlight, excessive moisture, damaging chemicals and dirt. Respirators shall not be stored in lockers or toolboxes unless they are protected from contamination, distortion and damage. One way to do this is keep them in a clean plastic bag and place in a tin container with a lid.

6.0 Donning a Respirator and Wearing Instructions
A. The proper techniques in donning and removing a respirator that are shown during training shall be utilized. When the respirator is put on and taken off all assurances shall be made to keep the interior of the respirator clean and free of the hazard. The respirator shall be adjusted so that the inlet covering is fitted properly on the face and causes a minimum of discomfort. A negative and positive pressure test shall be done every time the respirator is put on to insure a proper seal.

B. If at any time there appears to be a problem with the respirator, resistance to breathing, illness of the respirator wearer, breathing difficulty, vomiting, fever or chills, etc., the respirator wearer will leave the hazard area. The employee shall seek assistance from their Supervisor at that time and the supervisor will immediately notify the Project Superintendent. Respirator use will be monitored by the Project Superintendent or his/her designee to ensure that proper respirators are used and that the respirators are worn properly. Monitoring for hazards in the work area will be done by the Project Superintendent or his/her designee.

7.0 Confined Spaces
All confined spaces shall be considered as immediately dangerous to life and health. The Project Superintendent must be contacted before any confined space entry, so that a hazard evaluation can be made, and a confined space permit can be issued. The confined space must be continuously ventilated to prevent oxygen deficiency. A standby person will be on the outside of the confined space monitoring the worker in the confined space wearing a respirator. Continuous communication must be maintained.

8.0 Warning Properties
A warning property is a chemical characteristic or property that is exhibited so the chemical can be tasted, smelled or manifest acute irritating effects (eye or respiratory tract irritation). When a chemical has good warning properties, these effects can be detected at very low thresholds. Respirators work well against these hazards because the worker can sense when the hazard is present and can don a respirator or leave the work area. When a chemical does not have food warning properties, the chemical cannot be readily tasted, smelled or cause irritating effects. Radionuclides is a good example of a material with poor warning properties, requiring the employee to be more aware of the presence of the hazard. If an employee senses a chemical, becomes dizzy, light headed, has difficulty in breathing, nausea, weakness, etc., then they shall leave the work area and report immediately to their supervisor and the supervisor will notify the Project Superintendent.
RESPIRATOR PROTECTION
INDOCTRINATION AND TRAINING

In accepting employment with Preferred Industrial Contractors, Inc., I acknowledge that I have received respiratory protection training and orientation and that I will comply with the project rules and regulations.

Date: ____________________________

Location: _______________________________________________________________

Company: _______________________________________________________________

Dept./Crew/Unit: ___________________________________________________________

Name: ____________________________________________ (Print)

Signature: __________________________________________

Instructor/Witness: __________________________________________ (Print)

Instructor/ Witness Signature: ____________________________________________
The Respiratory Protection Procedure effectiveness review with summary analysis and future procedure changes or additions are provided below to serve as guidance to continually upgrade and modify the procedure. This evaluation is performed by the Project Superintendent or his / her designee.

A. Procedure Review
   1. Written operating procedures have been adequately implemented?
      a. Are there some improvements needed?
   2. Respirator selection encompasses the following:
      a. What are the contaminants?
      b. What are the concentrations?
      c. Are they gaseous or particulate?
      d. Do they have adequate warning properties?
      e. Are they immediately dangerous to life or health?
      f. Does the air contain at least 19.5% oxygen?
      g. Are protective clothing and hand protection necessary?
   3. Equipment in Use & Description:
      a. Gas Detector
      b. Monitors oxygen, combustibles, carbon monoxide and hydrogen sulfide.
      c. Sampling Pumps (personal & area).
      d. Personal Monitor
      e. Gas Sampling System
      f. High-Precision, piston-type volumetric pump
   4. Training Respirator Users
      a. Does the Project Director have responsibility for training and fit testing?
      b. Are records for training accurately maintained?
      c. Are Material Safety Data Sheets posted on site?
      d. Does the worker have knowledge for respirator use that is effective?
      e. Are workers comfortable in the respirators?
      f. Does the fit test take place during initial training with emphasis on using the positive-negative test before each use?
   5. Individual Respirators Assigned
      a. Are respirators individually assigned and instruction for care and cleaning given?
      b. Are instructions documented?
      c. Is the worker made aware of good hygiene practices?
   6. Regular Cleaning and Sanitizing Respirators
      a. How effectively accomplished is cleaning and proper handling of respirators?
   7. Respirator Storage
      a. Describe
   8. Respirator Inspection and Maintenance
      a. Adequate parts (spares) available?
9. Work Area Monitoring
   a. Is field line supervision being responsive to changes in conditions, taking appropriate action for respiratory protection and providing adequate documentation of the Respiratory Protection Procedure?

10. Describe Respiratory Protection Procedure Enforcement

11. Describe Medical Evaluation of Respirator Workers

12. Using Approved Respirator?
   (List types & models)

B. Summary Analysis
   1. In general, Respiratory Protection Procedure is: (Project Name)
   2. Procedure Implementation Improvements are as follows:

(Evaluator’s Name-Print)  (Evaluator’s Signature)  Date:

PIC  Rev 12/12/11
## PROCEDURES FOR QUALITATIVE RESPIRATOR FIT TESTING WITH IRRITANT SMOKE

**SAF-35.4-12**

<table>
<thead>
<tr>
<th>Step No.</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Prepare irritant smoke tube kit. Be sure to place the protective rubber tubing over the broken glass portion of the tube. The use of leather gloves may be necessary to prevent accidental puncture by the glass tube end when installing the rubber tubing.</td>
</tr>
<tr>
<td>2.</td>
<td>Prior to actual use of each smoke tube, determine if the irritant properties of the tube are adequate to cause an employee reaction if breakthrough occurs.</td>
</tr>
<tr>
<td>3.</td>
<td>Assure that the filters being used are high efficiency particulate air (H.E.P.A./P100) Filters that are red or purple in color.</td>
</tr>
<tr>
<td>4.</td>
<td>Fit testing shall be done in well-ventilated areas to prevent irritation to others and the person conducting the fit test.</td>
</tr>
<tr>
<td>5.</td>
<td>Fit test only those who are clean-shaven. Anyone with facial hair that interferes with the face to respirator seal or the operation of the exhalation valve shall not be fit tested.</td>
</tr>
<tr>
<td>6.</td>
<td>Instruct the respirator wearer to perform a positive and negative pressure fit test prior to using the irritant smoke. Observe the positive and negative fit test to determine if it is being conducted correctly. If it is not, provide the proper instruction.</td>
</tr>
<tr>
<td>7.</td>
<td>After successful pressure fit testing, instruct the respirator wearer to close his/her eyes and to keep them closed until specifically told to open them. Note: The irritant smoke does irritate the eyes.</td>
</tr>
<tr>
<td>8.</td>
<td>With the smoke tube about two (2) feet from the respirator wearer’s face, puff the smoke towards the wearer. This puffing from a distance is done to prevent excessive smoke inhalation if the respirator leaks. If a leak occurs, have the person re-adjust the straps or respirator. If no leaks, then go to step 9.</td>
</tr>
<tr>
<td>9.</td>
<td>From about six (6) inches away, direct the smoke towards the respirator/face seal, being sure to check areas such as skin folds, the chin area, the seal around the nose area and the exhalation valve area. If a leak develops, re-adjust the respirator as in step 8. If a leak still occurs, it may be necessary to inspect the respirator or to try another size of respirator. If no leak occurs, continue to step 10.</td>
</tr>
<tr>
<td>10.</td>
<td>The wearer shall now conduct exercises while the smoke is being applied such as deep breathing, turning the head from side to side, nodding the head up and down and talking while the smoke is being applied finally an over-exaggerated smile and a purposeful breaking of the seal shall be done by the wearer to assure that the respirator does re-seal. If no odor is detected at this point, the wearer has achieved a satisfactory fit.</td>
</tr>
<tr>
<td>11.</td>
<td>Prior to allowing the employee to remove the respirator, have him/her feel the respirator straps (angles and tension), the facepiece and its location on the nose and chin and how the respirator and glasses (if worn) sit on the face. This is done to help the employee know where and how the respirator is placed on the face when a satisfactory fit is achieved.</td>
</tr>
<tr>
<td>12.</td>
<td>Instruct all who have been fit tested with the smoke that if irritation develops on their skin (near the respirator/face area), they shall gently wash the area with water. The smoke is an acid mist and can irritate the skin.</td>
</tr>
<tr>
<td>13.</td>
<td>When the employee removes the mask, assure that the person can detect the odor of the irritant smoke either by actually testing the individual or by asking if he/she can detect the odor. Record if an employee cannot detect the smoke in your record of that individual.</td>
</tr>
<tr>
<td>14.</td>
<td>Clean and inspect the respirators as described in Exhibit 35.4-9.</td>
</tr>
</tbody>
</table>
COMPANY APPROVED RESPIRATORS

A 3M
1. Model 6000 ½ Mask Dual Cartridge
2. Model 7000 ½ Mask Dual Cartridge
3. Model 7800 Full Face Dual Cartridge
4. Model 8212 N95 Disposable ½ Mask
5. Model 8222 N99 Disposable ½ Mask
6. Model 8233 N100 Disposable ½ Mask

B SCOTT
1. Scott - O - Vista AV2000 Face Piece Assembly

C MSA
1. Comfo Classic ½ Mask
2. Ultralite II SCBA

D NORTH
1. Model 7600 Full Face Dual Cartridge
2. Model 7700 ½ Mask Dual Cartridge
3. Model BP1002 Dual Cartridge (Back Mount)

Note: Other respirators may be selected and used following approval of the Corporate Safety Dept.
1.0 Objective
To furnish each employee a place of employment, free of recognized hazards that are causing or
are likely to cause death or serious physical harm to employees and to comply with the OSHA
Bloodborne Pathogens Standard, 29 CFR 1910.1030, the following policy has been adopted.

2.0 Scope
A. Where reasonably anticipated contact between skin, eye, mucous membrane or parenteral
   contact and blood or other potentially infectious material that may result from the
   performance of the employee’s job duties.
B. Where reasonably anticipated includes the potential for exposure as well as actual
   exposure.

3.0 Covered Employees
“Trained and designated” employees responsible for rendering medical assistance as part of his or
her job function. On the project, the Project Superintendent and his/her Supervisors will receive
this training.

4.0 Definitions
A. O.P.I.M. - other potentially infectious materials are human body fluids, i.e., semen,
   vaginal secretions, cerebrospinal fluid, synovia fluid, pleural fluid, pericardial fluid,
   peritoneal fluid, amniotic fluid, saliva in dental procedures, anybody fluid that is visibly
   contaminated with blood, and all body fluids in situations where it is difficult or
   impossible to differentiate between body fluids.
Any unfixed tissue or organ (other than intact skin) from a human (living or dead) is included.

B. Parenteral Exposure - piercing mucous membranes or the skin barrier through such events as needle stick, human bites, cuts, and abrasions.

5.0 Control Plan Steps
A. All incidents of first aid involving the presence of blood of O.P.I.M. will be reported to Corporate SH&E Director before the end of the work shift during which the first aid incident occurred.
B. The report will include names of all first aid providers who rendered assistance. The report must describe the incident, including date and time.
C. The description will include a determination of whether or not, in addition to the presence of blood or O.P.I.M., an exposure incident, as defined by the OSHA Standard, occurred.
D. The report will be recorded on a list of such first aid incidents. It will be available to all employees and will be provided to OSHA on request. The list will be kept in same location as first aid supplies.
E. Responsible employees will receive training on the specifics of the reporting procedures.
F. Preferred Industrial Contractors, Inc. will make available the Hepatitis B Vaccine to all employees that have occupational exposure and post exposure evaluation and follow-up at no cost to the employee.
G. Full Hepatitis B vaccination series will be made available as soon as possible, but in no event later than 24 hours, to all unvaccinated first aid providers who have rendered assistance in any situation involving the presence of blood or O.P.I.M., regardless of whether or not a specific exposure incident occurred. An employee may decline such vaccination (see SAF-35.5-1).
H. The Control Plan and engineering controls will be reviewed and up-dated as conditions change and on an annual basis.
I. Employees must be notified as to the location of the washing facilities and if facilities are not available the Project Superintendent will ensure that a readily supply of antiseptic hand cleanser/towelettes and paper towels/dry cloths are available.
J. The Corporate SH&E Department will monitor the BP Procedure for effectiveness on a regular basis.

6.0 Engineering and Work Practice Controls
Engineering and work practice controls shall be used to eliminate or minimize employee exposure. Personal protective equipment shall be used when occupational exposure may occur even though the engineering and work practice controls are in place.
A. Engineering controls shall be examined and maintained or replaced on a regular schedule.
   1. Hand washing facilities shall be provided and maintained with adequate supplies.
   2. Proper sharps disposal, including disposal of any material such as broken glass that can cause an open cut. Contaminated sharps and needles shall be disposed of in puncture resistant, color-coded, or labeled, leak-proof containers.
   3. Resuscitation devices including mouthpieces or resuscitation bags shall be available for use in areas where the need for resuscitation is predictable.
   4. Safety knives where the blades will self-retract to prevent cuts.
   5. Eyewash stations shall be easily accessible and functional.
B. Work practice controls include general and site-specific safety practices. Examples include:

1. Hand washing shall be performed after removal of gloves and after contact with blood or OPIM.
2. Employees who have cuts or other open wounds shall refrain from handling blood or OPIM until the condition resolves.
3. Contaminated sharps and needles shall not be bent, recapped, or sheared.
4. Eating, drinking, smoking, handling contact lenses, and applying cosmetics are prohibited in work areas where there is a potential for blood or OPIM exposure.
5. Food and drink are prohibited in work areas where there is a potential for blood or OPIM exposure.
6. All procedures involving blood and OPIM cleanup shall be performed in such a manner to minimize splashing, spraying, spattering, generation of droplets, or aerosolization of these substances.

7.0 Personal Protective Equipment (PPE)

A. Personal protective equipment, including gloves, gowns, laboratory coats, face shields, face masks, eye protection, foot coverings and other items shall be provided to employees, as appropriate, to prevent exposure to blood or OPIM. These items shall be worn selectively, as needed for the task involved. PPE shall be considered "appropriate" if it does not permit the passage of blood or OPIM through to an employee's skin, mucous membranes, or street clothes.

B. Gloves

1. Disposable use gloves shall be worn when it is reasonably anticipated that the employee will have hand contact with blood or OPIM. The gloves shall be replaced when worn, torn, or contaminated. They shall not be washed or decontaminated for re-use.
2. Utility gloves may be decontaminated and re-used if not punctured.
3. Latex free gloves will be provided as necessary.

C. Masks, eye protection, face shields

Masks in combination with eye protection devices (with side shields) or a chin-length face shield with a mask shall be worn when there is a reasonably anticipated chance of exposure to blood or OPIM through splashes, sprays, spatters or droplets.

D. Gowns, coats, aprons and other protective coverings

Protective coverings shall be worn depending upon the task and the degree of exposure anticipated.

E. There shall be a designated area in each work setting for the dispensing, storage, and disposal of PPE. Contaminated PPE that is not immediately decontaminated shall be treated as bio-hazardous material. All PPE must be removed before leaving the work area. As a minimum, the following equipment will be provided to designated first responders:

1. Single use rubber or latex gloves.
2. Eye/face protection.
3. Full bodywork clothing.

8.0 Housekeeping

A. Cleaning, Disinfection, and Sterilization Practices
1. All environmental and work surfaces shall be properly cleaned and disinfected after contamination with blood or OPIM (see procedures).
2. Appropriate personal protective equipment (e.g. gloves) shall be worn to clean and disinfect blood and OPIM spills.
3. Cleaning, disinfection, and sterilization of equipment shall be performed, as appropriate, after contamination with blood and OPIM.
4. Any blood of O.P.I.M. spots on ground or equipment will be cleaned with chlorine bleach or other approved disinfectant.

B. Waste
1. Gloves shall be worn by employees who have direct contact with contaminated waste.
2. All first aid equipment to contact O.P.I.M. or blood will be disposed of in a designated hazardous waste container.
3. Contaminated first aid supplies will be disposed of in approved leak proof bags.
4. All cleaning, disinfection, and sterilization or other contaminated waste shall be properly labeled and removed off-site for disposal.

C. Labels
1. Warning labels as specified by the bloodborne pathogen standard shall be used. Red bags or red containers may be substituted for labels.
2. The labels shall include the biohazard symbol and be fluorescent orange or orange red.

D. Warning labels shall be placed on containers of regulated waste

9.0 Reference

10.0 Employee Bloodborne Pathogens Exposure Training
A. All employees determined to be exposed in the course of performing their jobs will receive training by a “qualified person” which includes the following minimums:
1. An explanation of the O.S.H.A. standard for Bloodborne Pathogens
2. Epidemiology and symptomatology of blood borne diseases.
3. Modes of transmission of Bloodborne pathogens.
4. The Exposure Control Plan (i.e., points of the plan, lines of responsibility, how the plan will be implemented, etc.)
5. Procedures which might cause exposure to blood or other potentially infectious materials in the workplace and ensuring that employees understand that all body fluids will be considered potentially infectious.
6. Control methods, which will be used at the facility to control exposure to blood or other potentially infectious materials.
7. Personal protective equipment available on the job and who should be contacted concerning such equipment.
8. Post exposure evaluation and follow up.
9. Signs and labels used on the project.
10. Hepatitis B vaccine program of the company.
11. An interactive question and answer session.
B. Bloodborne Pathogens training will be given prior to the start-up of the project and annually.

11.0 Records
A. Training records shall be retained for three years
B. Medical records of employees with occupational exposure must be kept for the duration of employment plus thirty (30) years.
C. Employees must have records available to them for review.
D. Medical records cannot be released to anyone without written authorization from the employee.
E. The Corporate Human Resources Department is responsible for maintaining the records once the project is complete.
F. In the event Preferred Industrial Contractors, Inc. or its successor cease to do business and the records will not be maintained for the prescribed time period, all records will be transferred as per the requirements of 29 CFR 1910 1020 (h)

12.0 Forms
SAF-35.5-1 Declination Statement
DECLINATION STATEMENT

I understand that due to my occupational exposure to blood or other potential infectious materials I may be at risk of acquiring Hepatitis B virus (HBV) infections. I have been given the opportunity to be vaccinated with Hepatitis B vaccine, at no charge to myself. However, I decline Hepatitis B vaccination at this time. I understand that by declining this vaccine I continue to be at risk of acquiring Hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with Hepatitis B vaccine, I can receive the vaccination series at no charge to me.

________________________________________
Employee – Print Name and Signature Date

________________________________________
Witness – Print Name & Signature Date
35.7 - Hearing Conservation Program

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1.0 Purpose
The intent of this section is to provide information and guidance on the proper selection, instruction, training and use of hearing protection devices. It also prescribes the general requirements of a hearing conservation program where required by law.

2.0 Authority
The subject material described in this procedure is based on the requirements of federal law and generally recognized industrial hygiene practices.
3.0 Application
This section is applicable to the construction industry (Regulated under 29 CFR Part 1926) that demonstrates the potential for employee exposure to sound levels equal or in excess of 90 decibels expressed as an 8-hour time weighted average.

4.0 Definitions
A. **85dBA** - Action level for the implementation of an effective hearing conservation program.
B. **A-Weighted Sound Level** - To obtain a single number representing the sound level of a noise containing a wide range of frequencies in a manner representative of the ear’s response, it is necessary to reduce, or weigh, the effects of the low and high frequencies with respect to the medium frequencies. Three weighting networks are provided on standard level meters in an attempt to duplicate the response of the human ear to various sounds.
C. **dBA** - A common abbreviation meaning decibels (dB) weighted on the A (A) scale of a standard sound level meter.
D. **Ear Defender (Ear Protector)** - A device inserted into or placed over the ear in order to attenuate air-conducted sounds. Note: If these devices are selected they must be fitted or determined individually by competent persons.
E. **Ear Muff** - An ear defender that encloses the entire outer ear.
F. **Ear Plug** - An ear defender, having specified or standard acoustic characteristics, which upon insertion occludes the external auditory meatus.
G. **Hearing Conservation** - The prevention or minimization of noise-induced hearing loss through the control of noise by administrative or engineering controls, annual audiometric testing, employee training and the use of hearing protection devices.
H. **Hearing Protection** - Ear protection devices used to attenuate noise exposure by either inserting them into the ear canal (ear plugs) or covering the ear (ear muffs).
I. **Impulse Noise (Impact Noise)** - Noise of short duration (typically, less than one second) especially of high intensity, abrupt onset and rapid decay and often rapidly changing spectral composition.
J. **Noise Dosimeter** - A cumulative noise exposure monitor worn by the worker during the course of the workday. It reports in percent dose. 100% dose is equivalent to the PEL of 85 dBA.
K. **Noise Reduction Rating (NRR)** - A rating system for ear protective devices developed by the Environmental Protection Agency. The NRR is a measure of the ability of a given protective device to attenuate noise, as a function of noise intensity and frequency. The NRR must be shown on the hearing protector package.
L. **OSHA** - Occupational Safety and Health Administration.
M. **Octave Band Analyzer** - An instrument typically coupled with a sound level meter that distributes a sound source into its component frequencies. Noise frequency is expressed in cycles per second, (CPS) or Hertz (Hz).
N. **PPE** - Personal protective equipment are types of clothing and equipment used to shield or isolate individuals from chemical, physical and biological hazards that may be encountered in the work place. PPE is used to protect the respiratory system, skin, eyes, hands, face, head, body and hearing. Examples are Tyvek coveralls, gloves, boots, hard hats, goggles, earplugs and respirators.
O. **Sound Level Meter** - A noise measurement device used to quantify the intensity of sound emanating from a source. It reports value in decibels.

5.0 Requirements
   A. **Tools And Equipment**
      1. Sound Level Meters
      2. Calibrators
      3. Noise Dosimeters
      4. Ear Plugs/Ear Muffs
   B. **Precautions And Limits**
      Persons exposed to 90 dBA or greater must be provided protection in terms of engineering/ administrative controls or PPE.

6.0 Procedure
   **Effects of Noise**
   The sensation of sound is produced when air pressure variations having a certain range of characteristics reach the ear. Its loudness or amount is measured in decibels (dB). The tone or pitch is measured in frequencies called Hertz (Hz). Unwanted sound is defined as noise. High noise levels can cause permanent damage to hair cells in the inner ear, causing hearing loss. Hearing loss usually begins with the higher frequencies. The amount of hearing loss depends on the loudness of the noise and length of exposure. Hearing loss can be permanent or it can be temporary. A person may undergo a temporary threshold shift (hearing loss) after certain noise exposures, which results in the inability to hear certain sounds under 40 dB. The ability to hear will usually return. Repeated or intense noise can prevent this bounce back, producing a permanent threshold shift hearing loss.

7.0 Hearing Conservation Program Implementation Outline
   A. A sound level survey shall be taken by a SH&E Supervisor to generally define areas of potentially high noise exposure. The SH&E Department shall be notified of any areas that have been identified as having high noise levels.
   B. The SH&E Department will perform feasibility and cost-benefit analysis of administrative and engineering controls to assess options other than hearing protection devices to reduce noise exposures.
   C. Employees potentially exposed to an 8-hour time-weighted average (TWA) of 85dBA or greater must participate in this hearing conservation program.
   D. The SH&E Department will document all noise data surveys. If employee exposure measurements are taken then these records must be maintained and a copy is retained by the SH&E Department.
   E. Noise monitoring will be available to the field operation that is affected and the employee exposed to levels of 90dBA or greater will be notified of the monitoring results.

8.0 Training
   A. Training and motivation are crucial to the effectiveness of hearing protection and the hearing conservation program. Due to the transient workforce in construction, training is more difficult to provide as compared to general industry. However, the project management is required to train their employees about hearing protection.
B. OSHA requires that hearing protectors inserted in the ear shall be fitted or determined individually by a competent person. Training maybe accomplished through the use of a hearing conservation video training tape or by live instruction. Documentation of this training will be provided by the completion of the Hearing Conservation Program Training Certificate. Field management may also supplement employee training by toolbox meetings and review of the correct use of the hearing protection device(s) used on the project.

C. Project management shall ensure subcontractor compliance with 29 CFR 1926.52 by reviewing their records and interviewing their employees, as necessary.

D. Topics for toolbox safety meetings are to include:
   1. The effects of noise on hearing.
      The purpose, advantages, disadvantages and attenuation of hearing protectors with instructions on their selection, fitting, uses and care.

9.0 Sound Level Surveys
A. The sound level meters shall meet the ANSI Standard S1.4-1971 (R1976) or S1.4 - 1983, Specifications for Sound Level Meters, “which sets performance and accuracy tolerances. The sound level meter should be used for the following purposes:
   1. To spot check noise dosimeter performance.
   2. To determine an employee’s noise dose by time-motion studies whenever a noise dosimeter is unavailable or inappropriate.
   3. To identify individual noise sources for abatement purposes.
   4. To aid in the determination of engineering feasibility of controls for individual noise sources for abatement purposes.
   5. To evaluate the adequacy of hearing protectors.
B. A sound level survey should be conducted which includes all equipment, including subcontractor, types utilized, all work areas and in the office areas. This is performed with a standard sound level meter on the A scale and set for slow response.
C. Sound level measurements should be taken at the front, back and at each side of the equipment when measured. The distances from the equipment at which the sound levels are obtained must be recorded with the corresponding readings, it they are to be used to determine whether hearing protectors are to be used. The sound level survey form should be filled out completely. A sketch of the equipment is to be made on the back of the sound level survey form and the readings recorded.

10.0 Noise Dosimetry
A. The purpose of performing noise dosimetry is to determine the actual noise exposure experienced by a particular employee. Dosimetry measurements should be based on the results of a thorough sound level survey. Employee working in areas having the highest noise levels should receive the most attention.
B. When using noise dosimeters, remember:
   1. Always use a windscreen on the dosimeter microphone.
   2. The accuracy tolerance for most noise dosimeters is +/- 2.0 dBA. Be sure to verify.
C. Action to reduce exposures will be implemented when sound intensity exceeds the action level, which is a dose of 50% or an 8-hour TWA of 90 dBA. The exchange rate used by
OSHA for personal monitoring is 5 dBA. This means that for every increase of 5dBA, the % dose is doubled.

D. When performing noise dosimetry, instructions to the individual being monitored must include an explanation of a noise dosimeter (that it is not a tape recorder), what the dosimeter accomplishes and why they are being sampled. Checks during the work shift should be made to ensure that the dosimeter’s microphone is still properly placed. The employee must also be advised that he is to perform his normal duties and not to target his activities just to the identified potential noise area.

E. All sampling information must be recorded at the end of the sample period.

11.0 Instrument Performance

A. Temperature
   1. Sound measuring equipment should perform within design specifications for an ambient temperature range between -20 degrees F and 140 degrees F.
   2. Sound measuring instruments should not be stored in automobiles during temperature extremes. Warm-up drift, moisture condensation and weakened batteries may result, which would adversely affect performance.

B. Humidity
   Noise instruments will perform accurately as long as moisture does not condense on the microphone diaphragm.

C. Wind Or Dust
   Wind or dust blowing across a microphone produces turbulence noise, which may cause positive error in the measurement. Use a windscreen for all out-of-doors measurements and whenever there is a significant air movement or dust.

D. Magnetic Fields
   Certain operations such as generators, transformers, arc welding and radio transmitting devices generate electromagnetic fields, which may induce current in the electronic circuitry of sound level meters and noise dosimeters, causing erratic readings. If sound level meters or dosimeters must be used near this type of equipment follow the manufacturer’s instructions for use.

12.0 Effects of Sound

Microphone Placement
   For sound level meters and noise dosimeters equipped with omni-directional microphones, the effects of microphone placement and orientation on instrument readings due to the sound field itself are negligible in typically reverberant environments. See section 35.7.13 on operator presence for more on this subject.

13.0 Effects of Operator Presence

A. Any object or surface can act as a reflector or absorber of sound. The person wearing the noise dosimeter is also a reflector/absorber of sound, which can affect the microphone’s performance. The noise dosimeter is designed to read correctly with the microphone in a random incidence sound field without the presence of reflection objects.

B. The recommended placement of the microphone for personal noise monitoring is on the shirt collar, high on the shoulder and as far away from the neck as possible. If noise is directional, it is generally the best practice to place the microphone near the ear, which receives the most noise exposure.
C. If the dosimeter is to be used as a handheld instrument, the microphone should be mounted on a microphone bracket. The bracket is then attached to the belt clip on the back of the instrument. If desired, the complete unit can be mounted on a tripod. This procedure is utilized for area noise sampling. The microphone is a random incident type and should be pointed upward at an approximately 70-degree angle.

14.0 Engineering Controls
A. OSHA requires that engineering controls to reduce employee noise exposures be implemented, if practical, before the alternate of a hearing protection device is used. Examples of engineering controls include construction of enclosures around the noise producing equipment, enclosures for personnel to shield them from the noise, process changes or system redesign, equipment repair and replacement of equipment. Careful cost-effectiveness analysis of these controls is required to assess their feasibility. Engineering controls should reduce or attenuate the noise levels enough that hearing protection is not necessary or is minimally required. It would not be cost effective to spend thousands of dollars on engineering controls for a short-term project when a couple of dollars could be spent on hearing protection. If the project is long-term and the engineering control would eliminate the need for cumulatively costly hearing protection, then the engineering control would be cost-effective.
B. Engineering controls must be employed where noise exposure to personnel is 115dBA or greater. The OSHA standard does not permit these exposures. At those sound levels, the noise is traveling through the bones of the skull and hearing protection in the ears is not effective to prevent permanent hearing loss.

15.0 Hearing Protection
A. Hearing protection will not attenuate the sound of machinery and equipment completely, but if properly fitted will reduce excessive noise to a tolerable and safe level. Unusual equipment noises or warning alarms will not sound as loud, but will be loud enough to attract personnel attention. There are different types of ear protectors ranging from glass wool, waxed cotton or foam insert disposable plugs to earmuffs. While earplugs are worn in the ear, blocking the auditory canal, earmuffs fit over the ears to reduce noise transmitted through the surrounding bone structure. The choice of protection depends on the type of noise, the job and comfort.
B. Project Management must make hearing protectors available to all employees exposed to an 8-hour TWA of 85 dBA or greater at no cost to the employee.
C. Training on the use and care of hearing protectors must be provided to all employees who are issued them. Instructions must be provided to all employees in construction due to the variable nature of the work conditions.
D. The Noise Reduction Rating (NRR) is listed on the hearing protection device. This reading reflects the maximum amount of noise reduction (attenuation) that can be achieved for the wearer when using the device as directed. The EPA has selected the NRR as the measure of a hearing protector’s noise reducing capabilities. Actual field use noise exposure reduction may be less since protection is highly dependent on user training, motivation and utilization. A better estimate of protection may be obtained by derating the labeled NRR by the equation; (NRR-7 dB) for evaluation of true effectiveness. The use of this equation gives a safety factor of 50% after taking off 7db
for correction from translating to A scale from C scale. Hearing protection is tested in the laboratories in C scale.

E. For dual protection, earplugs and muffs, add 5dB to the Noise Reduction Rating of the higher-rated protector. Where it appears that the attenuation of the hearing protector is not sufficient to reduce employee noise exposures below required levels, the employer should be advised that a greater degree of employee protection appears necessary. The degree of employee protection afforded by the hearing protection in use is of particular significance when determination is being made as to whether engineering and/or administrative controls are feasible.

F. The actual effectiveness of any individual hearing protector cannot be determined under workplace conditions, however OSHA noise standards require that personal hearing protection must attenuate the occupational noise received by the employee’s ears to within the specified regulatory levels. Hearing protectors are evaluated under rigorous laboratory conditions specified by ANSI. OSHA experience and published literature indicate that laboratory obtained real ear attenuation data for hearing protectors are seldom achieved in the workplace.

G. Hearing protectors shall be re-evaluated and employees refitted and trained whenever there is an increase in Noise level due to a change in equipment or work area and for those employees who as a result of an audiometric testing program indicate a standard threshold shift.

16.0 Environmental Noise
Environmental noise is the baseline or background noise. This is the amount of noise that is naturally occurring without the influence of our work on the project. Environmental noise occurs on the 3dB exchange rate. This type of noise can be measured by using a hand-held sound level meter, a noise dosimeter or a noise logging dosimeter. The dosimeter is set to act on the 5dB exchange rate for personal monitoring as per the OSHA regulations.

17.0 Forms
A. SAF-35.7-1 - Hearing Conservation Program Training Certificate
B. SAF-35.7-2 - Hearing Conservation Program Information Sheet
C. SAF-35.7-3 - Permissible Noise Exposure – Table 1
D. SAF-35.7-4 - Conversion From “Percent Noise Exposure” or “Dose” to “Eight-Hour” Time-Weighted Average Sound Level (TWA) – Table 2
E. SAF-35.7-5 - Audiometric Testing Program
HEARING CONSERVATION PROGRAM
TRAINING CERTIFICATE

I have received the hearing conservation training as described in the Preferred Industrial Contractors, Inc.’s Hearing Conservation Program.

________________________________________  ______________________________
Employee Name (Print)                      Employee Signature

________________________________________
Date of Training

I hereby certify that the above named employee has been provided with hearing conservation training as per the Company’s Hearing Conservation Program.

________________________________________  ______________________________
Instructor’s Name (Print)                    Instructor’s Signature

________________________________________
Date of Training
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<tr>
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<th>TWA</th>
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1.0 Computation of Employee Noise Exposure
A. Noise dose is computed using Table 1 (SAF-35.7-3) as follows:
   1. When the sound level, L, is constant over the entire work shift, the noise dose, D, in percent, is given by: \( D = \frac{100C}{T} \) where C is the total length of the workday, in hours, and T given in Table 1 (SAF-35.7-3).
   2. When the work shift noise exposure is composed of two or more periods of noise at different levels, the total noise dose over the workday is given by:
      a. \( D = 100 \left( \frac{C_1}{T_1} + \frac{C_2}{T_2} + \ldots + \frac{C_n}{T_n} \right) \)
      b. Where \( C_n \) indicates that total time of exposure at a specific noise level, and \( T_n \) indicates the reference duration for that level as given by Table 1 (SAF-35.7-3).
   3. The eight-hour time weighted average sound level (TWA), in decibels, may be computed from the dose, in percent, by means of the formula: \( TWA = 16.61 \log_{10} \left( \frac{D}{100} \right) + 90 \).
      For an eight-hour work shift with the noise level constant over the entire shift, the TWA is equal to the measured sound level.
   4. Table 2 (SAF-35.7-4) relates dose and TWA.

2.0 Conversion Between “Dose” and “Eight-Hour Time-Weighted Average” Sound Level
A. Noise exposure is usually measured with an audio dosimeter, which gives a readout in terms of “dose”. Dosimeter readings can be converted to an eight-hour time-weighted average sound level (TWA).
B. In order to convert the reading of a dosimeter into TWA, use Table 2 (SAF-35.7-4). This table applies to dosimeters that are set to calculate dose or percentage exposure according to the relationships in Table 1 (SAF-35.7-3). So, for example, a dose of 91% over an eight-hour day results in a TWA of 89.3dB, and a dose of 50% corresponds to a TWA of 85.0dB.
C. If the dose as read on the dosimeter is less than or greater than the values found in Table 2, (SAF-35.7-4) the TWA may be calculated by using the following formula:
   1. \( TWA = 16.61 \log_{10}(D/100) + 90 \)
   2. Where TWA=eight-hour time-weighted average level and D=accumulated dose in percent exposure.
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AUGIOMETRIC TESTING PROGRAM

A. The following Audiometric Testing Program is available for implementation whenever a client requires testing to be performed:

1. Project management will implement this program when employee exposure is equal or exceeds an 8 hour time-weighted average of 85 decibels at no cost to the employee.
2. All employees subject to exposure will be tested to establish a baseline for future comparisons. This baseline shall be completed within the first six months of employee exposure. The baseline must be performed after the employee has been protected or out of the noise area for 14 hours.
3. All employees in the Hearing Conservation Program shall complete an annual audiogram.
4. Audiometric evaluations shall be administered in a room meeting the requirements of Appendix D of CFR 1910.95 audiometric test rooms.
5. An optional audiogram may be offered to employees not in the HCP annually.
6. The employee’s annual audiogram shall be compared to the employee’s baseline audiogram to determine if the audiogram is valid and if a loss in hearing has occurred.
7. If the annual audiogram shows that the employee has suffered a Standard Threshold Shift (STS) a retest may be conducted within 30 days.
8. Evaluation of problem audiograms shall be performed by an Audiologist, Otolaryngologist, or qualified Physician. The person performing this evaluation will be provided the following information.
   a. A copy of the requirements for Hearing Conservation as set forth in paragraphs (c) through (r) of OSHA 1910.95.
   b. The baseline audiogram and most recent audiograms of the employee to be evaluated.
   c. Measurements of background sound pressure levels in the audiometric test room.
   d. Records of audiometer calibrations.
9. If the audiogram indicates a STS the employee will be notified in writing within 21 days.
10. If a STS is confirmed by a second audiogram, the following steps will be taken:
   a. Audio dosimeter sampling will be conducted to determine exposure levels.
   b. Employees working in areas at or above 85 dBA shall be fitted with hearing protectors, trained in their use and care, and required to use them.
   c. The employee will be referred for a clinical audiological evaluation, as appropriate, if additional testing is necessary or if it is suspected that a medical pathology of the ear is caused or aggravated by the wearing of hearing protectors.
11. Audiometric testing shall be conducted in accordance with OSHA 1910.95.

B. Hearing Protectors

1. A variety of hearing protectors will be made available to all employees.
2. Hearing protection must be worn by all employees exposed to an 8-hour TWA of 85 dBA or greater at no cost to the employee.
3. Employees will be trained in the use and care of all the types of protectors provided and methods to assure proper fit.
4. Hearing protectors provided will attenuate employee exposure below a TWA of 85 dBA.

C. Training
1. All employees will be trained in accordance with OSHA 1910.95.
2. The training program will be provided annually as Required Safety Training. Information provided in the training program will be updated to be consistent with changes in regulations, protective equipment and work processes.

D. Access To Information And Training Materials
1. Copies of OSHA 1910.95 will be made available to employees upon request and a copy will be posted where other employee notices are normally placed.
2. Employees will be provided any information pertaining to OSHA 1910.95 upon request.

E. Warning Signs
Warning signs will be posted in accordance with OSHA 1910.95 in areas in which employees may be exposed at or above 82 dBA. These signs will clearly indicate that the area is a high noise area.

F. Recordkeeping
1. An accurate record of all employee exposure measurements and audiometric tests will be maintained in accordance with OSHA 1910.95 and will be available to employees or designated representatives, and the Assistant Secretary and will include the following:
   a. Name and job classification of the employee;
   b. Date of the audiogram;
   c. The examiner's name;
   d. Date of the last acoustic or exhaustive calibration of the audiometer; and
   e. Employee's most recent noise exposure assessment.
2. Noise exposure measurement records shall be retained for two years.
3. Audiometric test records shall be retained for the duration of the affected employee's employment.
4. Confidentiality and records transfer requirements are identified in 29CFR 1910.95 and 1910.1020.

G. Recordable Hearing Losses
1. A STS with an average of 25 dB in either ear shall be recorded on the OSHA 300 log if this loss is determined to be work related.
2. Audiososimeter sampling and an investigation will be conducted to determine if the STS is work related.
3. Upon completion of the sampling and investigation if the STS are found not to be work related the OSHA 300 log will be appropriately updated.

NOTE: Contact the Corporate Safety, Health and Environmental Department for guidance on implementing this program.

H Reference: OSHA Subpart G 1910.95
35.8 - General Exposure Control Plan
For Lead in Construction
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1.0 Scope
A. Purpose
The purpose of this plan is to minimize the potential for worker exposure to lead and inorganic lead compounds in a manner, which is consistent with the requirements set forth by the OSHA lead standard. Project specific input to this plan and reference to the lead standard will be required.
B. Applicability
This plan is applicable to all of the company’s construction projects, unless superseded by a client’s standard, including alteration and repair on structures where employees may be exposed to metallic lead and inorganic lead compounds.
C. Authority / Reference
29 CFR 1926.62 is the governing standard for this plan.
2.0 Definitions

A. **Action Level** - The action level refers to an employee exposure to an airborne concentration of lead of 30 ug/m³ calculated as an 8-hour time weighted average.

B. **Competent Person** - Competent person refers to an employee or subcontractor who is capable of identifying existing and predictable lead hazards in the work place and who can take prompt corrective measures to eliminate them.

C. **Construction Operations** - Includes demolition or salvage, removal or encapsulation, new construction or alteration, clean up, maintenance operations, and/or transportation and disposal of lead or lead containing materials.

D. **Permissible Exposure Limit** - The PEL for lead and lead inorganic compounds is 50 ug/m³ averaged over an 8-hour time period.

3.0 Determining the Presence Of Lead In The Work Place

If the potential for lead exposure is present in the work place, then the provisions of the OSHA construction lead standard will apply. The presence of lead may be determined by the scope of work, material safety data sheets, historic records, methods of work, or bulk sampling and analysis. Coatings and other treatments, which are suspected of containing lead must be tested to verify lead content before commencing any work that may result in an occupational exposure. If testing has not been performed or there are no available records supporting the absence of lead, its presence must be assumed. The purpose of the Exposure Assessment and Control Plan is to assure that no employee is exposed to lead at concentrations greater than fifty micrograms per cubic meter of air (50 ug/m³) averaged over an 8-hour period.

4.0 Conducting the Exposure Assessment

A. Initial employee exposure monitoring must be performed to determine if the exposure level will exceed the action level of 30 ug/m³ as an 8-hour TWA. This exposure assessment shall be based on the following:
   1. Exposure data collected in the previous 12 months for similar operations
   2. Objective data demonstrating that the operation cannot result in exposure to lead at or above the action level.
   3. Personal sampling representative of full shift employee exposure to lead.

B. Exposure monitoring will require that at least one sample be taken for each job classification in each work area demonstrating the highest potential exposure. The sampling must be performed for the entire shift and be representative of the employee's daily exposure.

C. If the initial exposure monitoring results indicate no employee exposure at or above 30 ug/m³ as lead or lead compounds, no further sampling is required unless there is a change in equipment, personnel, materials or work practices. If the initial monitoring shows exposure to lead at or above 30 ug/m³ but below 50 ug/m³, personal exposure sampling must be performed every six months.

D. Results in excess of 50 ug/m³ will require personal exposure sampling quarterly (see 29 CFR 1926.62 (d)(6). The use of engineering and work practice controls, including administrative controls, will be used to reduce and maintain employee exposure to lead at or below the permissible exposure limit (50 ug/m³). If all feasible engineering and work practices controls are not sufficient to reduce employee exposure to or below the permissible exposure limit, Preferred Industrial Contractors, Inc. will continue their use to
reduce employee exposure to the lowest feasible level and supplement engineering and work practice controls with the use of respiratory protection.

**Health Effects of Lead:** One case report describes moderate exposure to inorganic lead while sandblasting lead-based paint for twelve hours. Symptoms included headache, fatigue, nausea, abdominal cramps and joint pain. Other health effects such as metallic taste in the mouth, vomiting and constipation or bloody diarrhea might also be expected to occur.

Lead accumulates in the body and inorganic lead compounds are well known to cause significant health effects following long-term (chronic) exposure. If a significant amount of lead has accumulated in the body, symptoms of long-term toxicity may develop after what may seem to be a short-term acute exposure. For more information, refer to “What are the long term health effects of exposure to lead?” below.

### 5.0 Employee Notification

Within 5 working days after completion of the exposure assessment, employees shall be notified in writing of the results of their exposure, and the corrective measures taken to reduce that exposure (see 29 CFR 1926.62 (d)(8)).

### 6.0 Project Specific Compliance Plan

A. A written compliance plan is required for all work where exposure levels are suspected to exceed 30 ug/m³. The written compliance plan shall be established prior to commencement of the work or within 24 hours after exposure sampling shows that levels are at or above 30ug/m³. The written compliance plan shall contain the following:

B. Description of each activity, which produces airborne lead. This shall include crew size, employee job responsibilities, maintenance practices, equipment used, and material involved.

C. A description of the specific means which will be used to achieve compliance to reduce employee exposure at or below the PEL, including any engineering plans or studies, ventilation, or respiratory protection.

D. Air monitoring data, which documents the source of, lead emissions.

E. Detailed schedule for implementation of the compliance plan.

F. Schedule of employee rotation if administrative controls are used.

G. Method used to notify other employees or subcontractors of potential exposure to lead (also see 29 CFR 1926.16).

H. Work practice program to include types of protective work clothing and equipment, housekeeping, and hygiene toiletries and practices.

I. The written plan must be revised and updated every six months and submitted upon request to OSHA and be available at the work site for examination and copying by any affected employee or employee representative.

### 7.0 Respiratory Protection

A. Respirators are to be provided at no cost to the workers as interim protection during the exposure assessment and when engineering or work practices are insufficient to reduce the employee exposure levels to or below the PEL. Employees may request the use of a respirator even if the levels are below the PEL.
B. Respirators will be selected on the basis of actual or anticipated exposure levels. Refer to 29 CFR 1926.62(d)(2)(i) for specific tasks and anticipated exposure levels. All negative pressure respirators shall be fitted with P100 filters. Quantitative or qualitative fit tests shall be performed at the time of initial fitting and every six months thereafter.

C. Respirators in use must be approved by the Mine Safety and Health Administration (MSHA) and the National Institute of Occupational Safety and Health (NIOSH). Respirators in use must be properly selected and fit tested. Powered, positive pressure air purifying respirators shall be provided to any employee that requests one. In addition, a respiratory protection program is to be implemented (Refer to Section 35 Procedure 35.4) which is to include the following:

D. Establish written standard operating procedures using Section 35 Procedure 35.4 for the selection and use of respirators on the project.

E. Respirators are to be selected on the basis of the hazards to which the worker is to be exposed.

F. Employees are to be trained in the proper use of respirators and their limitations. Training is to include demonstrating how to wear, adjust and check for proper fit of the respirator.

G. Respirators are to be regularly cleaned and disinfected. If possible, respirators are to be assigned to individual employees. Those respirators used by more than one worker are to be cleaned and disinfected after each use.

H. Respirators are to be stored in a convenient, clean and sanitary location.

I. Respirators are to be routinely inspected during cleaning. Worn or deteriorated parts are to be replaced or the respirator disposed of.

J. Appropriate surveillance of work area conditions, and the degree of employee exposure or stress is to be maintained.

K. The respiratory program is to be regularly inspected and evaluated for its effectiveness.

L. Employees shall not be assigned to tasks requiring the use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. The local physician shall determine what health and physical conditions are pertinent.

M. Only respirators approved by MSHA and NIOSH are to be used.

8.0 Personal Protective Clothing

A. When there is a possible employee exposure to lead, or when there is the possibility of skin or eye irritation from the work environment, then appropriate protective clothing and equipment is to be provided at no cost to the workers. This can include but not be limited to coveralls, or full body protection, gloves, hats, shoes and appropriate eye and face protection.

B. Clothing worn by employees exposed to lead must be removed at the completion of the work shift in change rooms or areas designated for that purpose. Protective clothing will be in clean and dry condition and provided at least weekly. The contaminated clothing is to be laundered, cleaned repaired or properly disposed of and is to be placed in closed containers, which will prevent the dispersion of lead.

C. Containers of contaminated clothing and equipment are to be labeled as follows:

   CAUTION: CLOTHING CONTAMINATED WITH LEAD. DO NOT REMOVEDUST BY BLOWING OR SHAKING. DISPOSE OF LEAD CONTAMINATED WASH WATER IN ACCORDANCE WITH APPLICABLE FEDERAL, LOCAL OR STATE REGULATIONS.
D. Employees are to be instructed that they are not to remove lead from their protective clothing or equipment by blowing, shaking or any other means, which will disperse lead into the air.

9.0 Personal Hygiene Facilities and Practices
When the airborne exposure to lead is above the PEL, the following facilities are to be provided:
A. Change rooms when needed, are to be provided and are to be equipped with separate storage facilities for both work clothing and personal clothing to prevent contamination of personal effects
B. Shower facilities, when needed, are to be provided in accordance with 1926.62 (i) (3) (i) through (v) which includes one shower for each (10) ten employees, body soap or other appropriate cleansing agents are to be provided convenient to the showers, hot and cold water are to be provided together with a common discharge line and employees are to be provided with individual clean towels.
C. Lunch rooms or designated eating areas are to be provided which are equipped with proper ventilation and filtration systems which will insure the eating area is free from the lead hazard. Employees will be required to wash their hands and face prior to eating, drinking, smoking, chewing, or similar activities and are not to enter the lunchroom facilities or clean areas until the lead dust has been removed from the protective clothing and equipment.
D. Lavatories or other washing facilities are to be provided in accordance with 1926.62 (i) (5) (i) through (ii) which included hot and cold running water, hand soap or similar cleansing agents and individual towels or sections of cloth, paper, air blowers, or sections of continuous cloth toweling.
E. Employees are not to possess or consume food, beverages or tobacco products in the contaminated work area. These items are only allowed in change rooms, showers or lunchrooms. The same restrictions apply to the possession or application of cosmetics.

10.0 Housekeeping
A. As with any project, each employee has the responsibility to maintain good housekeeping practices in their work areas. (Refer to Section 17). All surfaces are to be maintained as free as possible from accumulations of lead. Compressed air is not to be used as a method of cleaning since it will easily disperse fine dust particles. Vacuuming is the preferred method, with shoveling, brushing, and dry or wet sweeping used only when vacuuming or other equally effective methods have been tried and are insufficient.
B. The work area where exposure to lead is possible, shall be barricaded and warning signs placed frequently around the barricade to warn other employees. The work area will have controlled points of access. Controls will be taken to prevent lead contaminated airborne dust from escaping the work areas.
C. A warning sign shall be posted at each work and maintained legible and visible at all areas where employee’s exposure to lead is above the PEL:

WARNING: LEAD
WORK AREA
POISON
NO SMOKING OR EATING
11.0 Medical Surveillance

A. Initial medical surveillance must be made available to employees who are exposed on any day to lead at or above the Action Level. All medical examinations and procedures are at no cost to the worker and must be performed by or under the supervision of a licensed physician. This surveillance consists only of biological monitoring in the form of blood lead analysis and zinc protoporphyrin (ZPP). Blood lead levels (PbB) are reported in micrograms per deciliter (dl) of whole blood.

B. Each employee exposed to lead exposure in excess of the Action Level for more than 30 days per 12-month period is to receive a medical examination and consultation as part of the medical surveillance program at no cost to the worker. The program is to include a detailed work and medical history, a thorough physical examination, blood pressure and blood analysis, urine analysis with microscopic examination, and any other test deemed necessary by the physician.

C. Employees exposed to lead levels at or above the Action Level for more than 30 days per 12 month period are to be tested for blood lead levels and ZPP at least every two months for the first six months of exposure, then every six months for the duration of the lead exposure. Employees whose analysis indicates a blood lead level at or above 40ug/dl shall be tested at least every two months until two consecutive tests indicate a blood lead level below 40ug/dl.

D. Employees are to be notified in writing of the results of the tests within five days. Employees, whose levels are at or above 40ug/dl must also be advised of the medical removal requirements and protection provisions of the standard, should their blood lead levels increase to 50ug/dl.

E. Medical examinations and consultations must be made available for employees exposed to lead at or above the Action Level for more than 30 days in any consecutive 12 month period for any of the following conditions:
   1. At least annually for each employee who has had a blood lead level at or above 40ug/dl at any time in the preceding 12 months.
   2. As soon as possible for any employee who has complained of signs or symptoms commonly associated with lead intoxication, the employee desires medical advice concerning the effects of past or present lead exposure on the ability to procreate a healthy child, the employee is pregnant, or the employee has demonstrated difficulty in breathing during a respirator fit test or during the use of a respirator.
   3. As medically appropriate for each employee who has had limits placed on their lead exposure, or has been removed from lead exposure as dictated by the medical removal provisions.

F. The physician is to be supplied with a copy of the 1926.62 standard, a description of the employee's duties and work assignments, exposure levels or anticipated exposure levels, a description of the engineering controls and personal protective equipment to be used, any prior blood lead tests performed, and any prior medical information concerning the employee.

G. The physician must provide test results and an opinion regarding any medical conditions, which could adversely affect the employee or would place the employee at increased risk due to lead exposure. The physician must also recommend special protective measures or limitations, which should be placed on the employee’s exposure or the use of respirators.
Employees are to be notified in writing of the results of the tests within five days.

H. The Company will designate the physician to perform all medical examinations, however, the employee has the right to seek a second medical opinion, and is to be notified of that right upon receipt of the test results. Should the second physician's findings differ from the first and no agreement can be reached, then a third physician is to be selected to review all the results and to run any additional tests deemed necessary.

12.0 Medical Removal
A. Employees are to be removed from airborne lead exposure at or above the action level when a blood lead level (PbB) of 50ug/dl or greater is obtained and confirmed by a retest within 2 weeks of the first. During the medical removal period, blood tests are required at least monthly. (Preferred Industrial Contractors, Inc. uses a cutoff of 20 ug/dl to remove workers from tasks involving lead exposure.)
B. Removal is also necessary if, in the opinion of the physician or physicians performing the examinations, the exam indicates a medical condition, which places the employee at an increased risk due to lead exposure.
C. An employee removed due to increased lead levels may return to their former job status when 2 consecutive blood samples indicate PbB levels to be at or below 40ug/dl or when a medical determination finds that there is no longer an increased risk due to lead exposure.
D. Medical surveillance is to be made available to any employee who may be occupationally exposed on any day to lead in concentrations that are at or above the action level. Blood lead and ZPP (zinc protoporphyrin) bioassays will be required. Each employee will be tested prior to beginning work and at least every two months for the first six and every six months thereafter. Additional testing will be required if blood lead levels found to be are above 40 ug/dl. (See 29 CFR 1926.620)(iv)(2)(A-C)).
E. Complete medical examinations and consultations are not required unless the employee will be exposed to airborne lead for 30 days or longer, the blood sample results are 40 ug/dl or greater or the employee develops signs or symptoms of lead poisoning. (See 29 CFR .620)(3)(i)(A-C)). Employees must be notified of their biological monitoring results within five days of their receipt.

13.0 Training
A. All employees shall have lead awareness training at time of hire, during orientation or before initial assignment in area where lead is suspected and annual refresher training is conducted.
B. Any employee who is involved in any work where there is a hazard of lead exposure is to receive appropriate training prior to the start of the project and at least annually thereafter. Training will depend upon the type of work to be performed and the measured and/or anticipated exposure, however, in all cases the training plan is to include:
   1. The contents of the 29CFR 1926.62 lead standard and its appendices including the adverse health hazards of lead exposure.
   2. The specific nature of the operations, which could result in exposure to lead above the Action Level.
   3. The engineering controls and work practices which will be used to reduce the lead exposure, including any operation and maintenance procedures needed for the ventilation system to be used.
4. The selection, fitting, use and limitations of the respirators, which will be used for the work.
5. The purpose of the medical surveillance program and a description of the medical removal program, if applicable.
7. Instructions to employees that chelating agents are not to be routinely used to remove lead from their bodies and should not be used at all except under the direction of a licensed physician.

C. In addition, employees are to receive additional training concerning the chemical and physical hazards associated with the performance of specific job duties and classifications. This training is to consist of but not be limited to:
   1. OSHA Standards General Health And Safety
   2. Material Handling
   3. Ladders And Scaffolding
   4. Health Hazards And Personal Protective Equipment
   5. Electrical Safety
   6. Welding, Cutting, Grinding
   7. Tools
   8. Hazard Communication

D. Proper documentation will be made each time this training is given and retained per regulations.

E. A copy of OSHA Lead Standard 29 CFR 1926.62 must be made available upon an employee request.

14.0 Record Keeping
All employee exposure sampling and medical records shall be maintained for the duration of employment plus 30 years.

General Work Practices: When working on multi-contractor worksites Preferred Industrial Contractors, Inc. employees shall be protected from exposure. If employees working immediately adjacent to a lead abatement activity are exposed to lead due to the inadequate containment of such job, Preferred Industrial Contractors, Inc. shall either remove the employees from the area until the enclosure breach is repaired or perform an initial exposure assessment.

Employees will wash hands and face if lead materials are contacted. Any possible contact with lead containing material must be reported immediately to the supervisor or Safety Manager.

If air is re-circulated back into the workplace, the system must be equipped with a HEPA (high efficiency particulate air) and backup filter, and a system to monitor the lead level will be installed.

When using mechanical means to remove lead-containing paints or coatings, use equipment which is equipped with a HEPA collection system.

Whenever possible, use a wet system to reduce airborne dust.

Whenever possible, substitute lead material with non-leded material.

Respirators shall be used during the time period required to install or implement control if engineering and work practices are insufficient as well as for emergency use.
If respirators are required, they will be NIOSH certified and all employees will follow the Preferred Industrial Contractors, Inc. Respiratory Protection Program.

15.0 Forms
A. SAF-35.8-1 - Respiratory Protection For Lead Exposures
B. SAF-35.8-2 - General Lead Compliance Program Outline for Job Location or Project
C. SAF-35.8-3 - Lead Exposure Control Plan
D. SAF-35.8-4 - Lead Compliance Plan
# RESPIRATORY PROTECTION FOR LEAD EXPOSURES

**SAF-35.8-1**

<table>
<thead>
<tr>
<th>Airborne Lead Concentrations</th>
<th>Required Respirator</th>
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<tbody>
<tr>
<td>Not in excess of 500 ug/m³. (10XPEL)</td>
<td>• ½ mask air purifying respirator with HEPA/P100 filters&lt;br&gt;• ½ mask supplied air respirator operated in demand (negative pressure) mode</td>
</tr>
<tr>
<td>Not in excess of 1,250 ug/m³. (25XPEL)</td>
<td>• Loose fitting hood or helmet powered air purifying respirator with HEPA/P100 filters&lt;br&gt;• Hood or helmet supplied air respirator operated in continuous flow mode</td>
</tr>
<tr>
<td>Not in excess of 2,500 ug/m³. (50XPEL)</td>
<td>• Full face air purifying respirator with HEPA/P100 filters&lt;br&gt;• Tight fitting powered air purifying respirator with HEPA/P100 filters&lt;br&gt;• Full face supplied air respirator operated in demand mode&lt;br&gt;• ½ mask or full-face supplied air respirator operated in continuous-flow mode&lt;br&gt;• Full face self-contained breathing apparatus (SCBA) operated in demand mode</td>
</tr>
<tr>
<td>Not in excess of 50,000 ug/m³. (1,000XPEL)</td>
<td>• ½ mask supplied air respirator operated in pressure demand or other positive pressure mode</td>
</tr>
<tr>
<td>Not in excess of 100,000 ug/m³. (2000XPEL)</td>
<td>• Full face supplied air respirator operated in pressure demand or other positive pressure mode</td>
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<tr>
<td>Greater than 100,000 ug/m³.</td>
<td>• Full face SCBA operated in pressure demand or other positive pressure mode</td>
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*A high efficiency particulate filter (HEPA/P100) is one that is 99.97% efficient against particles of .3µ or larger including oil aerosols.*
GENERAL LEAD COMPLIANCE PROGRAM OUTLINE FOR JOB LOCATION OR PROJECT

A. Description Of Activity In Which Lead Is Emitted
   1. Activities - List the activities that will generate airborne lead. Be specific.
   2. Equipment used - List the equipment necessary to remove the lead coatings and that which will be used to control lead exposures.
   3. Materials involved - For example, abrasive blasting of lead-based paint, manual scraping, manual sanding, and use of heat gun. Power tool cleaning, lead burning, using lead containing mortar or spray painting with lead-containing paint. Abrasive blasting, rivet blasting, welding, cutting, or burning on any structure where lead containing coatings or paint are present. Transportation, disposal, storage, or containment of lead or materials containing lead on the site or location at which construction activities are performed.
   4. Controls in place - Containment, mechanical ventilation, local exhaust ventilation, BEPA vacuums, negative air machines with HEPA/P100 filters, PPE, and airline respirators. Hygiene facilities, showers, wash stations.
   5. Crew size - Be specific. Identify crew size by task if possible. For example: crew consists of four painters, two laborers, one pipe-fitter, and one operator.
   6. Employee job responsibilities - Use general work procedures, project agreements, construction work release and/or safe work plans to specify individual responsibilities.
   7. Operating Procedures - Use the detailed work description as described in general work procedures, project agreements, construction work release, job hazard analysis and the project health & safety plan.

B. Describe The Plans To Achieve Compliance And Engineering Controls
   Where engineering controls are required, engineering plans and studies should be used to determine feasible methods selected for controlling exposure to lead. Those methods will need to be documented.

C. Technology Considered To Meet The PEL
   This would be the engineering controls selected to control airborne lead concentration in the work place.

D. Air Monitoring Data That Documents Source Of Lead Emission
   This refers to the availability of any historic air sampling data used to determine or anticipate future worker exposures.

E. A Detailed Schedule For Implementation Of The Program
   This would include a timetable, which identifies the events or tasks, which may result in a lead exposure and the schedule milestones showing where controls will be implemented. Also, include purchase orders on long lead items that may impact the schedule.

F. Work Practice Program Including Procedures/Regulations
   Protective clothing and equipment, housekeeping, hygiene facilities and practices, and other relevant work practices such as those listed in this procedure or 29 CFR 1926.62, Construction Work Release, Job Safety Analysis, and Task Health & Safety Plan, etc.

G. Administrative Controls Schedule For Job Rotation
   If administrative controls are used as a means of reducing employee's exposure to lead, establish and implement a job rotation schedule to include: the names, ID numbers, duration and exposure levels at each job or work station, information used to assess the effectiveness of the administrative controls.
H Communications Between Other Contractor
A description of arrangements made among multi-contractor sites with respect to informing affected employees of potential exposure to lead and with respect to responsibility for subcontractor compliance with this program.
EAD EXPOSURE CONTROL PLAN

The purpose of implementing this Lead Exposure Control Plan is to reduce the risk of the worker being exposed to lead and inorganic lead compounds. Each project is required to analyze their specific issues pertaining to lead and implement this plan as accordingly. The following is required if any work is going to be performed when there is a potential of lead being present:

A Verification of lead being present.
1. There are a variety of methods of determining if lead is present and these method are:
   a. Client Disclosure
   b. Material Safety Data Sheets of Suspected Materials
   c. Historic Records
   d. Sampling and Analysis
2. If none of the above has been done the presence of lead will be considered present.
3. No work will be started until the above has been performed and appropriate/approved protection for the employees and the public has been implemented.

B Employee Monitoring
1. Employees will be monitored initially to determine if the action level exceeds 30 ug/m3 as an 8-hour Time Weighted Average (TWA). Each area that is suspected of lead contamination will be sampled. This sampling will be conducted for the duration of the shift and will reflect the employee’s daily exposure.
2. While this monitoring is being performed all employees, working in the suspected lead contaminated area, will be required to wear appropriate and approved protective equipment. Training must be implemented prior to the start of work.
3. If the sampling results is under the 30ug/m3 no further sampling is required unless conditions change. If the sampling is over but less than 50ug/m3 personal sampling will be performed every six months. If the sampling is over 50ug/m3 then sampling must be performed every twelve weeks.
4. All employees participating in the sampling must be advised in writing of the results and what protective measures will be taken to protect them.

C Compliance Documentation (If sampling is 30ug/m3 or more)
1. Description of each activity — SAF-35.8-4.
2. Crew size, employee duties, maintenance practices, equipment used and material involved — SAF-35.8-4.
3. Identify engineering and administrative controls used to reduce lead exposure — SAF-35.8-4.
4. If engineering controls are not applicable give reason — SAF-35.8-4.
5. Lead sampling documents must be readily available. The sampling documents and medical records must be retained for 30 years after the work has been completed.
6. Date this plan was implemented — SAF-35.8-4.
7. Documentation of other workers and subcontractors notified of potential exposure — SAF-35.8-4.
8. Documentation of types of protective work clothing and equipment, housekeeping, hygiene toiletries and practices — SAF-35.8-4.
9. Respiratory Program.
D Medical Requirements
1. Every employee will be medically tested, by a qualified physician, before being allowed to start work and at least every two months for the first six months and every six months thereafter. Additional testing will be required if blood levels exceed 40ug/dl.
2. A medical questionnaire must be completed and given to the testing medical physician - See Respirator Procedure.
3. Medical testing must be made available to any employee who may be exposed on any day to lead in concentrations that are at or above 30ug/m3.
4. Medical examinations and consultations are not required unless the employee will be exposed to airborne lead for 30 days or longer, blood sample results are 40ug/dl or greater or the employee develops signs or symptoms of lead poisoning. Employees must be notified of the results within 5 days.

E Respiratory Protection
1. Respirators will be selected on the basis of exposure levels, see SAF-35.8-1. AR negative pressure respirators shall be fitted with high efficiency particulate (HEPA) filters. Quantitative or qualitative fit tests shall be performed at the time of initial fitting and every six months thereafter.
2. Powered, positive pressure air purifying respirators shall be provided to any employee that requests one.

F Protective Clothing and Facilities
1. Clothing includes coveralls, gloves, head covers and shoe covers.
2. Contaminated clothing must not be permitted to leave the project.
3. Clean clothing must be provided daily to each employee.
4. Contaminated clothing must be bagged and appropriately labeled.
5. Contaminated clothing must not be blown or shaken.
6. Shower and hand washing facilities must be made available adjacent to the work area.
7. Every employee must be required to shower every time they leave the work area.
8. A clean eating area, from lead contamination, must be provided.
9. Contaminated wash water must be disposed of in accordance to local, state or federal regulations.
10. All employees are prohibited from smoking, eating or chewing tobacco in the work area.

G Training
1. Affected employees must receive hazard communication training prior to starting work.
2. Explanation of this plan.
3. Scope of work to be performed.
4. Hazards of lead and affects.
5. Respirator protection training.
6. Explanation of medical requirements.
7. Documentation of training.

*NOTE: A copy of the OSHA Lead Standard must be made available if the employee requests one.

H Work Area
1. The work area must be barricaded and warning signs posted. “No Smoking” or “No Eating” signs must be posted also.
2. The work area must have controlled access.
3. Controls must be in place to prevent contaminated airborne dust from escaping the work area.
LEAD COMPLIANCE PLAN

Contractor: ____________________________

____________________________________

Project Name: ____________________________________________________________

Location of Lead Control Area: ______________________________________________

Date Plan Implemented: ______________________________________________________

Description of Activities

____________________________________

Activity One: ______________________________________________________________

Activity Two: ______________________________________________________________

**Crew Size, Employee Duties, Maintenance Practices, Equipment Used and Materials Used**

Activity One Crew Size: ____________

Name: 1. ________________________________________________________________

Duties: __________________________________________________________________

Maintenance Practices: ______________________________________________________

Equipment Used: __________________________________________________________

Material Used: _____________________________________________________________

Name: 2. ________________________________________________________________

Duties: __________________________________________________________________

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Engineering Not Applicable - Give Reason: ____________________________________________

______________________________________________________________________________

Administrative: ____________________________________________

______________________________________________________________________________

Lead Sampling Documents
Location: ____________________________________________
Analysis By: ____________________________________________
Date of Sampling: ____________________________________________

Notifications - Subcontractors and Other Employees
Subcontractor Name: ____________________________________________
Letter #: ___________ Date: __________________

Other Employees: Name: __________________ Date: ___________
Name: __________________ Date: ___________
Name: __________________ Date: ___________
Name: __________________ Date: ___________
Name: __________________ Date: ___________
Name: __________________ Date: ___________
Name: __________________ Date: ___________
Name: __________________ Date: ___________
Name: __________________ Date: ___________
Name: __________________ Date: ___________

Additional Documentation
Type of Protective Clothing: ____________________________________________
Type of Protective Equipment: ____________________________________________
Type of Toiletries: ____________________________________________
Hygiene Practices: ____________________________________________

Respiratory Program
Location: ____________________________________________
1.0 Scope
   A. As appropriate, participates in pre-job and daily worker briefings regarding task-specific butadiene hazards and controls, work practices/plans (such as JSAs), and other applicable information, including any changes that are made to controls or to the work practices or plans.
   B. Employees shall follow all requirements regarding the safe work procedures for butadiene.
   C. Possible locations: Butadiene may be present at refineries and petrochemical plants. Butadiene is used in the production of styrene-butadiene rubber and polybutadiene rubber for the tire industry. Other uses include copolymer latexes for carpet backing and paper coating as well as resins and polymers for pipes and automobile and appliance parts. It is also used as an intermediate in the production of such chemicals as fungicides.

2.0 Procedure
   A. Characteristics
      Butadiene is a flammable, colorless gas with a mild, aromatic odor at room temperature and pressure. Butadiene may also exist as a cryogenic liquid.
      Butadiene is insoluble in water, stable, and reacts with oxidizers.
   B. Physical Hazards
      • Flammable gas
      • Explosive peroxides
      • Fire hazard when exposed to heat, flame, or strong oxidizers
      • Release of toxic gases such as carbon monoxide during a fire
   C. Health Hazards
      • There are no recorded cases of accidental exposures at high levels that have caused death in humans, but this could occur.
      • Overexposure can cause respiratory and eye irritation.
      • Contact with liquid butadiene can cause burns and frostbite.
      • Acute (short term) health hazards include:
         o Central nervous system effects
         o Blurred Vision
         o Nausea
         o Fatigue
Headache  
- Decreased blood pressure  
- Decreased pulse rate  
- Unconsciousness

- Chronic (long term) health hazards include:
  - Cancers of the lymph hematopoietic system (carcinogen)
  - Lymphoma
  - Leukemia
  - Potential reproductive toxicity

3.0 Practices
A. Exposure Monitoring
   Monitoring or measuring of employee exposure shall be conducted when exposure to butadiene is at or above the action level on 30 or more days a year or when exposure is at or above the PELs for 10 days or more a year or following an emergency situation.

B. Regulated Areas
   Regulated areas shall be established when exposure to an employee is or is expected to be in excess of the PEL. Regulated areas shall be marked with warning signs to alert employees and access is restricted to authorized persons only.

C. Contingency Planning
   Preferred Industrial Contractors, Inc. shall be aware of owner’s contingency plan provisions. Employees must be informed where butadiene is used in host facility and aware of additional plant safety rules.

D. Respiratory Protection & PPE
   - Eye and skin protection should be worn where exposures to liquid butadiene may occur.
   - Respirators may be required where exposures are above the permissible exposure limit, and emergency respirators may be required where releases could occur.
   - Contact lenses should not be worn with this chemical.

E. Fire Protection
   Fire extinguishers shall be readily available and smoking prohibited in areas where butadiene is present or where butadiene may be released.

4.0 Training
   Training shall be provided on the health hazards and any use/handling requirements for butadiene at time of initial assignment and annually. Preferred Industrial Contractors, Inc. will assure employee participation and maintain a written record of the training contents. This training will include:
   - Hazard communication training for potentially exposed employees.
   - Training specified by the applicable butadiene standard.
   - Respirator training if respirators are to be used.
o Provide information to workers regarding task-specific butadiene hazards and control methods, the JSA, work practices, medical surveillance and other applicable information, including any changes that are made to these controls.

o Provide training annually, as appropriate, to workers who continue to have exposure to butadiene at or above the action level on any one day.

o All training will be recorded and include the identity of the employee trained, the signature of the person who conducted the training and the date of the training.
1.0 Scope
This policy applies to operations where exposures to benzene can occur. The purpose of this policy is to minimize occupational exposure to benzene and meet the requirements of the OSHA Benzene Standard 29 CFR 1910.1028 and 29 CFR 1926.1128. Based upon the most recent exposure monitoring data, the Benzene Exposure Control Plan will be reviewed annually by the EHS Manager to insure the plan is kept current. Copies of this program shall be furnished upon request for examination and copying to the Assistant Secretary, the Director, affected employees, and designated employee representatives.

2.0 Definitions
A. **Action Level** – The exposure level at which various parts of the benzene standard are required to be implemented, for example, medical surveillance, and training. The AL is 0.5 ppm averaged over 8 hours.
B. **Permissible Exposure Limit (PEL)** - The PEL for Benzene is 1.0 ppm (parts per million) averaged over an 8-hour time period.
C. **Short-Term Exposure Limit (STEL)** - The STEL for Benzene is 5.0 ppm (parts per million) averaged over a 15 minute time period.

3.0 Regulated Areas
A. Regulated areas will be established whenever airborne concentrations of benzene exceed or can be reasonably expected to exceed 1.0 ppm. include:

   1. During venting, draining, blinding or opening process equipment and piping containing or having contained greater than 10% benzene.
   2. During unplanned releases or spills greater than 5 gallons of liquids which contain 0.1% or more of benzene (i.e., gasoline, crude oil, crude ethylbenzene, mixed xylems).
B. To limit access to authorized personnel, the regulated area must be clearly marked with the appropriate warning signs. Where feasible, the area should also be barricaded.

Warning signs must read as follows:
C. Once established, an area will remain regulated until monitoring indicates the concentration of benzene in the air is less than 1.0 ppm.

D. Only personnel trained in the hazards of benzene will enter a benzene-regulated area.

E. All personnel entering a regulated area will wear all appropriate respiratory protection and protective clothing.

4.0 Methods of Reducing Personnel Exposure

A. Engineering and Work Practices Controls

Where feasible, benzene exposures will be controlled through engineering controls and work practices. Respirators should be used to control exposures that are intermittent or caused by emergency conditions and while awaiting engineering controls to be implemented. Engineering controls include, but are not limited to, closed-loop sample points, sample cooler, hard piping for draining, natural, or mechanical ventilation and fume hoods. Work practice controls include closed draining, hot nitrogen purging, and pre-cleaning of process equipment.

B. Respiratory Protection

1. Respirators are to be provided as interim protection and when engineering or work practices are insufficient to reduce the employee exposure levels to or below the PEL. Employees may request the use of a respirator even if the levels are below the PEL.

2. Respirators will be selected on the basis of actual or anticipated exposure levels. All negative pressure respirators shall be fitted with organic vapor filters. Quantitative or qualitative fit tests shall be performed at the time of initial fitting and every six months thereafter.

3. Respirators in use must be approved by the Mine Safety and Health Administration (MSHA) and the National Institute of Occupational Safety and Health (NIOSH). Respirators in use must be properly selected and fit tested. Powered, positive pressure air purifying respirators shall be provided to any employee that requests one. In addition, a respiratory protection program is to be implemented (Refer to Section 35 Procedure 35.4) which is to include the following:
   a. Establish written standard operating procedures using Section 35 Procedure 35.4 for the selection and use of respirators on the project.
   b. Respirators are to be selected on the basis of the hazards to which the worker is to be exposed.

4. Employees are to be trained in the proper use of respirators and their limitations. Training is to include demonstrating how to wear, adjust, and check for proper fit of the respirator.

5. Respirators are to be regularly cleaned and disinfected. If possible, respirators are to be assigned to individual employees.
Those respirators used by more than one worker are to be cleaned and disinfected after each use.

6. Respirators are to be stored in a convenient, clean, and sanitary location.

7. Respirators are to be routinely inspected during cleaning. Worn or deteriorated parts are to be replaced or the respirator disposed of.

8. Appropriate surveillance of work area conditions and the degree of employee exposure or stress is to be maintained.

9. The respiratory program is to be regularly inspected and evaluated for its effectiveness.

10. Employees shall not be assigned to tasks requiring the use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. The occupational physician shall determine what health and physical conditions are pertinent.

<table>
<thead>
<tr>
<th>Benzene Concentration</th>
<th>Respirator*</th>
<th>Cartridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown (i.e., no air sampling information) and/or emergency response for a release</td>
<td>Supplied Air</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Less than 1.0 ppm</td>
<td>None required</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Greater than or equal to 1.0 ppm, but less than 10 ppm</td>
<td>Half-Mask Air</td>
<td>Organic vapor (Black) or organic vapor/acid gas (Yellow) cartridges</td>
</tr>
<tr>
<td>Greater than or equal to 10 ppm, but less than 50 ppm</td>
<td>Full Face Air</td>
<td>Organic vapor (Black) or organic vapor/acid gas (Yellow) cartridges</td>
</tr>
<tr>
<td>Equal to or above 50 ppm</td>
<td>Supplied Air</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

5.0 Personal Protective Clothing

A. When liquids containing benzene are present or when there is the possibility of skin or eye irritation from the work environment; appropriate protective clothing and equipment is to be provided. This can include but not be limited to coveralls, full body protection, gloves, hats, appropriate eye and face protection, slicker suites, boots, etc.

B. Protective clothing worn by employees exposed to benzene must be removed at the completion of the work shift and disposed of in designated containers.

C. Containers of contaminated clothing and equipment are to be labeled as follows:

6.0 Benzene Hazard Communication

A. Labels

In addition to the labels required for the Hazard Communication Program, containers containing benzene greater than 0.1% must be labeled as follows:

DANGER CONTAINS
BENZENE CANCER
HAZARD

Note: As long as the MSDS has the above wording and the vessel refers to that particular MSDS on the container list, the MSDS can serve as the label for a benzene containing vessel. However, portable containers (i.e. drums, cans, sample containers) still require the above wording.
B. Employee Training
1. All Preferred Industrial Contractors, Inc. employees working in areas with potential benzene exposures must be properly trained to work with benzene.
2. Training will be conducted upon initial employment and repeated at a frequency determined by the Health Safety and Environment (HSE) Department.
3. Training will include the specific hazards of benzene, the contents of the benzene standard, medical surveillance program and the appropriate protective measurements to control benzene exposures.

C. Exposure Monitoring
1. Personal exposure monitoring will be coordinated by HSE personnel.
2. Initial personal monitoring will be performed to determine representative exposures for each job function in which exposures to benzene may exceed the OSHA action limit or short-term exposure limit.
3. For job functions in which initial monitoring indicates benzene exposure above the action level, a periodic monitoring program will be established.
   a. Periodic Monitoring will be completed depending on exposure levels.
   b. Periodic monitoring will be conducted semi-annually when engineering controls or work practices do not reduce benzene exposure below the PEL or STEL.
   c. Periodic monitoring will be conducted annually when engineering controls or work practices do not reduce benzene exposures below the action level.

D. Employee Notification
1. Each employee monitored will be notified in writing of his/her personal monitoring result within 15 days of the receipt of analytical results.
2. In the event of overexposure, the individual will be notified of any corrective action through his/her supervisor.

E. Observation of Monitoring
The monitoring process may be observed by all employees whom the monitoring affects.

F. Atmospheric Testing
There are several different ways to test the atmosphere for benzene. The most prevalent ways are the use of a benzene specific draeger tube, a photo ionization detector (PID), bag sample, and gas chromatograph (GC) analysis. There are other ways such as the use of a portable GC and a combination of a photo ionization detector (PID) and a portable

7.0 Medical Surveillance
A. Initial and Periodic Medical Evaluations
1. Employees working in areas who have potential exposure to benzene will receive pre-employment and periodic medical evaluations as determined by the occupational physician.
2. If initial or periodic medical evaluations indicate an abnormal condition (i.e., abnormal blood condition), further evaluations will be given and referrals made as determined by the occupational physician.
3. Medical evaluations will be done periodically for individuals that have been
identified as having benzene exposures above 10 ppm for 30 or more days per year.

B. Medical Evaluations as a Result of Emergency Exposures
   1. In the event of exposure, without the use of proper respiratory protection, to an unforeseen release of benzene-containing vapor or liquid, the employee shall provide a urine specimen to the occupational physician. The specimen must be collected no sooner than 6 hours and no later than 8 hours following the exposure. If a urine sample is not collected within this time frame, the exposed employee must enter a blood monitoring program administered by the occupational physician.
   2. If the urine specimen indicates an abnormal condition (i.e., high phenol in urine), further evaluation will be performed and referrals made as determined by the occupational physician.
   3. The Company will designate the physician to perform all medical examinations; however, the employee has the right to seek a second medical opinion, and is to be notified of that right upon receipt of the test results. Should the second physician’s findings differ from the first and no agreement can be reached, then a third physician is to be selected to review all the results and to run any additional tests deemed necessary.

C. Medical Records
   1. Medical records associated with benzene medical surveillance will be maintained by the H.R. Department.
   2. An employee’s medical records must be made available for review and copying to the employee or to anyone with written consent of the employee.
1.0 Scope
This policy applies to projects where exposures to Hydrogen Sulfide can occur. The purpose of this policy is to minimize occupational exposure to Hydrogen Sulfide and meet the requirements of the OSHA Hazard Communication and Process Safety Management Standards 29 CFR 1926.59 and CFR 1926.64.

2.0 Physical Characteristics
A. Odor Threshold ...........................................0.13 PPM
B. Color ..............................................................Colorless
C. Odor ..........................................................Rotten egg smell at low concentrations. Rapidly deadens the sense of smell at 100 ppm.
D. Molecular Weight .......................................34.08
E. Boiling Point @ 1 atm. ....................-76.6 F
F. Vapor Density .............................................1.1895 (air = 1)
G. Vapor Pressure @ 70 F ..................252 psig
H. Solubility in Water .......................0.672 g/100 ml. water
I. Lower Explosive Level ......................4.3 %
J. Upper Explosive Level ......................45 %

3.0 Exposure Limits
A. Threshold Limit Value (TLV) ..........10.0 ppm, 14 mg/m3 TWA
B. Short-Term Exposure Limit (STEL) ..15.0 ppm, 21 mg/m3

4.0 Methods Of Reducing Exposure
A. Engineering and Work Practices Controls
   Where feasible, hydrogen sulfide exposures should be controlled through engineering controls and work practices. Respirators should be used to control exposures that are
intermittent or caused by emergency conditions and while awaiting engineering controls to be implemented.

B. Respiratory Protection

1. Respiratory Protection will be worn as outlined below:

<table>
<thead>
<tr>
<th>H2S Concentration</th>
<th>Respirator*</th>
<th>Cartridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown (i.e., no air sampling information and/or emergency response for a release)</td>
<td>Full Face Supplied Air with escape SCBA</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Less than 10.0 PPM</th>
<th>Nonrequired</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than or equal to 10.0 PPM</td>
<td>Full Face supplied Air with escape SCBA</td>
<td></td>
</tr>
</tbody>
</table>

2. When self-contained breathing apparatus is used in operations where known or potential concentrations of hydrogen sulfide levels reach or exceed levels which are immediately dangerous to life or health (IDLH), two or more standby persons must be present and equipped with the appropriate Personal Protective and rescue equipment.

C. Additional Personal Protective Equipment (PPE)

When liquids or vapors containing hydrogen sulfide are present, additional PPE i.e., chemical suites, gloves, boots, etc. will be used.

5.0 Employee Training

A. All employees working in areas with potential hydrogen sulfide exposures must be properly trained.

B. Training will be conducted upon initial employment and repeated annually. Employees must receive additional training if there is a change in or addition of a process or operation that creates the potential for exposure. The project HSE department is responsible for tracking and maintaining employee-training records. Copies of all training records are to be sent to the corporate HR department.

C. Training will include the specific hazards and symptoms of hydrogen sulfide H2S, safe work practices, Personal Protective Equipment, Preferred Industrial Contractors, Inc. and plant specific Emergency Procedures. The following hazard information shall be included:

D. Hydrogen sulfide is a very common air contaminant, found in oil and gas fields and refineries i.e., Drilling Operations, recycled drilling mud, water from sour crude wells, blow outs, tank gauging, field maintenance, tank batteries and processes and process streams. Hydrogen Sulfide can also be found in underground sewers, manholes, and electrical vaults.

E. Inhalation is the common route by which hydrogen sulfide enters the body. Able to pass easily from the lungs to the bloodstream, H2S can quickly kill. Exposure to as little as 600 ppm H2S in air for 30 minutes has been fatal; higher exposures can cause immediate
Hydrogen sulfide is a neurotoxin, which means it is poisonous to nerve and brain cells. If \( \text{H}_2\text{S} \) is absorbed faster or in greater quantities than the body can rid itself of it, it will build up in the blood and poison the centers in the brain, which control breathing. The lungs stop working and death due to asphyxiation results. A person can be overcome by hydrogen sulfide and lose consciousness in seconds.

Much more rarely, death results not from the poisonous properties of hydrogen sulfide but from its irritant properties. If conditions are just right (low exposure levels for long periods of time). The upper respiratory tract and lungs fill with fluid in response to the irritation, in effect drowning the victim, even though poisoning of the nervous has not yet occurred. This is called pulmonary edema.

Although even in low concentrations hydrogen sulfide has the distinct and disagreeable odor of rotten eggs, poisoning can occur with virtually no warning at all. This is because hydrogen sulfide in concentrations high enough to kill also quickly numbs the sense of smell.

In small doses, \( \text{H}_2\text{S} \) causes a wide range of chronic effects. With low level (e.g., 10 - 100 ppm) or repeated exposures, headache, dizziness, nausea and vomiting may develop, along with irritation of the eyes and respiratory tract. Respiratory symptoms include cough, pain in the nose and throat, and painful breathing. Other symptoms of chronic poisoning include slowed pulse, fatigue, insomnia, digestive disturbances, cold sweats, eye infections, and weight loss.

Area emergency alarms and evacuation routes, the location of emergency eye wash stations and showers and emergency phone numbers are to be included as part of the employees pre-job safety plan review.

### 6.0 Regulated Areas

A. Whenever airborne concentrations of hydrogen sulfide in an area or specific operation exceed or can be reasonably expected to exceed 10.0 PPM, the areas and or operations are to be identified and regulated. The project safety supervisor and the project superintendent are responsible for obtaining from the facility owner or operator the area(s) or operations that exceed or have the potential to exceed the 10.0 PPM level.

B. The project safety supervisor shall identify the areas or operations on a facility plot plan. The plot plan is to be included as part of the New Hire Orientation program, the Hydrogen Sulfide training program, the Hazard Communication Program and the daily pre-task safety review.

C. To limit access to authorized personnel, the regulated area should be posted with the appropriate warning signs.

D. Warning signs should contain the following warning:

```
DANGER HYDROGEN SULFIDE
AUTHORIZED PERSONNEL ONLY
```

E. Only employees trained in the hazards of hydrogen sulfide are permitted to enter a hydrogen sulfide regulated area.

F. All personnel entering a regulated area will wear all appropriate respiratory protection and protective clothing.
7.0 Monitoring
   A. Prior to entering the area project site safety supervisor and facility operations personnel will survey the area with air monitoring equipment.
   B. Continuous air monitoring will be conducted while employees are working in areas that have the potential to exceed established exposure levels. Monitors shall be equipped with a pre-set audible alarm that activates when levels exceed 20 PPM.
   C. Employees shall evacuate the area in the event a monitor alarm sounds. Employees are not permitted to return to the area until; the area has been deemed safe by Preferred Industrial Contractors, Inc. and facility owner or operator personnel.
   D. Proper respiratory and personal protective equipment has been donned and employees have reviewed and signed off on a pre-task safety form developed to address the changes in the conditions.

8.0 Confined Spaces
   Employees shall not be permitted to enter confined spaces that contain Hydrogen Sulfide levels in excess of 10 PPM. A detailed pre-task safety plan shall be developed and approved by the facility owner or operator and Preferred Industrial Contractors, Inc. Project Manager and site safety supervisor for any confined space entry where Hydrogen Sulfide levels have the potential to exceed the level. The plan shall include respiratory and personal protective equipment requirements, an emergency response plan, roles, and responsibilities, and the number of craft employees involved. Upon approval all employees, and supervisors involved shall attend a pre-job meeting. The plan and all requirements shall be reviewed and roles and responsibilities assigned.
   (Refer to Preferred Industrial Contractors, Inc. EHS Manual Section 35.3 Confined Space Entry)
38.0 - Naturally Occurring Radioactive Material (NORM)

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6.0 Decontamination / Disposal .......................................................................................................3

1.0 Purpose
To address the requirements of work activities that involve the demolition, removal, renovation, maintenance or handling of NORM contaminated materials.

2.0 Safety, Health And Environmental Considerations
A. NORM presents a health hazard to all personnel that come in contact with the material. NORM enters the body by ingestion, absorption through the skin, or by breathing NORM contaminated dust that is generated during maintenance activities.
B. The Project site safety supervisor, working under the direction of the Corporate Safety and Industrial Hygienist and the facility owner Industrial Hygienist, shall be responsible for administrating and monitoring this program.
C. The Project site safety supervisor in coordination with the facility owner or operator shall identify on a facility plot plan the locations of processes where NORM can be found.
D. A NORM survey shall be performed by site safety personnel on equipment suspected of containing NORM when interior surfaces are exposed for maintenance.
E. Employees entering an area where NORM is present must be informed of the presence of the NORM and trained on the potential for exposure under normal operations and emergency situations. Employees are to be trained on the hazards associated with NORM and safe work practices to be used to protect themselves.
F. Employees shall receive initial training with refresher training provided annually and at any time there is a change in procedure.
G. Compliance with and the effectiveness of this procedure will be included as part of the project’s annual corporate safety assessment.
H. Approaches to work areas containing NORM shall be posted with warning signs and barricades.

3.0 Definitions
A. (NORM) - Normally Occurring Radioactive Material. Naturally occurring radioactive materials whose radionuclide concentrations have been increased by or as a result of human practices. TENORM does not include the natural radioactivity of rocks or soils, or background radiation.
B. Becquerel (Bq) - A quantitative measure of radioactive material in the International System (SI) of Units. One Becquerel equals one disintegration per second (dps).
C. **Curie (Ci)** - A quantitative measure of radioactive material in unit commonly used in the U.S.A. One curie is equal to 37,000,000,000 Becquerels.

D. **DAC (derived air concentration)** - The concentration of a specific radioisotope. In air in which a person, receiving an occupational dose, can work for a 2000-hour work-year and not exceed the permissible radiation exposure level.

E. **dpm (disintegration per minute)** - A quantitative measure of radioactive material. One dpm is equal to 60 Bq.dpm/100 cm²: A measure of the average quantity of radioactive material on a surface.

F. **Microrem (prem)** - A relative measure of radiation dosage. Equal to 0.000001 rem (1.0 x 10^-6 rem).

G. **Microsievert** - A unit of dose equivalence in the International System (SI) of Units. Equal to 0.000001 sievert (1.0 x 10^-6 sievert)

H. **Picocurie (pCi)** - A quantitative measure of radioactive material in units commonly used in the U.S.A. One picocurie is equal to 1 X 10^-12 curie.

I. **Radiation** - In this context, radiation refers specifically to ionizing radiation. There are three principal types of radiation:

J. **Alpha Radiation** - A not very penetrating radiation that is primarily a hazard if taken into a person's body. A thin sheet of paper will shield from most alpha radiation.

K. **Beta Radiation** - A slightly penetrating radiation that can cause damage to surface tissue such as the skin or lens of the eye or internal organs if taken into a person's body. A thin sheet of metal or a heavy glove will shield from most beta radiation.

L. **Gamma Radiation** - A very penetrating radiation very similar to x-ray radiation. Gamma rays can penetrate through several inches of steel.

M. **Rem** - A relative measure of radiation dosage. Equal to 1000 millirem (mrem) and 1,000,000 microrems (urem).

N. **Sievert (Sv)** - The unit of dose equivalence in the International System (SI) of Units. One sievert is equal to 100 rems.

4.0 **General**

A. Determine if the equipment to be worked on is suspected of containing TENORM contaminated materials.

B. If the equipment is suspected of containing TENORM, the work area must be posted with precautionary barricades and warning signs. Warning signs state:

   **CAUTION TECHNOLOGICALLY ENHANCED NATURALLY OCCURRING RADIOACTIVE MATERIAL (NORM) HAZARD AUTHORIZED PERSONNEL ONLY**

C. Personnel that enter the work area must wear the appropriate personnel protective equipment such as protective clothing and respiratory equipment equipped with HEPA filters.

D. A radiation survey must be done on the equipment immediately after the interior surfaces are exposed.

E. Radiation levels greater than the following indicate that the facilities or equipment must be considered TENORM-contaminated:
   - gamma radiation: 50 microrems per hour on contact with the item (0.5 microsievert per hour on contact with the item)
alpha or beta surface contamination (internal or external)
5,000 dpm | 100 cm²-average-reading (alpha or beta)
15,000 dpm | 100 cm² maximum reading
1,000 dpm | 100 cm² removable contamination

F. If the survey shows TENORM contamination to be below the acceptable limit, work may proceed. Protective clothing and respiratory equipment is not required for TENORM contamination.

G. If the survey shows TENORM contamination to be above the acceptable limit, then the appropriate personnel protective equipment must be used by all employees working within the TENORM contaminated area.

H. TENORM contaminated equipment that is opened and/or removed from the process must be protected to prevent the TENORM material from being released into the environment. This includes wrapping the openings of equipment and collecting all solids and liquids that may be released from the equipment.

5.0 Protective Equipment
Employees who may be exposed to TENORM at or above contamination or airborne limits are provided personal protective equipment and a means to care for this equipment according to the following:

A. Employees who work on or remove TENORM-contaminated materials use respiratory protection if airborne contamination levels exceed 10% of the Derived Air Concentration (DAC).

B. Special work clothing, such as disposable coveralls or similar whole-body clothing, gloves and goggles are required when working with TENORM-contaminated materials. Single-use disposable coveralls are recommended.

C. During personnel entry into contaminated vessels, shoe covers are required in addition to special work clothing described above.

D. Disposable clothing is removed before the worker leaves the contaminated area. Special work clothing used when working with TENORM-contaminated materials shall be surveyed for alpha and/or beta contamination. If they are found to be contaminated, the clothing will be turned inside out as removed and placed in TEMORM waste containers for disposal.

E. Personnel wearing special work clothing are surveyed for alpha and or beta contamination using an appropriate survey meter, after, removal of their special work clothing or disposable clothing. Personnel working with or on TENORM contaminated materials must wash their hands and faces prior to smoking or eating. Smoking, eating or drinking is not permitted in restricted area.

6.0 Decontamination / Disposal

A. Potentially contaminated bulk materials or equipment are characterized for radioactivity content. Specific activity greater than the following are considered TENORM contaminated:
   1. 150 picocuries / gram (pCi / g)
   2. 5,500 Becquerel per kilogram (Bq/kg)

B. Contaminated equipment must be maintained in an area that is bordered on all sides with red barricade tape and posted with warning signs until decontaminated or shipped off-site for disposal.
C. Decontamination must be done by an approved licensed firm. The Corporate Industrial Hygienist can assist to determine whether a firm is licensed.

D. The preferred method of decontamination is water blasting. The water must be collected, filtered, and tested prior to disposal. Non-contaminated water can be sent to the sewer. Contaminated water and/or filters must be sent to an approved disposal site.

E. Decontaminated equipment can then be tested to ensure that it is below acceptable standards and if so can be disposed of as scrap metal through conventional means.

F. Equipment that cannot be properly decontaminated must be disposed of through an approved TENORM disposal facility.

G. Contaminated equipment that will be sent off-site for disposal must be placed in appropriate containers and properly labeled.

H. Contaminated equipment must be decontaminated or disposed of in 90 days unless an extension is received from the state DEQ.
1.0 Scope

Purpose

The purpose of this plan is to minimize the potential for worker exposure to Hexavalent Chromium in a manner, which is consistent with the requirements set forth by OSHA 29 CFR Parts 1910.1026 and 1926.1126, standard. With a few exceptions, the Hexavalent Chromium Standard for Construction, i.e., 29 CFR 1926.1126 is the compliance standard that applies to all Preferred Industrial Contractors, Inc. projects except:
A. Exposures that occur in the application of pesticides regulated by EPAS or other Federal government agency;
B. Exposures to Portland cement; or
C. Where objective data has been obtained that the material containing chromium or a specific process, operation, or activity involving chromium cannot release dusts, fumes or mists of chromium (VI) in concentrations at or above 0.5 μg/m³ as an 8-hour TWA under any expected conditions or use.
D. The revised OSHA standards permit a transition period between November 26, 2006 and May 2010 to obtain full compliance with the required engineering controls. Preferred Industrial Contractors, Inc.’s exposure monitoring and data gathering will be an ongoing process. Our Cr(VI) plan, our compliance strategy, and recommended work practices will evolve as more knowledge specific to our work activities is acquired. We will continue to monitor and assess our compliance processes and close any resulting data gaps to enable us to establish the full compliance program before May 2010.

2.0 Applicability
This plan is applicable to all of the company’s construction projects, unless superseded by a client’s standard, including all greenfield and brownfield projects, maintenance, alteration, and repair work where employees may be exposed to hexavalent chromium and chromium compounds.

3.0 Authority / Reference
29 CFR 1926.1126 is the governing standard for this plan.

4.0 Definitions
A. Action Level - Employee exposure, without regard to the use of respirators, to an airborne concentration of hexavalent chromium of 2.5 micrograms per cubic meter of air (2.5 μg/m³) calculated as an eight-hour time-weighted average (TWA).
B. Competent Person - Competent person refers to an employee or subcontractor who is capable of identifying existing and predictable lead hazards in the workplace and who can take prompt corrective measures to eliminate them.
C. Permissible Exposure Limit - The PEL for CrVI is 5 ug/m³ averaged over an 8-hour time period. If an employee is exposed to hexavalent chromium for more than eight hours in any work day, the permissible exposure limit, as a time weighted average (TWA) for that day, will be reduced according to the following formula: Allowable employee exposure (μg/m³) = 40 divided by hours worked in that day.
D. Chromium (VI) [Hexavalent Chromium or Cr(VI)] - means chromium with a valence of positive six, in any form or chemical compound in which it occurs. This term includes Cr(VI) in all states of matter, in any solution or other mixture, even if it is encapsulated by another substance. The term also includes Cr(VI) when it is created by an industrial process, such as when welding on stainless steel generates Cr(VI) fume.
E. Employee Exposure - means exposure to Cr(VI) that would occur if the employee were not using a respirator. Thus, exposure levels should be determined outside of the respirator for those employees wearing a respirator.

5.0 Cr(VI) Sources and Activities
A. Cr(VI) is a naturally occurring metal that is widely used in a variety of industrial products including the manufacturing of steel alloys, paint, corrosion resistant substances,
electroplating baths and wood preservatives. It is often found in abrasive blasting grit and dust.

B. Major users of chromium are in the metallurgical, refractory, and chemical industries. Chromium is used to produce stainless steel, alloy steel, and nonferrous alloys. CrVI is used in the chemical industry in pigments, metal plating, and chemical synthesis as ingredients and catalysts. There are about 30 major industries and processes where CrVI is used. These include producers of chromates and related chemicals from chromite ore, electroplating, welding, painting, chromate pigment production and use, steel mills, and iron and steel foundries.

C. Welding operations affected by the CrVI standards are those performed on stainless steel and high-chrome content carbon steel, as well as carbon steel welding in confined and enclosed spaces. Fume generated from the welding of stainless steel may contain both trivalent chromium and hexavalent chromium compounds. Fume composition and the rate of generation will depend on the welding process used and filler material used, if any. The rate of fume generation during welding of stainless steel depends on a number of factors, including welding current (current density), arc voltage (arc length), type of metal transfer (type of filler material and/or welding process), and the shielding gas or welding atmosphere.

D. The welding processes expected to generate the highest CrVI exposures are shielded metal arc welding (SMAW) and gas-metal arc welding (GMAW). It's estimated that CrVI accounts for approximately 4 percent of the of the total chromium content in GMAW fume and up to 50 percent of chromium content in SMAW fume. Other types of welding, such as tungsten-arc welding (TIG) and submerged-arc welding (SAW), may also present exposure concerns. However, these processes generally present lower fume volumes compared to SMAW and GMAW.

E. The specific tasks involving potential exposure to hexavalent chromium will vary from job to job, depending on the project scope and the materials present. However, when hexavalent chromium-containing materials are present, the following procedures or work activities performed by Preferred Industrial Contractors, Inc. often involve potential exposures, and should be addressed:
Welding on stainless steel and chrome alloys containing 1% or greater chromium content during all welding processes –
1. Shielded Metal Arc Welding (SMAW)
2. Flux Cored Arc Welding (FCAW)
3. Gas tungsten arc welding (GTAW)-heliarc
4. Gas metal arc welding (GMAW)
5. Submerged arc welding (SAW)
6. Plasma Arc Cutting
7. Torch Cutting
8. Arc Gouging
9. Grinding, welding, or cutting metals coated with chromate primers and paints
10. Insulation maintenance or demolition of refractory brick
11. Woodworking with chromate-treated lumber
12. Sawing and sanding of chromate-treated lumber
13. Spray painting when using chromate or chromic oxide paints.
14. Abrasive blasting when using a grit containing Cr(VI)
15. Abrasive blasting that generates Cr(VI) dust because of a blasted material (i.e., paint).

F. The potential for exposure is dependent upon the activity involving the hexavalent chromium-containing material. If the proposed activity does not produce hexavalent chromium-containing fumes and has a low potential for causing surface hexavalent chromium contamination, then the overall potential for hexavalent chromium exposure is probably very low.

6.0 Determining The Presence Of CrVI In The Work Place

If the potential for CrVI exposure is present in the workplace, Preferred Industrial Contractors, Inc. will conduct assessments for all jobs covered by the Cr (VI) standard and determine the 8-hour TWA of each employee individually or by representative exposure sampling, to ensure that no employee is exposed to CrVI in excess of the PEL of 5 ug/m³. The presence of CrVI may be determined by the scope of work, material safety data sheets, historic records, methods of work, or bulk sampling and analysis. Coatings and other treatments, which are suspected of containing chromium or chromium pigments must be tested to verify chromium content before commencing any work that may result in an occupational exposure. If testing has not been performed or there are no available records supporting the absence of chromium, its presence must be assumed.

A. Initial Determination – Performance-Oriented Option

Preferred Industrial Contractors, Inc. may utilize the performance-oriented option, where appropriate, to determine the 8-hour TWA exposure for each employee on the basis of any combination of the following:

1. Historical monitoring data;
2. Air monitoring data;
3. Objective data sufficient to accurately characterize employee exposure to chromium (VI);

B. Conducting The Exposure Assessment

1. Initial employee exposure monitoring is to be performed to determine if the exposure level will exceed the action level of 2.5 ug/m³ as an 8-hour TWA. Preferred Industrial Contractors, Inc. will conduct initial exposure monitoring to determine employee exposure to Cr(VI). This monitoring is performed by sampling the air within the employee’s breathing zone. Representative exposure sampling is permitted when a number of employees perform essentially the same job under the same conditions. Representative personal sampling for employees engaged in similar work involving similar Cr(VI) exposures is achieved by monitoring the employee(s) reasonably expected to have the highest Cr(VI) exposures.

2. Exposure monitoring will require that at least one sample be taken for each job classification in each work area demonstrating the highest potential exposure. The sampling must be performed for the entire shift and be representative of the employee’s daily exposure. Until initial employee exposure assessments are determined the employee shall be treated as if exposure is above the PEL and personal protective measures will be taken accordingly.

3. If the initial exposure monitoring results indicate no employee exposure at or above 2.5 ug/m³ CrVI, no further sampling is required unless there is a change in equipment, personnel, materials or work practices. If the initial monitoring shows exposure at or above 2.5 ug/m³ but below 5 ug/m³, personal exposure...
sampling must be performed every six months. Results in excess of 5 ug/m3 will require personal exposure sampling quarterly (see 29 CFR 1926.1126).

4. Personal breathing zone air samples representative of a full shift exposure will be conducted initially for all similar exposure groups. Samples will be collected in accordance with the Occupational Safety and Health Administration (OSHA) Method ID-215, or equivalent, under conditions that represent each employee's regular daily exposure to hexavalent chromium.

C. Employee Notification
Within 5 working days after completion of the exposure assessment, employees shall be notified in writing of the results of their exposure, and the corrective measures taken to reduce that exposure (see 29 CFR 1926.62 (d)(8)).

7.0 Engineering Controls
A. Engineering controls and work practice controls must be utilized where feasible in order to reduce and maintain employee exposure to hexavalent chromium to or below the PEL. Examples of engineering controls are; substitution (e.g., using a less toxic material instead of Cr(VI), or substituting a process that results in lower exposures for another type of process that results in higher exposures); isolation (e.g., enclosing the source of exposure, or placing a barrier between employees and the source of exposure); and ventilation (e.g., local exhaust systems that capture airborne Cr(VI) near its source and remove it from the workplace, or general ventilation that dilutes Cr(VI) concentrations by circulating large quantities of air.

B. Ventilation needs will vary based on the type of operation. Below are some of the recommended engineering control methods that may be used to reduce exposure levels during welding or cutting operations.
1. Dilution ventilation
2. Negative air equipment and filtration system for containment areas.
3. Source capture using air cleaning device

8.0 Respiratory Protection
A. Engineering and work practice controls are the most effective and required methods to control hexavalent chromium exposures. Where engineering control is not feasible or is inadequate appropriate respiratory protection together with the feasible engineering controls are to be implemented.

B. Respirators are to be provided as interim protection during the exposure assessment and when engineering or work practices are insufficient to reduce the employee exposure levels to or below the PEL. Employees may request the use of a respirator even if the levels are below the PEL.

C. All negative pressure respirators shall be fitted with P100 filters. Quantitative or qualitative fit tests shall be performed at the time of initial fitting and annually thereafter.

D. Respirators in use must be approved by the Mine Safety and Health Administration (MSHA) and the National Institute of Occupational Safety and Health (NIOSH). Respirators in use must be properly selected and fit tested. Powered, positive pressure air purifying respirators shall be provided to any employee that requests one. In addition, a respiratory protection program is to be implemented (Refer to Section 35 Procedure 35.4) which is to include the following:
1. Establish written standard operating procedures using Section 35 Procedure 35.4 for the selection and use of respirators on the project.
2. Respirators are to be selected on the basis of the hazards to which the worker is to be exposed.

3. Employees are to be trained in the proper use of respirators and their limitations. Training is to include demonstrating how to wear, adjust and check for proper fit of the respirator.

4. Respirators are to be regularly cleaned and disinfected. If possible, respirators are to be assigned to individual employees. Those respirators used by more than one worker are to be cleaned and disinfected after each use.

5. Respirators are to be stored in a convenient, clean and sanitary location.

6. Respirators are to be routinely inspected during cleaning. Worn or deteriorated parts are to be replaced or the respirator disposed of.

7. Appropriate surveillance of work area conditions, and the degree of employee exposure or stress is to be maintained.

8. The respiratory program is to be regularly inspected and evaluated for its effectiveness.

9. Employees shall not be assigned to tasks requiring the use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. The local physician shall determine what health and physical conditions are pertinent.

9.0 Respirator Selection

Once the criteria for the use of respirators, as specified in the Cr(VI) OSHA standard have been met, one can use the table below to guide in the selection process. It is important to remember that HEPA filters are the minimum permitted when a protection factor of 10 is acceptable against Cr (VI) particulates. (A HEPA filter is one that is at least 99.97 percent efficient against particles that are 0.3um in diameter). However, there maybe certain conditions where air monitoring results or the type of work indicates that a more protective respirator is needed.
Respiratory Protection for Hexavalent Chromium Exposures

<table>
<thead>
<tr>
<th>Airborne Concentrations of CrVI or Condition of Use</th>
<th>Respirator Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not in excess of 50 µg/m³ (10 x PEL)</td>
<td>½ mask air-purifying respirator equipped with HEPA filters. ½ mask supplied air respirator operated in demand mode.</td>
</tr>
<tr>
<td>Not in excess of 125 µg/m³ (25 x PEL)</td>
<td>Any powered, air-purifying respirator equipped with HEPA filters. Hood or helmet supplied air respirator operated in continuous-flow mode.</td>
</tr>
<tr>
<td>Not in excess of 250 µg/m³ (50 x PEL)</td>
<td>Any air-purifying full-face piece respirator equipped with HEPA filters. Any powered, air-purifying respirator with a tight-fitting facepiece and HEPA filters.</td>
</tr>
<tr>
<td>Not in excess of 5,000 µg/m³ (1,000 x PEL)</td>
<td>½ mask supplied air respirator operated in a pressure-demand or other positive-pressure mode.</td>
</tr>
<tr>
<td>Not in excess of 10,000 µg/m³ (2,000 x PEL)</td>
<td>Any supplied-air respirator that has a full-facepiece and is operated in a pressure-demand or other positive-pressure mode.</td>
</tr>
<tr>
<td>Greater than 50,000 µg/m³, unknown concentration, or fire fighting (10,000 x PEL)</td>
<td>Any self-contained breathing apparatus that has a full-facepiece and is operated in a pressure-demand or other positive-pressure mode.</td>
</tr>
</tbody>
</table>

10.0 Respirator Fit Testing

A. All negative pressure respirators must be subjected to a negative pressure fit-test to ensure a proper face seal.

B. Prior to using a respirator, a valid qualitative fit-test (QLFT) or a quantitative fit-test (QNFT) must be conducted. A QLFT must only be used for testing the fit of half-mask respirators. Both QLFT and QNFT must be done in accordance with 29 CFR 1910.134.

C. Respirator fit-testing using QLFT or QNFT must be completed before beginning any job falling under the hexavalent chromium compliance program where respirators are required. Annual respirator fit recertification is required thereafter.

D. Quantitative fit-testing may also be available in areas through accredited fit-testing organizations.

11.0 Respirator Filter Cartridge Change-Out Schedule

A respirator filter cartridge change-out schedule for the respirators used in during hexavalent chromium work will be based on expected usage. However, if increased resistance is experienced during use respirator filter cartridge should be changed out. It is acceptable and safe to use increased breathing resistance with this HEPA filter as an early indicator for change-out.

12.0 Training and Information - Respirator Use

All respirator users must be trained in the limitations, fitting, usage, cleaning, maintenance, care and storage of their respirators.

13.0 Personal Protective Clothing and Equipment

A. When there is a possible employee exposure to CrVI above the PEL, or when there is the possibility of skin or eye irritation from the work environment, then appropriate protective clothing and equipment is to be provided at no cost to the employees. This can include but not be limited to coveralls, or full body protection, gloves, hats, shoes and appropriate eye and face protection. Some examples of disposable clothing include: Tyvec 101-1985 or Pyrlon Limited Use Flame Retardant Garments.

B. Contaminated clothing that is to be disposed of will be placed into labeled closed containers. The container will read:

**CAUTION: CLOTHING CONTAMINATED WITH HEXAVALENT CHROMIUM. DO NOT REMOVE DUST BY BLOWING OR SHAKING. DISPOSE**
OF LEAD CONTAMINATED WASH WATER IN ACCORDANCE WITH APPLICABLE FEDERAL, LOCAL OR STATE REGULATIONS.

C. Employees are to be instructed that they are not to remove hexavalent chromium from their protective clothing or equipment by blowing, shaking or any other means, which will disperse lead into the air.

14.0 Housekeeping

A. As with any project, each employee has the responsibility to maintain good housekeeping practices in their work areas. (Refer to Section 17). All surfaces are to be maintained as free as possible from accumulations of CrVI dusts. Compressed air is not to be used as a method of cleaning since it will easily disperse fine dust particles. Vacuuming is the preferred method, with shoveling, brushing, and dry or wet sweeping used only when vacuuming or other equally effective methods have been tried and are insufficient.

B. The work area where exposure to CrVI is possible, shall be barricaded and warning signs placed frequently around the barricade to warn other employees. Access to the restricted work areas will be limited to “authorized persons” only.

C. When full, waste containers will be taped closed, decontaminated if necessary, and moved to the disposal or staging area.

D. Large quantities of flammable or combustible wastes should not be allowed to accumulate. Such wastes should be kept away from hot lights, flames, sparks, and other ignition sources.

15.0 Medical Surveillance

A. Medical surveillance must be provided to employees who are:
   1. Exposed to Cr(VI) at or above the action level (2.5 μg/m3 Cr(VI) as an 8-hour time-weighted average) for 30 or more days a year;
   2. Experiencing signs or symptoms of the adverse health effects associated with Cr(VI) exposure (e.g., blistering lesions, redness or itchiness of exposed skin, shortness of breath or wheezing that worsens at work, nosebleeds, a whistling sound while inhaling or exhaling); or
   3. Exposed in an emergency (i.e., an uncontrolled release of Cr(VI) that results in significant and unexpected exposures).

B. A medical examination provided under the standard must be performed by or under the supervision of a physician or other licensed health care professional (PLHCP). Medical surveillance must be provided at no cost to employees, and at a reasonable time and place consists of:
   1. A medical and work history which focuses on: the employee’s past, present, and anticipated future exposure to Cr(VI); any history of respiratory system dysfunction; any history of asthma, dermatitis, skin ulceration, or nasal septum perforation; and smoking status and history;
   2. A physical examination of the skin and respiratory tract; and
   3. Any additional tests that the examining PLHCP considers to be appropriate for that individual.

C. The standards do not specify specific tests or procedures that must be provided to all employees. Rather, the information obtained from the medical and work history along with the physical examination of the skin and respiratory tract (the main targets of Cr(VI) toxicity) allow the PLHCPs to use their medical expertise to determine what tests, if any, are warranted.
D. The medical examination shall be provided:
1. Within 30 days after initial assignment to tasks with exposure to CrVI.
2. Annually
3. Within 30 days after a PLHCP's written medical opinion recommends an additional examination;
4. Whenever an employee shows signs or symptoms of the adverse health effects associated with chromium (VI) exposure;
5. Within 30 days after exposure during an emergency which results in an uncontrolled release of chromium (VI); or
6. At the termination of employment or transfer to another jobsite.

16.0 Training
A. To protect against illnesses and injuries from Cr(VI) exposures, it is critically important that employees recognize the hazards associated with exposure to Cr(VI) and understand the measures they can take to protect themselves. Any employee who is involved in any work where there is a hazard of Cr(VI) exposure is to receive appropriate training prior to or at the time of initial assignment. Training will depend upon the type of work to be performed and the measured and / or anticipated exposure, however, in all cases the training plan is to include:
1. The methods that may be used to detect Cr(VI) in the work area:
2. The hazards of Cr(VI); and
3. Measures employees can take to protect themselves from these hazards (e.g., appropriate work practices, emergency procedures, engineering controls, and protective equipment to be used).
4. The requirements of the Cr(VI) standard; and the medical surveillance program required by the standard, including recognition of the signs and symptoms of adverse health effects that may result from Cr(VI) exposure.
B. Preferred Industrial Contractors, Inc. will also make a copy of the Cr(VI) standard available without cost to all affected employees.

17.0 Recordkeeping
Preferred Industrial Contractors, Inc. shall establish and maintain accurate records of all employee training, exposure sampling, medical surveillance and objective data used to comply with the requirements of the standard for the duration of employment plus 30 years.

18.0 Personal Hygiene Facilities and Practices
When the airborne exposure to lead is above the PEL, the following facilities are to be provided:
A. Change rooms when needed, are to be provided and are to be equipped with separate storage facilities for both work clothing and personal clothing to prevent contamination of personal effects.
B. Lunch rooms or designated eating and drinking areas are to be provided which are maintained as free as practicable of chromium (VI). Employees will be required to wash their hands and face prior to eating, drinking, smoking, chewing, or similar activities and are not to enter the lunchroom facilities or clean areas unless surface chromium (VI) has been removed from the clothing and equipment by methods that do not disperse chromium (VI) into the air or onto an employee's body.
C. Lavatories or other washing facilities are to be provided in accordance with 1926.51 which included hot and cold running water, hand soap or similar cleansing agents and
individual towels or sections of cloth, paper, air blowers, or sections of continuous cloth toweling.

D. Employees are not to possess or consume food, beverages or tobacco products in the contaminated work area. These items are only allowed in change rooms, showers or lunchrooms. The same restrictions apply to the possession or application of cosmetics.
1.0 Scope
This section covers the following operations:
   A. Clean-up operations required by a governmental body, whether Federal, state, local or other involving hazardous substances that are conducted at uncontrolled hazardous waste sites (including, but not limited to, the EPA's National Priority Site List (NPL), state priority site lists, sites recommended for the EPA NPL, and initial investigations of government identified sites which are conducted before the presence or absence of hazardous substances has been ascertained);
   B. Corrective actions involving clean-up operations at sites covered by the Resource Conservation and Recovery Act of 1976 (RCRA) as amended (42 U.S.C. 6901 et seq.);
   C. Voluntary clean-up operations at sites recognized by Federal, state, local or other governmental bodies as uncontrolled hazardous waste sites;
   D. Operations involving hazardous wastes that are conducted at treatment, storage, and disposal (TSD) facilities regulated by 40 CFR parts 264 and 265 pursuant to RCRA; or by agencies under agreement with U.S.E.P.A. to implement RCRA regulations; and
2.0 Organizational Structure
A. This section of the Health and Safety Plan (HASP) describes lines of authority, responsibility, and communication for health and safety functions at locations involving hazardous waste. The purpose of this section is to identify the personnel involved in the development and implementation of the site health and safety plan and to describe their roles and responsibilities. This chapter also identifies other contractors and subcontractors involved in work operations and establish the lines of communication among them for safety and health matters. The organizational structure of this site’s safety and health program is consistent with OSHA requirements in 29 CFR 1910.120(b)(2) and provides the following site-specific information:
1. **The General Supervisor** who has the responsibility and authority to direct all hazardous waste cleanup operations
2. **The Site Safety and Health Officer** who has the responsibility and authority to develop and implement this HASP and verify compliance.
3. **Other personnel** needed for cleanup operations and emergency response and their general functions and responsibilities.
4. **The lines of authority**, responsibility, and communication for safety and health functions.
B. This chapter is reviewed and updated as necessary to reflect the current organizational structure at this site.

3.0 Roles And Responsibilities
All personnel and visitors on this site must comply with the requirements of this HASP. The specific responsibilities and authority of management, safety, and health, and other personnel on this site are detailed in the following paragraphs. A site organizational chart illustrating the hierarchy of personnel and lines of communication within this company and with additional contractors on site is found in Figure 1-1.

*(The roles and responsibilities below are examples of roles/responsibilities that typically exist at hazardous waste clean-up sites. One person may fill more than one role.)*

A. **Key Personnel** - The safe and successful completion of the project, which includes the implementation of this HASP, is accomplished through an integral team effort comprised of the owner / operator and Preferred Industrial Contractors, Inc. The key Preferred Industrial Contractors, Inc. personnel and responsibilities are listed below

B. **Project Manager** - The Project Manager is the employee responsible for the overall performance of the work, both on and off-site. Developing the scope of work and establishing cost and scheduling parameters for the job will be the responsibility of the Project Manager. The Project Manager has ultimate responsibility for health and safety during the course of the work. The Project Manager will direct the efforts of the Site Superintendent to ensure that the project is performed with strict accordance with federal, state, local, Preferred Industrial Contractors and plant / facility requirements; preparing and coordinating the site work plan; serving as primary site liaison with public agencies and officials and site contractors.

C. **Site Superintendent** - The Site Superintendent will review the scope of work along with the Project Manager to ensure that the work will comply with all applicable regulations. The Site Superintendent has all applicable licensing to perform the work; providing site supervisor(s) with work assignments and overseeing their performance; coordinating safety and health efforts with the SSHO; ensuring effective emergency response through
coordination with the Emergency Response Coordinator (ERC). The Site Superintendent will direct the field activities for this project.

D. **Health and Safety Officer (HSO)** - The HSO has responsibility for ensuring that the provisions of this HASP are adequate and implemented in the field. Changing field conditions may require decisions to be made concerning adequate protection programs. Therefore, it is vital that personnel assigned as HSO be experienced and meet the additional training requirements specified by OSHA in 29 CFR 1910.120. The HSO may also be the Site Superintendent. The HSO is also responsible for conducting site inspections on a regular basis in order to ensure the effectiveness of this plan. The HSO is on site or readily accessible to the site during all work operations and has the authority to halt site work if unsafe conditions are detected. The specific responsibilities of the HSO are; managing the safety and health functions on this site; serving as the site’s point of contact for safety and health matters; ensuring site monitoring, worker training, medical surveillance, and effective selection and use of PPE; assessing site conditions for unsafe acts and conditions and providing corrective action; assisting the preparation and review of this HASP; maintaining effective safety and health records as described in this HASP; coordinating with the Emergency Response Coordinator (ERC), Site Supervisor(s), and others as necessary for safety and health efforts.

E. **Alternate HSO** - The alternate HSO has the responsibility for ensuring that the provisions of this HASP are adequate and implemented in the field, when the HSO is not on site.

F. **Emergency Response Coordinator (ERC)** - The ERC is responsible for assessing site conditions and directing and controlling emergency response activities and personnel in accordance with the Site Emergency Response Plan. The ERC reports to the Project Manager (PM). The ERC will ensure the evacuation, emergency transport, and treatment of site personnel and will notify the appropriate emergency response units and management staff in accordance with the emergency response plan of this HASP. The ERC is the employee that is certified in first aid/CPR by the American Red Cross, or equivalent agency. The ERC will coordinate with medical personnel in the event of a medical emergency. Specific duties of the ERC include:

1. Developing and reviewing the emergency response plan; conducting emergency response rehearsals; ensuring effective emergency response to and evacuation of the site; coordinating emergency response functions with the Site Safety and Health Officer (SSHO).
2. Integrating site emergency response plans with the disaster, fire, and/or emergency response plans of local, state, and federal organizations and agencies.

G. **Site Workers for Preferred Industrial Contractors, Inc.** - will be required to safely operate various machinery and heavy equipment and perform various tasks to successfully complete this project. Site workers are responsible for complying with this HASP, using the proper PPE, reporting unsafe acts and conditions, and following the lines of authority established for this project site.

H. **Decontamination Manager** - is responsible for decontamination procedures, equipment, and supplies. The specific responsibilities of the Decontamination Manager are: Setting up decontamination lines and the solutions appropriate for the type of contamination on site; controlling the decontamination of all equipment, personnel and samples from the contaminated areas; assisting in disposal of contaminated clothing and materials;
ensuring all required equipment is available and in working order; and providing for collection, storage and disposal of waste.

I. **Security Officer** - is responsible for managing and maintaining site security. The specific responsibilities of the Security Officer are: Conducting routine area patrols; controlling facility access and egress; assisting with communication during an emergency; securing accident/incident scenes; maintaining a log of site access and egress.

J. **Identification of Other Site Contractors** - The other contractors and subcontractors on this site who could be affected by the tasks and operations associated with this work plan and HASP is listed in Table 3-1 below.

<table>
<thead>
<tr>
<th>Table 3-1 Other Site Contractors and Subcontractors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
</tr>
</tbody>
</table>

K. Safety and health lines of communication with these contractors will be developed on a site-specific basis.

**4.0 Site Characterization And Job Hazard Analysis**

This Site Specific Health and Safety Plan (HASP) establish procedures, safety and health requirements, and emergency response as required by 29 CFR 1910.120 for the protection of contractor employees from potential safety and health hazards during cleanup or emergency operations. This section of the HASP identifies and describes safety and health hazards associated with site work. The purpose of characterization and job hazard analysis is to identify and quantify the health and safety hazards associated with each site task and operation, and to evaluate the risks to workers. With this information, risks are then eliminated if possible, or effectively controlled. The information contained in this section of the HASP is essential to effective preparation of all other sections of the HASP. This section of the HASP includes:

1. Site history
2. Job hazard analysis
3. Chemical and biological hazard information
4. Employee notification of hazards
5. The Site Safety and Health Officer (SSHO) is responsible for ongoing site characterization and job hazard analysis.

A. **Site History**

1. This HASP defines the hazards identified with the project as identified in previous site work or background information. The HASP is designed to establish methods to prevent and/or minimize the hazards associated with this project. Information pertaining to the site conditions and potential hazards are to be collected from all available sources including site reconnaissance, correspondence, and location records. The following information summarizes the history of this site as it relates to the need to perform an emergency response or cleanup of the site.

Site History should identify:

a. Emergency Response Actions
b. Regulatory Actions (If Applicable)
c. Sampling Events And Results
d. Extent Of Contamination

B. Materials referenced in providing site history information include:

1. Site Preparation
   Additional dressing of the site may be required prior to the start of work Preferred Industrial Contractors, Inc. will provide a lined, bermed area for Diesel fuel storage. The bermed area will be built to contain 110% of the volume of the fuel tank. All fueling operations will be performed in this area. Routine maintenance, service, and minor repairs of mobile equipment will not be performed on the site. A silt fence may need to be erected at outfall locations of the site to control erosion and sedimentation.

2. Environmental Work Plan
   a. This plan was prepared using information provided by contract as to the known waste streams. Actual quantities, specific types, and waste streams to be used for disposal are to be determined by TSD facilities and the laboratory analysis performed on certain wastes.
   b. Preferred Industrial Contractors, Inc. will ensure that all wastes are properly identified, collected, placed in proper containers, labeled, and disposed of as required by Federal, State and Local environmental requirements. All 55-gallon DOT approved drums used for waste collection, transport and disposal will be in “New” condition.
   c. Preferred Industrial Contractors, Inc. will follow applicable Federal EPA and state environmental regulations.
   d. The owner will provide the EPA Identification Number for the jobsite and the state Hazardous Waste Generator Number to be used for manifesting and disposal of hazardous waste streams generated on the project.
   e. Preferred Industrial Contractors, Inc. will maintain a waste-tracking log for all wastes removed from the site and provide the owner with a detailed summary at the end of the project, of all wastes disposed of. The waste tracking log will list information concerning the waste type, quantity, manifest numbers, transporter and disposal method.
   f. Waste Stream Identification
      Waste streams will be segregated into hazardous and non-hazardous. Hazardous waste streams will be identified through laboratory analysis of the waste for EPA listed wastes or characteristic wastes. Information from MSDS sheets provided by the owner will be used to characterize the following waste streams:
<table>
<thead>
<tr>
<th>Product Name Manufacturer</th>
<th>Use / Location</th>
<th>Hazardous Ingredient</th>
<th>Percentage in Product</th>
<th>RCRA Waste Code</th>
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</table>

**g. Non-Hazardous Waste Oils And Grease Removal**

(1.) Used oils will be sampled to determine if the oil is “spec” or “off spec” per Waste Characterization. Non-hazardous oils will be transported off site for proper recycle or disposal by an authorized transporter to a site approved by the owner and Preferred Industrial Contractors, Inc.

(2.) Used oils, filters, and absorbents that are not considered hazardous will be placed in steel 55-gallon DOT approved drums and will be recycled through a used oil recycle center as long they have not been mixed with a hazardous waste. Rags, used Tyvek suits, and similar items are to be separated from liquid wastes for disposal.

(3.) Non-hazardous used oil will be maintained separate from other waste streams. Used oils are not to be mixed with any amount of hazardous waste material.

**h. Waste Stream Analysis**

(1.) Containers will be properly labeled, numbered and placed in an area of the site sectioned off as a satellite accumulation area for hazardous waste drums awaiting disposal. Containment areas will be lined and bermed to prevent surface contamination should a spill or leak occur. A sample of the waste will be taken from each drum by an approved TSD facility. The samples are to be sent to a licensed laboratory for analysis.

(2.) Once the lab analysis is complete, the waste drums will be shipped off site for proper disposal. Depending upon the analysis, the waste may be classified as either a “listed or characteristic” waste. This waste stream will be manifested and transported by a licensed operator, to an approved treatment, storage and disposal (TSD) site approved by the owner and Preferred Industrial Contractors, Inc.

**i. Handling and Shipping Of Non-Hazardous And Hazardous Wastes**

(1.) All containers will be properly labeled, numbered and placed in an area of the site sectioned off as a satellite accumulation area for drums awaiting disposal. Containment areas will be lined and bermed to prevent surface contamination should a spill or leak occur. Once the lab analysis is complete, (if performed) the
waste drums will be shipped off site for proper disposal.

(2.) All hazardous wastes shipped for disposal, will be manifested and transported by a licensed operator, to an approved treatment, storage and disposal site approved by the owner and Preferred Industrial Contractors, Inc.

(3.) Non-hazardous wastes will be transported off site for proper recycle or disposal to a site authorized by the owner and Preferred Industrial Contractors, Inc.

(4.) Personal protective equipment (PPE), consisting of protective clothing, gloves, eye and face protection as needed is to be worn by all employees.

j. Miscellaneous Wastes

(1.) It is assumed that there will be a collection of miscellaneous wastes that will need to be disposed of, including rags, miscellaneous paint, paint cans, aerosol cans, etc. Each of these waste streams will be accumulated in drums and/or lined containers, labeled and samples taken if needed.

(2.) Proper care will be taken to remove paint residue from used paint cans. Once the paint can is “essentially empty” and the residual paint left in the container is dry, the paint container is to be crushed and treated as a non-hazardous waste.

(3.) Used aerosol cans are not to be punctured; they will be collected in a 55-gallon DOT approved drum for disposal.

(4.) All items considered hazardous wastes will be manifested and transported by a licensed operator, to an approved treatment, storage and disposal site approved by the owner and Preferred Industrial Contractors, Inc.

(5.) All items Non-hazardous wastes will be transported off site for proper recycle or disposal to a site authorized by the owner and Preferred Industrial Contractors, Inc.

k. Training

Preferred Industrial Contractors, Inc. performs both weekly as well as daily safety and health training. Environmental topics that will be included, as part of our ongoing training matrix are:

(1.) Identification of Onsite Wastes

(2.) Proper Storage Practices

(3.) Waste Segregation and Containment

(4.) Spill Prevention and Response

(5.) Good Housekeeping Practices

(6.) Container Identification and Labeling

(7.) Best Practices for Materials Management and Disposal

l. Waste Tracking Report

Preferred Industrial Contractors, Inc. will maintain a waste-tracking log throughout the project. At the completion of the project, a waste tracking report as presented in Appendix A will be submitted to the owner for review.

3. Air Pollution Prevention

Depending upon site conditions, it may be necessary to minimize dust due to the amount of traffic which will be using roads and site access on a daily basis. A water truck may be used to water down the roads to keep dust levels under control, however, some maintenance may need to be provided. The site will be maintained to minimize dust.
4. Waste Management
   a. Non-Hazardous general site refuse will be disposed of through a contract with a local waste management company. Refuse will be hauled off site in drop off containers. All trash containers will be covered to prevent windblown trash. Hazardous and non-hazardous waste streams shall be separated at all times. All employees will be trained to differentiate between non-hazardous and hazardous waste.
   b. The Disposal of batteries, engine oil, transmission fluids, hydraulic fluids, filters, radiator fluids, tires, fluorescent light bulbs or other wastes shall not be permitted on site and must be disposed of off-site, in accordance with local environmental requirements. Disposal of all wastes must be in approved disposal facilities. Liquids are not permitted to be dumped on site. All paint, solvents, and other containers shall be completely empty of all solids and liquids prior to disposal. All containers are to be stored in an upright position, on pallets, drum pads or similar devices to allow for ease of transport and to observe for damage or leaks.

5. Job Hazard Analysis
   A detailed hazard analysis is to be developed for the work associated with the project. The hazards presented are accompanied by a brief of precautionary actions to be taken to prevent employee exposure to these safety and health hazards. The table lists each task or operation required for this facility cleanup by site location. Biological and chemical hazards and their known or anticipated airborne concentrations are identified for each distinct combination of location and task/operation. Based on the task/operation at a particular location, anticipated physical hazards are also identified. Table 2.2a lists the control measures implemented to protect employees from the hazards identified. The information provided here is designed to satisfy the job hazard analysis requirements of 1910.120(b) (4) (ii) (A) and the workplace hazard assessment requirements of 1910.132(d).
<table>
<thead>
<tr>
<th>Physical Hazards</th>
<th>Precautionary Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat Stress</td>
<td>Monitor temperature, heat index. Replace lost body fluids; provide adequate work/rest periods.</td>
</tr>
<tr>
<td>Biological Hazards; Stinging and biting Insects / Animals</td>
<td>Secure and clean area, identify areas where nests, hives or other “critters homes” may be located. Use pest control company if needed. Identify any personnel that may have allergies</td>
</tr>
<tr>
<td>Mobile Equipment Hazards / Ground Traffic</td>
<td>Maintain proper clearances, observe back-up alarms, only trained and authorized personnel to operate mobile equipment. Operators are to wear seat belts at all times when operating mobile equipment. Watch for moving equipment when entering or leaving area. Daily pre-shift inspections are to be performed on all mobile equipment. Unsafe equipment shall be taken out of service until repaired. Mobile equipment shall be provided with ROPS. Preferred Industrial Contractors, Inc. SH&amp;E Manual Section 28.0</td>
</tr>
<tr>
<td>Line Breaking / First Breaks, Handling of contaminated materials.</td>
<td>Follow line break procedures including, blinding, blanking, decommissioning, isolation, and adequate PPE including, Rubber Gloves, Rubber Boots, Hardhat, Chemical Goggles chemical resistant suit and Full Face Shield as needed. Appropriate Respiratory Protection (unless proper testing proves definitively that no toxic respiratory hazard exists) Preferred Industrial Contractors, Inc. SH&amp;E Manual Section 13.0</td>
</tr>
<tr>
<td>Noise</td>
<td>Elevated noise may be associated with areas or work tasks such as operating equipment, tools and grinding. Employees are to wear hearing protection as required in those areas. Preferred Industrial Contractors, Inc. SH&amp;E Manual Section 35.7</td>
</tr>
<tr>
<td>Hoisted Loads / Crane Operations</td>
<td>All lifts shall be performed under the supervision of a competent person. Only trained and authorized personnel to operate cranes. All rigging is to be inspected prior to each lift. All rigging shall be used as per manufacturer’s recommendations. Lift plans are required for all lifts greater than 2000 pounds. Preferred Industrial Contractors, Inc. SH&amp;E Manual Section 28.2</td>
</tr>
<tr>
<td>Physical Hazards</td>
<td>Precautionary Action</td>
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<td>-------------------------------------------</td>
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</tr>
<tr>
<td>Fall Hazards</td>
<td>100% Fall protection is required when there is a fall hazard of four (6) feet (1.8 meters) or more. Fall protection shall consist of a full body harness equipped with a dual lanyard system with double locking snap hooks. Attachment points shall be able to hold a 5000 lb. Use of boom lifts, scaffolding, handrail systems and retractable lifelines when possible. Protect open holes and open sides with adequate hole covers, and guard rail systems equipped with top rails, mid rails and toe boards. Preferred Industrial Contractors, Inc. SH&amp;E Manual Section 13.14</td>
</tr>
<tr>
<td>Inadequate Lighting</td>
<td>Inadequate lighting conditions may exist due to the location of some of the work or nighttime operations. Temporary portable lighting will be required in those areas as needed. Preferred Industrial Contractors, Inc. SH&amp;E Manual Section 25.0</td>
</tr>
<tr>
<td>Fire Protection</td>
<td>Hot work permits may be required prior to any welding or cutting operations in certain locations. An adequate supply of ABC fire extinguishers will be maintained on site. In addition to a fire extinguisher located at each hot work area, a fire watch will be required in these areas to monitor cutting and welding being performed. Preferred Industrial Contractors, Inc. SH&amp;E Manual Section 16.0</td>
</tr>
<tr>
<td>Electrical Hazards - Lockout/Tagout</td>
<td>Electrical or other sources of energy will be isolated and/or disconnected prior to beginning dismantle activities. Generators will be used for primary power source in the field. Low voltage electrical hazards can be prevented by insuring that all electrical tools, cords and plugs are approved for use and maintained free from defects or damage. Assured Grounding Program will be mandatory in addition to GFCI breakers. Preferred Industrial Contractors, Inc. SH&amp;E Manual Section 25.0 &amp; 26.0</td>
</tr>
<tr>
<td>Hand and Power Tools</td>
<td>Proper PPE, proper clothing, de-energize power tools when not in use, authorized personnel only. Tools to be fitted with proper safeguards as required. (Preferred Industrial Contractors, Inc. SH&amp;E Manual Section 20.0)</td>
</tr>
<tr>
<td>Adverse Weather</td>
<td>Watch weather advisories, Tornado /High Wind Contingency Plan, Emergency Evacuation Procedures</td>
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<tr>
<td>Overhead Power Lines or Underground Utilities</td>
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<tr>
<td>Physical Hazards</td>
<td>Precautionary Action</td>
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<td>----------------------------------</td>
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</tr>
<tr>
<td>Confined Space Hazards</td>
<td>Confined space entry procedures including confined space entry permit, atmosphere testing, attendant, and rescue procedures. Preferred Industrial Contractors, Inc. SH&amp;E Manual Section 35.3</td>
</tr>
<tr>
<td>Rigging / Overhead Work</td>
<td>Use proper rigging techniques, inspection of all rigging equipment. Barricade areas where overhead work is taking place. Proper communication between all workers in area. Maintain safe distance from overhead work activities. Welding and cutting above will require adequate protective measures from sparks and slag. Preferred Industrial Contractors, Inc. SH&amp;E Manual Section 30.0</td>
</tr>
<tr>
<td>Ladders &amp; Scaffolds</td>
<td>Metal ladders are not to be used. Ladders are to be inspected and used properly. Extension ladders to extend 36” above landings and tied off or secured against movement. Stepladders are to be fully opened; the top two steps are not to be used. Damaged ladders are to be removed from service. Scaffolding shall be erected, moved, dismantled, or altered only under the supervision of properly trained and qualified personnel. Scaffolds are to support 4X the maximum intended load, fully braced, decked and equipped with handrail, mid-rail, toe board and safe access. Employees are to be instructed in the erection and safe use of scaffolds. Scaffolds are to be inspected and maintained in a safe condition. Preferred Industrial Contractors, Inc. SH&amp;E Manual Section 24.0</td>
</tr>
</tbody>
</table>
6. Exposure Limits

Acceptable limits for prolonged exposure to the airborne particulates of these products in the workplace have been established by the Federal Government through the Occupational Safety and Health Administration (OSHA), Mine Safety and Health Administration (MSHA), as well as by non-governmental occupational health organizations such as the National Institute of Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists (ACGIH). The most widely used of these limits, the Permissible Exposure Limit (PEL) is detailed in Table 2.7. Also included in Table 2.7, are the Immediately Dangerous to Life and Health (IDLH) concentrations of these products. The symptoms of acute and chronic exposure are also identified. A not all-inclusive listing of the potential safety and health hazards that may be encountered during these operations include the following:
<table>
<thead>
<tr>
<th>Chemical</th>
<th>PEL</th>
<th>TLV</th>
<th>STEL</th>
<th>IDLH</th>
<th>Route/Symptoms</th>
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Table 4-7
PERMISSIBLE EXPOSURE LEVELS

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7. Employee Notification of Hazards and Overall Site Information Program
The information in Table 2.7 is made available to all employees who could be affected by it prior to the time they begin their work activities. Modifications to these tables are communicated during routine briefings. Consistent with paragraph (i) of HAZWOPER, and the requirements of the Hazard Communication Program we also inform other contractors and subcontractors about the nature and level of hazardous substances at this site, and likely degree of exposure to workers who participate in site operations. The site Health and Safety Officer (HSO) is responsible for providing site characterization information, this HASP, and modifications to it to other contractors and subcontractors working on this site.

5.0 Site Control
The site control program is designed to reduce the spread of hazardous substances from contaminated areas to clean areas, to identify and isolate contaminated areas of the site, to facilitate emergency evacuation and medical care, to prevent unauthorized entry to the site, and to deter vandalism and theft.

The site control program includes the elements specified in 29 CFR 1910.120(d) and must provide the following site-specific information:
1. Site map, indicating site perimeter and work zones
2. Site access procedures
3. Site security
4. Site work zones including standard operating procedures
5. Use of the buddy system
6. Both internal (on-site) and external communications

The Site Health and Safety Officer (HSO) is responsible for evaluating site conditions and for verifying that the site control program functions effectively. The site control program is updated regularly to reflect current site conditions, work operations, and procedures.

A. Site Map
A map of the site, showing site boundaries, designated work zones, and points of entry and exit must be provided as part of the site-specific safety plan for the project.

B. Site Access
1. Access to the site is restricted to reduce the potential for exposure to its safety and health hazards. During hours of site operation, site entry and exit is authorized only at the point(s) identified by the site-specific safety plan for the project.
2. Visitors to the site must sign in at the office and are to be escorted at all times. Visitors are expected to comply with the requirements of this HASP. Visitors who want to enter contaminated areas of the site must provide documentation that they have the required training and medical evaluation and must receive a site-specific briefing about protecting themselves from site hazards, recognizing site zones demarcations, and following emergency evacuation procedures prior to entry.

C. Site Security
1. Security at this site is maintained during both working hours and non-working hours to prevent unauthorized entry; removal of contaminated material from the exclusion zone; exposure of unauthorized, unprotected people to site hazards;
and increased hazards due to vandalism and theft. This site takes the following measures for security during working hours:

a. Security is maintained in the Support Zone and at Access Control Points to ensure only authorized entrants access the site.
b. A barricade or other physical barrier is erected around the perimeter of the site to prevent unauthorized entry or exit.
c. Signs have been posted around the perimeter of the site to warn of the site dangers and prohibition of unauthorized entry.
d. Site personnel patrol the perimeter of the site.

2. The following measures are several that can be used for security during nonworking hours:

a. Trained in-house site personnel used for site surveillance.
b. Plant or facility security personnel used for site surveillance.
c. An outside contractor is used for site surveillance.
d. A local police department is used for site surveillance.
e. All doors to buildings and/or trailers are locked and equipment is secured.

D. Site Work Zones

1. This site is divided into three (3) major zones, described below and shown in Figure 3-1. These zones are characterized by presence or absence of chemical hazards and the activities performed within them.

2. Zone boundaries are clearly marked at all times and the flow of personnel and equipment among the zones is controlled.

3. The site is monitored for changing conditions that may warrant adjustment of zone boundaries. Zone boundaries are adjusted as necessary to protect personnel and clean areas. Whenever boundaries are adjusted, zone markings are also changed and workers are immediately notified of the change.

4. The following criteria were considered in establishing the site work zones:

a. Required Clean-Up Activities
b. Sampling Results For Air And Surface Contaminants
c. Inside Traffic Patterns
d. Ventilation System & Air Circulation Patterns
e. Air Dispersion Calculations
f. Potential For Fire
g. Physical, Biological, Other Characteristics Of Hazardous Materials And Decontamination Substances

E. Exclusion Zone

1. The Exclusion Zone is the area where hazardous substances are known or suspected to be present and pose the greatest potential for exposure. Remediation operations (site clean-up) are performed in the Exclusion Zone. At this site, the Exclusion Zone boundaries are clearly marked using lines, placards, hazard tape and/or sign or enclosed by physical barriers, such as chains, barricades, fencing or ropes.

2. Access control points regulate the flow of personnel and equipment into and out of the zone and help to verify that proper procedures for entering and exiting are followed. If feasible, separate entrance and exit points should be set up.
Personnel and equipment will enter and exit the Exclusion Zone from the designated access points in the Contamination Reduction Zone (CRZ), shown in Figure 3-1.

3. **Exclusion Zone (ExZ) SOPs**
   a. Check in and out of this zone at the designated access point.
   b. Use the buddy system at all times.
   c. Wear the PPE required for this zone (see PPE section of this HASP).
   d. Perform air and surface sampling as required for this zone (see Exposure Monitoring section of this HASP).
   e. Do not smoke, eat, or drink.
   f. Monitor self and buddy for signs of heat stress and other difficulties.
   g. Alert supervisor to signs of unanticipated hazards.
   h. Do not engage in horseplay.
   i. Monitor self and buddy for PPE improper fittings, rips, tears, and/or damage.
   j. Use monitoring equipment and tools that are safe for the working environment.

4. **Contamination Reduction Zone (CRZ)**
   1. The CRZ is located between the Exclusion Zone and the Support Zone (clean zone). Its primary purpose is for decontamination of workers and equipment. The distance that the CRZ creates between the Exclusion Zone and the Support Zone, plus the decontamination of personnel and equipment that occur here, limit the physical transfer of hazardous substances into clean areas. When establishing the CRZ, consider factors such as airflow from the Exclusion Zone toward the Support Zone, work site configurations, traffic patterns, and other activities or processes that could result in the transfer of contaminants. The CRZ also serves as a buffer between the Exclusion Zone and Support Zone, to limit the potential for contamination to spread to the Support Zone and outlying areas. The CRZ boundaries are to be clearly marked using lines, placards, hazard tape and/or signs or enclosed by physical barriers, such as chains, barricades, fencing or ropes.
   2. Based on monitoring results, the CRZ boundaries may be adjusted to ensure that the Support Zone remains uncontaminated.
   3. Workers and equipment exit the Exclusion Zone through the designated access point(s) into the CRZ. Workers and equipment are then decontaminated in the CRZ, according to the procedures specified in the Decontamination section of this HASP. Workers and equipment then exit the CRZ into the Support Zone through the designated access points, shown in Figure 3-1.
   4. If necessary, emergency decontamination procedures are implemented. Emergency decontamination procedures are described in the site's emergency response program, Chapter 11 of this HASP.
   5. **Contamination Reduction Zone (CRZ) SOPs**
      a. Check in and out of this zone at the designated access point.
      b. Wear the PPE required for this zone (see PPE section of this HASP).
      c. Perform air and surface sampling as required for this zone (see Exposure Monitoring section of this HASP).
d. Do not smoke, eat, or drink.
e. Monitor self and buddy for signs of heat stress and other difficulties.
f. Alert supervisor to signs of unanticipated hazards.
g. Do not engage in horseplay.
h. Monitor self and buddy for PPE improper fittings, rips, tears, and/or damage.

G. Support Zone
1. The Support Zone is the clean area of the site, beyond the outer boundary of the CRZ. There should be no contamination in this zone. Administrative, clerical, and other support functions are based in the Support Zone.
2. The Support Zone is shown in Figure 3-1 and its boundaries are marked by using lines, placards, hazard tape and/or signs or enclosed by physical barriers, such as chains, barricades, fencing or ropes.
3. Air and surface monitoring are conducted in the Support Zone as needed to ensure that it remains uncontaminated. If contamination is detected, zone boundaries are adjusted until corrective action is taken and monitoring results indicate that this zone is again uncontaminated.
4. Support Zone (SZ) SOPs
   a. Check in and out of this zone from the CRZ at the designated site access point.
   b. Alert supervisor to signs of unanticipated hazards.
   c. Do not engage in horseplay.
   d. Perform air and surface sampling as required for this zone (see Exposure Monitoring section of this HASP).

H. Buddy System
While working in the Exclusion Zone, site workers use the buddy system. The buddy system means that personnel work in pairs and stay in close visual contact to be able to observe one another and summon rapid assistance in case of an emergency. The responsibilities of workers using the buddy system include:
1. Remaining in close visual contact with partner,
2. Providing partner with assistance as needed or requested,
3. Observing partner for signs of heat stress or other difficulties,
4. Periodically checking the integrity of partner's ppe, and
5. Notifying the supervisor or other site personnel if emergency assistance is needed.

I. Site Communications
1. The following communication equipment is used to support on-site communications.
2. Site personnel are trained to recognize and use hand signals when visual contact is possible, but noise or PPE inhibit voice communication. These hand signals are listed below in Table 3-6.

<table>
<thead>
<tr>
<th>List All Telephones, Cell Phones, Two-Way Radios, And Other Forms Communication Equipment That Apply To This Site</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Telephones at this site are located in the following areas:</strong></td>
</tr>
</tbody>
</table>
Two-way radios are available in the following locations:

The following people will carry two-way radios:

Other forms of communication on this site include:

<table>
<thead>
<tr>
<th>Table 3-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal</td>
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</tbody>
</table>
Map of Site Boundaries, Work Zones and Entry/Exit Points

- Support Zone
- Access Control Points
- Contamination Reduction Corridor
- Contamination Reduction Zone (CRZ)
- Exclusion Zone

NOTE: Area dimensions not to scale. Distances between points may vary.

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6.0 Training Program
The site-training program is designed to ensure that workers receive the training they need to work safely. Consistent with OSHA's 29 CFR 1910.120 regulation covering hazardous waste operations and emergency response, all site personnel are required to be trained in accordance with the standard and based upon the hazards, duties and functions of each worker. At a minimum all personnel are required to be trained to recognize the hazards on-site, the compliance provision within this HASP, and the personnel chain-of-command.

This training program is consistent with the requirements of 29 CFR 1910.120(e) and (q) (11) and addresses the following site-specific information:

1. Initial Training For Site Workers & Supervisors
2. Exceptions To Initial Training Requirements
3. Site Briefings For Visitors And Workers
4. Refresher Training
5. Qualification Of Trainers
6. Training Certification
7. Emergency Response Training

A. Pre-assignment and Annual Refresher Training

1. Prior to arrival on site, each employer will be responsible for certifying that his/her employees meet the requirements of pre-assignment training, consistent with OSHA 290 CFR 1910.120 paragraph (e)(3). The employer should be able to provide a document certifying that each general site worker has received 40 hours of instruction off the site, and 24 hours of training for any workers who are on site only occasionally for a specific task. If an individual employee has work experience and/or training that is equivalent to that provided in the initial training consistent with the provisions of 29 CFR 1910.120(e)(9), an employer may waive the 40-hour training so long as that equivalent experience is documented or certified. All personnel must also receive 8 hours of refresher training annually. Employees who have not been trained to a level required by their job function and responsibility are not permitted to participate in or supervise field activities. In addition, such personnel have received 3 days of supervised field experience applicable to this site.

2. The initial training provided to these workers addresses:
   a. Names Of Personnel And Alternates Responsible For Site Safety And Health
   b. Safety, Health And Other Hazards Present On The Site
   c. Use Of Ppe
   d. Work Practices By Which The Employee Can Minimize Risks From Hazards
   e. Safe Use Of Engineering Controls And Equipment On The Site
   f. The Site Control Plan Detailed In Chapter 3 Of This Hasp
   g. Medical Surveillance Requirements Detailed In Chapter 5 Of This Hasp
   h. The Spill Containment Program Detailed In Chapter 9 Of This Hasp
   i. Decontamination Procedures Detailed In Chapter 10 Of This Hasp
   j. The Emergency Response Plan Detailed In Chapter 11 Of This Hasp
   k. Confined Space Entry Procedures Detailed In Chapter 13 Of This Hasp

B. Management and Supervisor Training
On-site managers and supervisors who are directly responsible for or who supervise workers engaged in hazardous waste operations receive, in addition to the appropriate level of worker HAZWOPER training described above, eight (8) additional hours of specialized supervisory training, in compliance with 29 CFR 1910.120(e)(4).

C. Site-Specific Briefings for Visitors and Workers
1. A site-specific briefing is provided to all individuals, including site visitors, who enter the site beyond the initial point of access. Visitors to the site may be exempted from these training requirements if they will be entering only areas where non-hazardous conditions are present and are escorted at all times. This would apply, for instance, to deliveries of materials to a staging area, or to visitors who would remain in the area of the site office.

2. For visitors, the site-specific briefing provides information about site hazards, the site lay-out including work zones and places of refuge, the emergency alarm system and emergency evacuation procedures, and other pertinent safety and health requirements as appropriate.

D. Refresher Training
All workers on this site, including managers and supervisors, receive annual HAZWOPER refresher training consistent with the requirements of 29 CFR 1910.120

E. Qualification of Trainers
Only instructors qualified in accordance with 29 CFR 1910.120 are used to train workers for this site. Qualified instructors have either completed a training program for the subjects they are expected to teach, or have the academic credentials and instructional experience necessary for teaching these subjects.

F. Training Certification
Employees and supervisors receive a written certificate when they complete necessary training and field experience. Any person who has not been so certified or who does not meet the requirements of equivalent training is prohibited from engaging in the clean-up operations on this site. Preferred Industrial Contractors, Inc. maintains written certification of the successful completion of applicable training requirements for all personnel. Training records are maintained up-to-date and are retained onsite.

G. Emergency Response Training
Emergency response training is addressed in Chapter 11 of this HASP, Emergency Response Plan.

H. References
1. Occupational Safety; and Health Standards, General Industry, latest edition.........OSHA
2. Safety and Health Regulations, Construction Industry, latest edition.................OSHA
3. Mine Safety & Health Administration Regulations, latest edition .....................MSHA
4. American Conference of Governmental Industrial Hygienists ..........................ACGIH
5. National Institute of Occupational Safety and Health..................................NIOSH
8. American Welding Society...............................................................................AWS
9. American National Standards Institute ..........................................................ANSI
10. Industrial Hygiene and Toxicology .................................................................
7.0 Medical Surveillance

The medical surveillance section of the HASP describes how worker health status is monitored at this site. Medical surveillance is used when there is the potential for worker exposure to harmful levels of hazardous substances. The purpose of a medical surveillance program is to medically monitor worker health to ensure that personnel are not adversely affected by site hazards. The provisions for medical surveillance at the site are based on the site characterization and job hazard analysis found in section 2 of this HASP. They are consistent with OSHA requirements in 29 CFR 1910.120(f) and the substance-specific requirements also found in the OSHA Regulations.

The medical surveillance program addresses the following information:

1. Provisions of the site medical surveillance program
2. Provisions of the medical protocol
3. Communication between the site, physicians, and workers
4. Medical recordkeeping procedures

A. Site Medical Surveillance Program

1. Medical surveillance requirements are based on a worker’s potential for exposure as determined by the site characterization and job hazard analysis documented in Chapter 2 of this HASP and as required by 29 CFR 1910.120(f)(2) and the substance-specific standard(s) identified in Section 5.0 above.

2. A medical surveillance program is implemented at this site based on the potential for employee exposure to levels of hazardous substances or health hazards in at or in excess of the PEL or other published exposure limits, the use of respiratory protection, and/or the assignment of workers to a HAZMAT team. Medical surveillance requirements are based on a worker’s potential for exposure as determined by the site characterization and job hazard analysis documented in Chapter 2 of this HASP and as required by 29 CFR 1910.120(f)(2) and the substance-specific standard(s) identified in Section 5.0 above. Based on that evaluation:

a. All personnel who enter contaminated areas and are assigned to a hazardous or a potentially hazardous activity involving exposure to toxic materials is to be covered by the medical surveillance program. In addition, all workers assigned to tasks requiring the use of respirators receive medical evaluations in accordance with 29 CFR 1910.134(e) to ensure they are physically capable to perform the work and use the equipment.

b. Personnel within the medical surveillance program receive medical examinations on the following schedule:

(1.) Prior to assignment: personnel covered by the medical surveillance program are medically examined prior to commencing work in contaminated areas of the site. The purpose of this examination is to assess baseline health status and the
worker’s ability to perform anticipated duties wearing required PPE without any adverse health effects. The pre-assignment medical examination must have been performed within the past 12 months. The content of the exam may include the items listed in the Pre-work Assignment Physical Exam below, and any other tests deemed necessary by the examining physician, based on the hazards present at this site and anticipated work duties. A copy of the results of that examination, in the form of a physician’s written opinion as described in paragraph 5.2, must be presented on site prior to entry into contaminated areas.

(2.) Periodic Monitoring: In addition to a baseline physical, all employees require a periodic physical within the last 12 months, unless the advising physician believes a shorter interval is appropriate. The employer’s medical consultant should prescribe an adequate medical examination which fulfills OSHA 29 CFR 1910.120 requirements. The pre-assignment medical outlined above may be applicable.

(3.) At termination or reassignment: Personnel are offered the opportunity for a medical examination upon their termination of employment or reassignment to work where the worker is not exposed to hazardous materials or required to wear a respirator. If his/her last physical was within the last 6 months, the advising medical consultant has the right to determine adequacy and necessity of such an exit physical.

(4.) Post-injury/illness: Any worker who is injured, becomes ill, or develops signs or symptoms of possible over-exposure to hazardous substances or health hazards, receives a medical examination as soon as possible after the occurrence, with follow-up examinations provided as required by the attending physician.

3. Provisions for emergency treatment and acute non-emergency treatment must be made at each site, preplanning is vital. When developing plans, procedures, and equipment lists, the range of actual and potential hazards specific to the site should be considered, including chemical, physical (such as heat and/or cold stress, falls and trips), and biologic hazards (animal bites and plant poisoning as well as hazardous biological wastes). Not only site workers, but also contractors, visitors, and other personnel (particularly firefighters) may require emergency treatment. Emergency medical treatment should be integrated with the overall site emergency response program. The following are recommended guidelines for establishing an emergency treatment program.

4. Site personnel are to be trained in emergency first aid. This should include an American Heart Association, Red Cross or equivalent certified course in cardiopulmonary resuscitation (CPR), and first-aid training that emphasizes treatment for explosion and burn injuries, heat stress, and acute chemical toxicity. In addition, this team should include an emergency medical technician (EMT) if possible. Table 5-4 lists signs and symptoms of exposure and heat stress that indicate potential medical emergencies.

a. Train personnel in emergency decontamination procedures in coordination with the Emergency Response Plan (see Chapter 12 for details).

b. Pre-designate roles and responsibilities to be assumed by personnel in an emergency.
c. Establish an emergency/first-aid station on site, capable of providing (1) stabilization for patients requiring offsite treatment, and (2) general first aid (e.g., minor cuts, sprains, abrasions).

d. Locate the station in the clean area adjacent to the decontamination area to facilitate emergency decontamination.

e. Provide a standard first-aid kit or equivalent supplies, plus additional items such as emergency/deluge showers, stretchers, portable water, ice, emergency eyewash, decontamination solutions, and fire-extinguishing blankets.

f. Restock supplies and equipment immediately after each use and check them regularly.

5. All medical examinations and procedures are performed by or under the supervision of a licensed physician and are provided to workers free of cost, without loss of pay, and at a reasonable time and place.

6. Table 5-1b identifies the exam protocol for the baseline, periodic and termination exams conducted for all personnel within the medical surveillance program. These protocols were determined by the site's attending physician.

B. Pre-work Assignment Physical Exam

1. The program is to include a detailed work and medical history, a thorough physical examination, blood pressure and blood analysis, urine analysis with microscopic examination, and any other test deemed necessary by the physician and may include the following:

a. Medical History which includes, but is not limited to:
   (1.) Job-related illnesses or injuries.
   (2.) Types of substances handled at work.
   (3.) Personal habits, e.g. smoking, alcohol and drug consumption.
   (4.) Medical History.
   (5.) Allergies
   (6.) Immunizations, vaccines and antitoxins

b. A full Physical Examination with particular attention to the following:
   (1.) a. Cardiopulmonary system. e. Renal system.
   (2.) b. Skin f. Nervous system.
   (3.) c. Blood forming system. g. General physical fitness.
   (4.) d. Liver

c. Vital systems check including:
   (1.) Height
   (2.) Weight
   (3.) Blood pressure
   (4.) Pulse.

d. Visual Acuity Measurement including color perception.

e. Pulmonary Function Test (Spirometry - FVC and FEV 1.0).
   (1.) Respirator certification (Dr's release) by physician that employee is physically fit to wear a respirator.
   (2.) Fit tests not required by MD, will be done at jobsite.

f. Chest X-ray

g. Chemistry Profile to include:
(1.) White Blood Cell and Differential Cell Count.
(2.) Calcium
(3.) Hemoglobin and/or hematocrit
(4.) Phosphorus
(5.) Albumin, globulin and total protein
(6.) Uric Acid
(7.) Serum glutamic oxalacetic transaminase (SGOT)
(8.) Creatinine
(9.) Lactic Dehydrogenase (LDH)
(10.) Glucose
(11.) Alkaline Phosphatase
(12.) Cholesterol
(13.) GGT
(14.) Urea Nitrogen.

h. Urinalysis, including
(1.) Specific gravity
(2.) d. pH
(3.) Microscopic examination
(4.) Proteins
(5.) Acetone
(6.) Glucose

i. Potential exposures that may occur at a site must also be considered. While it is often impossible to identify every toxic substance that exists at each hazardous waste site, certain types of hazardous substances or chemicals are more likely to be present than others and may include:
(1.) Aromatic hydrocarbons.
(2.) Asbestos (or asbestiform particles).
(3.) Dioxin.
(4.) Halogenated aliphatic hydrocarbons.
(5.) Herbicides.
(6.) Organochlorine insecticides.
(7.) Organophosphate and carbamate insecticides.
(8.) Polychlorinated biphenyls (PCBs).
(9.) Heavy metals such as:
   a. Cadmium
   b. Arsenic
   c. Lead
   d. Chromium

2. The physician must provide test results and an opinion regarding any medical conditions which could adversely affect the employee or would place the employee at increased risk. The physician must also recommend special protective measures or limitations which should be placed on the employee’s exposure or the use of respirators. The pre-assignment physical should categorize employees as fit-for-duty and able to wear respiratory protection.

C. Periodic and exit medical examinations
1. Must be developed for each site and used in conjunction with pre-employment
screening examinations. Comparison of sequential medical reports with baseline data is essential to determine biologic trends that may mark early signs of adverse health effects, and thereby facilitate appropriate protective measures. The frequency and content of examinations will vary, depending on the nature of the work and exposures. Generally, medical examinations have been recommended at least yearly. More frequent examinations may be necessary, depending on the extent of potential or actual exposure, the type of chemicals involved, the duration of the work assignment, and the individual worker’s profile. Periodic screening exams should include:

a. Interval medical history, focusing on changes in health status, illnesses, and possible work related symptoms. The examining physician should have information about the worker's interval exposure history, including exposure monitoring at the job site, supplemented by worker-reported exposure history and general information on possible exposures at previously worked sites.

b. Physical examination.

c. Additional medical testing, depending on available exposure information, medical history, and examination results. Testing should be specific for the possible medical effects of the worker’s exposure. Multiple testing for a large range of potential exposures is not always useful; it may involve invasive procedures (e.g., tissue biopsy), be expensive, and may produce false-positive results.

d. Pulmonary function tests should be administered if the individual uses a respirator, has been or may be exposed to irritating or toxic substances, or if the individual has breathing difficulties, especially when wearing a respirator.

e. Audiometric tests. Annual retests are required for personnel subject to high noise exposures (an 8-hour, time-weighted average of 85 dBA2 or more), those required to wear hearing protection, or as otherwise indicated.

f. Vision tests. Annual retests are recommended to check for vision degradation.

g. Blood and urine tests when indicated.

2. The Company will designate the physician to perform all medical examinations; however, the employee has the right to seek a second medical opinion, and is to be notified of that right upon receipt of the test results. Should the second physician’s findings differ from the first and no agreement can be reached, then a third physician is to be selected to review all the results and to run any additional tests deemed necessary.

D. Communication between the Site, Physicians, and Workers

1. Preferred Industrial Contractors, Inc. will provide information about the site hazards and potential exposure levels, work activities and PPE requirements, and other information as required by OSHA in 29 CFR 1910.120(f)(6) to the designated medical facility and physician.

2. A physician’s written opinion of the results of these examinations is required for each worker and a copy is maintained on site. The contents of the written opinion are limited to:

a. A Statement Of The Worker’s Health Status In Relation To His/Her Job Duties
And A Description Of Any Detected Medical Condition That Could Put The
Worker At Increased Risk,
b. Notation Of Any Recommended Limitations In Work Activity Or PPE Use, And
c. Confirmation That The Physician Has Informed The Employee Of The
Examination Results And Any Further Examination Or Treatment
Required.

E. Medical Recordkeeping Procedures
   1. Corporate medical recordkeeping procedures are consistent with the requirements
   of 29 CFR 1910.1020, and are described in the company’s overall safety and
   health program. A copy of that program is available at the site location.
   2. All employee exposure sampling and medical records shall be maintained for the
duration of employment plus 30 years. Records required under this medical
surveillance program, consistent with 1910.120(f)(8), are kept accurate, updated
and secure at the Preferred Industrial Contractors, Inc. corporate office.

F. Program Review
   Periodic reviews of the medical program shall be performed to ensure its effectiveness.
The Safety Department shall be responsible for this review. At a minimum, this review
consists of:
   1. Review of accident and injury records and medical records to determine whether
   the causes of accidents and illness are promptly investigated and whether
   corrective measures are taken wherever possible,
   2. Evaluation of the appropriateness of required medical tests on the basis of site
   exposures, and
   3. Review of emergency treatment procedures and emergency contacts list to ensure
   they are site-specific, effective, and current.
8.0 Personal Protective Equipment

Preferred Industrial Contractors, Inc. shall furnish and ensure that employees wear adequate PPE at all times while on site. Selection, use, and inspection of PPE shall be based upon the requirements of the Preferred Industrial Contractors, Inc. Safety Health and Environmental Manual (Section 13). This section of the HASP describes how PPE is selected and used to protect workers from exposure to hazardous substances and hazardous conditions on the site. Exposure to site hazards, toxic or hazardous materials, as well as those from the decontamination process, are considered. The following topics are addressed in this chapter:

1. PPE selection criteria
2. Site specific PPE ensembles
3. Work mission duration
4. Training in use of PPE
5. Respiratory protection
6. Hearing conservation
7. PPE maintenance & storage
8. Evaluation of this program
9. References

The site Safety and Health Officer HSO has responsibility for implementing the PPE program on the project level.

A. PPE Selection Criteria

1. Site safety and health hazards are eliminated or reduced to the greatest extent possible through engineering controls and work practices. Where hazards are still present, a combination of engineering controls, work practices, and PPE are used to protect employees.

2. An initial level of PPE is assigned to each task to provide an adequate barrier to exposure hazards. Personnel will wear protective equipment when response activities involve known or suspected atmospheric contamination, including vapors, gases, or particulates generated by site activities, or when direct contact with skin-affecting substances may occur. Respirators protect lungs and gastrointestinal tract against airborne toxicants. Chemical-resistant clothing protects the skin from contact with skin-destructive and absorbable chemicals. Goggles, eyeglasses, and full face-shields protect the eyes from particulates, projectiles, and other airborne toxicants.

3. Initial PPE ensembles are selected based on the anticipated route(s) of entry of biological and chemical hazards and their concentration. Ensemble materials are selected using permeation data supplied by individual manufacturers. Materials providing the greatest duration of protection have been chosen. Tear and seam strength of the PPE are also considered to ensure ensemble durability while work is performed. When necessary, multiple layers of protection will be used to accommodate the range of hazards that may be encountered. Where possible, employees are provided with a range of component sizes to ensure properly fitted PPE.

4. The following criteria are used in selecting PPE levels depending upon exposure levels:
   a. Level A - The highest level of protection to be utilized when respiratory, dermal, and eye exposure is possible.
Employees will use Level A Protection should any of the following conditions exist:

1. Measured or potentially high concentration(s) of atmospheric vapors, gases, or particulate.
2. High potential for splash, immersion, or exposure to unexpected vapors, gases, or particulate of materials that are harmful to skin or capable of being absorbed through the skin.
3. Operations in confined or poorly ventilated areas where the absence of conditions requiring Level A have not yet been determined.

b. Level B - Provides the highest level of respiratory protection but a lesser degree of dermal protection. Level B protection may be used initially until sampling results identify levels of exposure. Employees will use Level B protection should be used if any of the following conditions exist:* Exposures are known and the highest degree of respiratory protection is needed.

1. The atmosphere is oxygen deficient (<19.5%).
2. There are no warning properties for the identified gases, vapors, or particulates.
3. The atmosphere contains incompletely identified vapors or gases (indicated by a direct-reading instrument) not suspected of containing high levels of hazardous substances harmful to skin or capable of being absorbed through the skin.
4. Atmospheres with IDLH concentrations of specific substances that present severe inhalation hazards but do not represent a skin absorption hazard.

c. Level C - To be used when the types and concentrations of respirable contaminants are known and are not greater than the protection limitations of the air-purifying respirators and cartridges. There may be some areas where a modified Level C protection will be worn. Level C protection should be used to protect against measured concentrations of known atmospheric contaminants for which an air-purifying respirator can be used and when liquid splashes or other direct contact with hazardous substances will not adversely affect employee health or be absorbed through any exposed skin. Air purifying respirators (APR) can be used only when the contaminant(s) are known, cartridges/canisters exist, and concentrations are within the substance-specific standard guidelines or within the maximum use concentration (MUC) for the APR used. The NIOSH APF for half face APRs is 10. The NIOSH APF for full face APRs is 50.

d. Level D - protection may be used during tasks where the atmosphere contains no known hazard and work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any biological or chemical substances. The following personal protective equipment will be worn as level D or modified Level C protection as needed based on site conditions:

1. Hard Hat
2. Safety Toed Boots
3. Goggles, face shield, safety glasses, or welding hood as needed
4. Disposable coveralls or chemical resistant suit as needed
5. Appropriate work gloves
6. Approved respiratory protection as needed.
B. Hazard Assessment

A hazard assessment must be conducted and documented in writing using the SAFE Program and the JSA form. From this assessment the proper PPE will be selected and properly fitted to the affected employees. When selecting personal protective equipment the following requirements must be met:

1. Approved for use by the Corporate SH&E Department.
3. Durable, readily available and maintainable by project personnel, if possible.
4. Provide desired protection to workers against hazard exposure.
5. Maximum comfort with minimal weight.
6. Minimum restriction of essential body movement, vision, etc.

C. Criteria for PPE Upgrades and Downgrades

1. Since PPE is primarily used as a barrier to toxic, biological and chemical exposure, airborne concentrations of are to be monitored routinely, in accordance with Chapter 7, Exposure Monitoring. The level of PPE is assessed based on the results of the air monitoring.
2. The site Safety and Health Officer SHO has the authority to upgrade or downgrade PPE in a timely manner to respond to changing site conditions and to protect worker health and safety. Routine evaluation of the PPE program is conducted as identified in Section 6.7 below.
3. The site Safety and Health Officer SHO identifies task-specific work duration based on the following:
   a. Physiological requirements of the task
   b. PPE level for the task- ambient temperature and humidity
   c. Respiratory protection capacity (air supply or cartridge change requirements)
   d. Chemical protective clothing capacity (permeation rate of on-site materials), and
e. Acclimatization of the work force to site and task conditions.
4. Work duration is consistent with the requirements outlined in Chapter 8, Heat Stress and the respiratory protection capacity for the assigned PPE. Work duration is re-evaluated throughout the day in response to changes in working conditions.

D. Training

Employees receive general training regarding proper selection, use and inspection of PPE during initial HAZWOPER training (or equivalent) and subsequent refresher training. Site-specific PPE requirements, including task specific PPE, ensemble components, cartridge/canister service times, and inspection procedures are communicated as identified in Chapter 4, Training. Chapter 12, Standard Operating Procedures, may include additional information regarding PPE training requirements.

E. Respiratory Protection

Respiratory protection is selected, fitted, used, stored and maintained in accordance with the Respiratory Protection Program located in the Preferred Industrial Contractors, Inc. SH&E
Manual Section 35.4. The written Respiratory Protection Program has been reviewed for consistency with the other requirements of this HASP.

F. Hearing Conservation
1. Consistent with 1910.95, 1926.101 and Preferred Industrial Contractors, Inc. SH&E Manual Section 13.9 hearing protection is made available when noise exposures equal or exceed an 8-hour time-weighted average sound level of 85 dBA. Hearing protection is required when the 8-hour time weighted average sound level > 90 dBA. Where noise exposure meets or exceeds this level, noise is listed as a physical hazard in the job hazard analysis for the tasks/operation, and hearing protection is included as one of the control measures (PPE).
2. Hearing protection is also required for any employees who have not yet had a baseline audiogram or who have experienced a standard threshold shift and are exposed to an 8-hour time weighted average sound level > 85 dBA.

G. PPE Maintenance & Storage
1. The site Safety and Health Officer SHO is responsible for overseeing PPE maintenance and storage procedures and for maintaining the inspection record. Table 6-6 identifies the PPE maintenance requirements for this site

<table>
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<tr>
<th>Type of PPE</th>
<th>Model</th>
<th>Inspection Frequency/Procedures</th>
<th>Done by</th>
<th>Cleaning Frequency/Procedures</th>
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2. Defective or damaged equipment is not used and is reported to the site Safety and Health Officer SHO so that the equipment can be repaired or discarded. Spent and disposable PPE is discarded as specified in Chapter 10, Decontamination. After decontamination, reusable PPE is properly stored, according to the manufacturers’ recommendations and the site decontamination plan.

H. Evaluation of PPE Program
Assessment of PPE performance occurs throughout site activities in response to air monitoring data collected and the action levels identified in the hazard assessments. Surface samples are collected from the inside surfaces of used PPE to ensure that the equipment provides an adequate barrier throughout the work shift. Surface monitoring procedures are described in Chapter 7.

Modifications to initially selected PPE are determined by the site Safety and Health Officer SHO and affected employees are informed immediately.
1. **PPE Picklists**

   a. **Level A**
   
   (1.) Booties-outer, chemical-resistant, disposable
   (2.) Cascade System
   (3.) Cooling vest
   (4.) Coveralls
   (5.) Disposable protective suit (depending on suit construction, may be worn over totally-encapsulating suit)
   (6.) Gloves (outer, chemical-resistant)
   (7.) Gloves (inner, chemical-resistant)
   (8.) Hardhat
   (9.) Hardhat liner
   (10.) Hearing protection
   (11.) Manifold System
   (12.) Positive pressure supplied air respirator, with escape SCBA (NIOSH certified)
   (13.) SCBA-positive pressure, full face-piece (NIOSH certified)
   (14.) Safety boots-steel toe and shank, chemical-resistant
   (15.) Spare air cylinders
   (16.) Totally-encapsulating chemical protective suit

   b. **Level B**
   
   (1.) Booties-outer, chemical-resistant, disposable
   (2.) Butyl apron
   (3.) Cascade System
   (4.) Cooling vest
   (5.) Cotton clothing
   (6.) Face shield
   (7.) Hardhat
   (8.) Hardhat liner
   (9.) Hearing protection
   (10.) Hooded chemical-resistant clothing (overalls and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant overalls)
   (11.) Gloves (outer, chemical-resistant)
   (12.) Gloves (inner, chemical-resistant)
   (13.) Manifold System
   (14.) Positive pressure supplied air respirator, with escape SCBA (NIOSH certified)
   (15.) Protective coverall
   (16.) SCBA-positive pressure, full face-piece (NIOSH certified)
(17.) Safety boots-steel toe and shank, chemical-resistant
(18.) Spare air cylinders

c. **Level C**
(1.) 5-minute escape mask
(2.) Booties-outer, chemical-resistant, disposable
(3.) Butyl apron
(4.) Cartridges
(5.) Canisters
(6.) Cooling vest
(7.) Cotton clothing
(8.) Coveralls
(9.) Face shield
(10.) Full-face or half-mask air purifying respirator (NIOSH certified)
(11.) Hardhat
(12.) Hardhat liner
(13.) Hearing protection
(14.) Hooded chemical-resistant clothing (overalls; two-piece
chemical-splash suit; disposable chemical-resistant overalls)
(15.) Insulated Coveralls
(16.) Insulated Boots
(17.) Outer gloves
(18.) Outer work gloves
(19.) Power air purifying respirator
(20.) Protective coverall
(21.) Safety boots-steel toe and shank, chemical-resistant
(22.) Safety glasses or chemical splash goggles

d. **Level D**
(1.) 5-minute escape mask
(2.) Booties-outer, chemical-resistant, disposable
(3.) Cotton clothing
(4.) Coveralls
(5.) Face shield
(6.) Hardhat
(7.) Hardhat liner
(8.) Hearing protection
(9.) Insulated Coveralls
(10.) Insulated Boots
(11.) Protective coverall
(12.) Safety boots-steel toe and shank, chemical-resistant
(13.) Safety glasses or chemical splash goggles
(14.) Work gloves

9.0 Exposure Monitoring Program
This section of the HASP describes how levels of hazardous substances, physical hazards, and worker exposures to them, are monitored at this site. The purpose of air monitoring is to identify and quantify airborne contaminants in order to determine the level of worker protection needed. Initial screening for identification is often qualitative, i.e., the contaminant, or the class to which it belongs, is demonstrated to be present but the determination of its concentration (quantification) must await subsequent testing. Priorities for air monitoring should be based on the information gathered during initial site characterization. This information serves as the basis for selecting the appropriate monitoring equipment and personal protective equipment (PPE) to use when conducting site monitoring. Depending on site conditions and project goals, four categories of site monitoring may be necessary: monitoring for IDLH and other dangerous conditions, general onsite monitoring, perimeter monitoring, and periodic monitoring. The exposure monitoring program provides project-specific information about:

1. Monitoring procedures to detect the presence of hazardous substances
2. Monitoring procedures to determine worker exposures to hazardous substances and physical hazards
3. Action levels and required responses for known and expected hazardous substances and physical hazards
4. Calibration and maintenance procedures for monitoring equipment

The site Safety and Health Officer (SHO) is responsible for implementing this exposure monitoring program.

A. Monitoring for IDLH and Other Dangerous Conditions
1. As a first step, air monitoring is to be conducted to identify any IDLH and other dangerous conditions, such as flammable or explosive atmospheres, oxygen deficient environments, and highly toxic levels of airborne contaminants. Direct reading monitoring instruments will normally include combustible gas indicators, oxygen meters, colorimetric indicator tubes, and organic vapor monitors. Other monitoring instruments may be necessary based on the initial site characterization. When time permits, air samples should be collected for laboratory analysis. Extreme caution should be exercised in continuing a site survey when atmospheric hazards are indicated. Monitoring personnel should be aware that conditions can suddenly change from non-hazardous to hazardous.

2. Acutely hazardous concentrations of chemicals may exist in confined and lowlying spaces. Examine any confined spaces such as vessels, shafts, silos, storage tanks, box cars, buildings, bulk tanks, sumps etc. where chemical exposures capable of causing acute health effects are likely to accumulate.

3. In open spaces, toxic materials tend to be emitted into the atmosphere, transported away from the source, and dispersed. Acutely hazardous conditions are not likely to persist in open spaces for extended periods of time unless there is a very large and readily identifiable source, such as an overturned tank car. Depending upon the hazard, open spaces are generally given a lower monitoring priority.

B. General Onsite Monitoring
Air sampling should be conducted using a variety of media to identify the major classes of airborne contaminants and their concentrations. After visually identifying the sources
of possible generation, collect air samples downwind from the designated source along the axis of the wind direction. Work upwind, until reaching or getting as close as possible to the source. Levels of protection for sampling should be based upon the results obtained and the potential for an unexpected release of chemicals. After reaching the source, or finding the highest concentration, sample cross-axis of the wind direction to determine the degree of dispersion. To ensure that there is no background interference and that the detected substance(s) are originating at the identified source, also collect air samples upwind of the source.

C. Initial Monitoring

1. When the job hazard analyses (JHAs) in Chapter 2 of this HASP are prepared, the results of monitoring conducted during initial entry are entered. This data does not indicate airborne concentrations or employee exposures during any site work activities. Air sample collection and analysis are used to determine the identity and quantity of materials to which workers are exposed throughout the work shift.

2. Consistent with HAZWOPER, personal air samples are collected in the breathing zones of employees expected to have the highest exposure during the task or in the location being evaluated. If exposures for these employees exceed the exposure limits, additional samples are collected in the breathing zones of all employees associated with the task or the facility location evaluated. Selectively monitoring workers who are closest to the source of contaminant is based on the rationale that the probability of significant exposure varies directly with the distance from the source. If workers closest to the source are not significantly exposed, then all other workers are, presumably, also not significantly exposed and probably do not need to be monitored.

3. Full-shift and short-term samples are collected, providing quantitative results that can be compared to OSHA Permissible Exposure Limits and other published exposure limits. Frequency and duration of sample collection are also consistent with the requirements in OSHA’s substance specific standards. Periodic monitoring of work activities is conducted to quantify employee exposure during activities and the JHAs are updated accordingly.

D. Perimeter Monitoring

Fixed-location monitoring at the "fence line" or perimeter, where personal protective equipment is no longer required, measures contaminant migration away from the site and enables the Site Safety and Health Officer (SHO) to evaluate the integrity of the site's clean areas. Since the fixed-location samples may reflect exposures either upwind or downwind from the site, wind speed and direction data may be needed to interpret the sample results.

E. Periodic Monitoring

Periodic monitoring is conducted to evaluate potential worker exposure to airborne hazardous substances and surface contamination. Site conditions and atmospheric chemical conditions may change following the initial characterization. The resulting data is then used to determine baseline and on-going airborne and surface concentrations of contaminants, particularly when employee exposures may change significantly or rapidly. Monitoring should be repeated periodically, especially when:

1. Commencement of work on another portion of the facility
2. Exposure to or handling of contaminants/hazards not previously identified
3. Commencement of a new task/operation
4. Change in indoor environmental conditions
5. Commencement of task/operation that is likely to increase airborne concentrations of hazardous substances

F. Direct-Reading Instruments
1. Direct-reading instruments are used to identify known chemicals in the ambient atmosphere. Some direct-reading instruments can detect contaminants in concentrations down to one part contaminant per million parts of air (ppm), although quantitative data are difficult to obtain when multiple contaminants are present. Unlike air sampling devices, which are used to collect samples for subsequent analysis in a laboratory, direct reading instruments provide information at the time of sampling, enabling rapid decision-making. Direct-Reading instruments may be used to rapidly detect flammable or explosive atmospheres, oxygen deficiency, certain gases and vapors, and ionizing radiation. They are the primary tools of initial site characterization.

2. The information provided by direct-reading instruments can be used to institute appropriate protective measures (e.g., personal protective equipment, evacuation), to determine the most appropriate equipment for further monitoring, and to develop optimum sampling and analytical protocols. All direct-reading instruments have inherent constraints in their ability to detect hazards:
   a. They usually detect and/or measure only specific classes of chemicals.
   b. Generally, they are not designed to measure and/or detect airborne concentrations below 1 ppm.
   c. Many of the direct-reading instruments that have been designed to detect one particular substance also detect other substances (interference) and, consequently, may give false readings.
   d. It is imperative that direct-reading instruments be operated, and their data interpreted, by trained qualified individuals who are thoroughly familiar with the particular device's operating principles and limitations. The following guidelines may facilitate accurate recording and interpretation:
      (1.) Calibrate instruments according to the manufacturer's instructions before and after every use.
      (2.) Develop chemical response curves if these are not provided by the instrument manufacturer.
      (3.) Remember that the instrument’s readings have limited value where contaminants are unknown. When recording readings of unknown contaminants, report them as "needle deflection" or "positive instrument response" rather than specific concentrations (i.e., ppm). Conduct additional monitoring at any location where a positive response occurs.
      (4.) A reading of zero should be reported as "no instrument response" rather than "clean" because quantities of chemicals may be present that are not detectable by the instrument.
Table 9.6
Guidelines for Some Atmospheric Hazards

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Monitoring Equipment</th>
<th>Measured Level</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explosive Atmosphere</td>
<td>Combustible gas indicator</td>
<td>&lt;10% LEL, 10%-25% LEL &gt;25% LEL</td>
<td>Continue onsite monitoring with extreme caution as higher levels are encountered. Explosion hazard. Withdraw from area immediately.</td>
</tr>
<tr>
<td>Oxygen</td>
<td>Oxygen concentration meter</td>
<td>&lt;19.5%  19.5%-25% &gt;25%</td>
<td>Monitor wearing self-contained breathing apparatus. WARNING: Combustible gas readings are not valid in atmospheres with &lt;19.5% oxygen. Continue investigation with caution. Deviation from normal level may be due to the presence of other substances. Fire hazard potential. Discontinue investigation.</td>
</tr>
<tr>
<td>Radiation</td>
<td>Radiation survey equipment</td>
<td>&lt;2 mrem/hr, f&gt;2 mrem/hr</td>
<td>Radiation above background levels (normally 0.01-0.02 mrem/hr) signifies the possible presence of radiation sources. Continue investigation with caution. Perform thorough monitoring. Potential radiation hazard. Evacuate site. Continue investigation only upon the advice of a health physicist.</td>
</tr>
<tr>
<td>Inorganic and Organic Gases and Vapors</td>
<td>Colorimetric tubes, Chemical-specific instruments, including halide meter, hydrogen sulfide detector, carbon monoxide monitor, and mercury meter</td>
<td>Depends on chemical</td>
<td>Consult standard reference manuals for air concentration/toxicity data. Action level depends on PEL/REL/TLV.</td>
</tr>
<tr>
<td>Organic Gases and Vapors</td>
<td>Portable photoionizer, Organic vapor analyzer</td>
<td>Depends on chemical</td>
<td>Consult standard reference manuals for air concentration/toxicity data. Action level depends on PEL/REL/TLV.</td>
</tr>
</tbody>
</table>

G. Equipment Calibration and Maintenance

Table 9-7 lists the specific monitoring instruments and the calibration procedures used on this project/facility. Instruments are to be calibrated and maintained according to the manufacturers’ recommendations.

Table 9-7 Equipment Calibration & Maintenance

<table>
<thead>
<tr>
<th>Instrument / Serial Number</th>
<th>Hazard(s) Measured</th>
<th>Field Calibration Method</th>
<th>Field Calibration Frequency</th>
<th>Manufacturer Recalibration Date</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>
H. Laboratory Analysis

1. Direct-reading personal monitors are available for only a few specific substances and are rarely sensitive enough to measure the minute (i.e., parts of contaminant per billion parts of air) quantities of contaminants which may, nevertheless induce health changes. To detect relatively low-level concentrations of contaminants, long-term or "full-shift" personal air samples must be analyzed in a laboratory. Full-shift air samples for some chemicals may be collected with passive dosimeters, or by means of a pump which draws air through a filter or sorbent. Selection of the appropriate sampling media largely depends on the physical state of the contaminants.

2. A major disadvantage of long-term air monitoring is the time required to obtain data. The samples must be submitted to a laboratory for analysis and as a result it could be hours, if an onsite laboratory is available, or days, weeks, even months, if a remote laboratory is involved before the results are available. This can be a significant problem if the situation requires immediate decisions concerning worker safety.

3. Laboratory results should be compared with any direct-reading data to ensure that direct-reading instruments are accurate. If a direct-reading instrument is not compatible with the contaminants identified in the air sample results, or the direct-reading results appear inaccurate, an alternative monitoring strategy must be developed. If the monitoring strategy must be modified, the HASP is to be revised accordingly and affected employees briefed about the change.

I. General Sampling Procedures

1. Assure that the air sampling pump is calibrated pre and post sampling to adjust or determine the flow rate using a rotometer or an electronic bubble calibrator. Check to make sure the batteries are charged and the date of the sampling media has not expired.

2. Select the worker or the area to be monitored. Briefly explain the purpose of the monitoring to the worker(s). Stress the importance of not removing or tampering with the sampling equipment. Record the worker’s name, ID number and craft, the sampling date, location device and any other pertinent data on the air sampling data form.

3. For a personal sample, attach the monitoring device and/or medium to the worker so that it does not interfere with work performance. Attach the collection device (filter cassette, charcoal tube, etc.) in the breathing zone, such as the shirt collar or within a 1-foot radius of the worker’s nose and mouth. Point the inlet downward to avoid gross contamination and position the excess tubing so that it does not interfere with the work of the employee.

4. For an area sample position the monitoring device or sampling medium approximately four to six feet from the floor and assure that the medium is not in direct contact with or too close to settled or spilled contaminant.

5. Turn on the pump and record the starting time. Observe the pump operation for a short time after starting to make sure it is operating correctly. If using a passive device, record the time when first exposed to the workplace atmosphere.

6. Document the worker’s tasks performed and/or the processes operating in the area. Check the pump every two hours to ensure that sample integrity is
maintained and cyclical activities and work practices are identified. More frequent checks may be necessary when heavy filter loading is possible.

7. Ensure that the sampler is still assembled properly and that the hose has not become pinched or detached from the cassette or the pump. For filters, observe for symmetrical deposition of particulate on the filter, unexpected large particles, or other evidence of sample tampering with the sample or pump. If applicable, change the medium when conditions warrant (i.e. signs of overloading, excessive airborne concentrations of contaminant, or to isolate exposure to specific time periods or work tasks.)

8. Record the “stop time” when the medium is changed (or sampling is concluded) and the “start time” when the medium is replaced. Make sure the identification number of each sample is recorded.

9. Take photographs (as appropriate) and detailed notes concerning visible airborne contaminants, work practices, potential interferences, movements, and other conditions to assist in determining appropriate engineering controls.

10. Prepare blank(s) during the sample period for each type of sample collected. Generally one blank is adequate for up to 20 samples for any given analysis/sampling period except asbestos, which requires a minimum of two field blanks. The blanks should be opened but not used to take samples (charcoal tubes, filters etc.). They should be handled in the same manner as any sampling media used in sampling air contaminants, with the exception that no air is drawn through them.

11. Remove the sampling device from the worker and make sure to record the time and the identification number of each sample. If there is a pump rotameter, check the flow rate to ensure that the rotameter ball is still at the calibrated mark. If the ball is no longer at the mark, record the pump rotameter reading.

12. Perform a post calibration check of the sample train using either the primary or secondary calibrator. Remove the collection device from the pump attach the ID sticker on the cassette. Replace both end plugs and place clear tape over the ends of the cassette to seal it.
13. Samples are shipped to and analyzed by the laboratories listed in Table 7-9 below:

**SAMPLING DATA WORKSHEET**

<table>
<thead>
<tr>
<th>Job Number:</th>
<th>Location:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee Name:</td>
<td>Social Security #:</td>
</tr>
<tr>
<td>Job Classification / Description:</td>
<td>Area:</td>
</tr>
<tr>
<td>Sample Type</td>
<td>Date:</td>
</tr>
<tr>
<td>Personal</td>
<td>Sample No.:</td>
</tr>
<tr>
<td>Area</td>
<td>Sampled By:</td>
</tr>
<tr>
<td>Source</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Work Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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</tr>
</tbody>
</table>

List Personal Protective Equipment Worn:

<table>
<thead>
<tr>
<th>Instrument Type and Model No.</th>
<th>Serial No.</th>
<th>Calibrated By:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Rate:</td>
<td>Time Start:</td>
<td>Time Stop:</td>
</tr>
<tr>
<td>Pre-Cal:</td>
<td>Post-Cal:</td>
<td>Wind:</td>
</tr>
<tr>
<td>Type Analysis Required:</td>
<td>Special Instructions or Comments:</td>
<td></td>
</tr>
</tbody>
</table>
### J. Documentation and Employee Examination

Direct-reading monitoring data, air sample collection procedures and analytical results are to be documented daily, by qualified individuals. The site Safety and Health Officer SHO reviews the analytical results and communicates the information to employees. Workers may review general air and surface monitoring results and may obtain copies of their personal monitoring results. Employees who participated in an air sampling event will receive written notification of their respective personal exposures within 5 days of receipt of results.

### K. Surface Monitoring

1. Depending upon site conditions, surface samples may collected in all work zones. Surface samples in the EZ can provide possible exposure information. Surface samples in the CRZ and SZ are used to evaluate the effectiveness of decontamination methods and exposure controls, including hygiene practices, and to ensure that zone boundaries accurately reflect the presence or absence of contamination. Surface sample locations, methods, and permissible contamination limits are listed in Table 9-11.

2. Surface concentrations in excess of the established limits may results in adjustments of PPE, decontamination procedures, and controls, and corresponding information in those chapters of the HASP. The site Safety and Health Officer SHO is responsible for evaluating and defining corrective actions if sample results indicate contaminant levels in excess of established limits.

3. Surface samples are shipped to and analyzed by the laboratories identified in Table 9-9.

### Table 9-9 Laboratory Information

<table>
<thead>
<tr>
<th>Analyte(s)</th>
<th>Laboratory Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Laboratory Name:</td>
</tr>
<tr>
<td></td>
<td>Addresses:</td>
</tr>
<tr>
<td></td>
<td>Telephone:</td>
</tr>
<tr>
<td></td>
<td>Laboratory Contact:</td>
</tr>
<tr>
<td></td>
<td>Laboratory Name:</td>
</tr>
<tr>
<td></td>
<td>Addresses:</td>
</tr>
<tr>
<td></td>
<td>Telephone:</td>
</tr>
<tr>
<td></td>
<td>Laboratory Contact:</td>
</tr>
</tbody>
</table>
L. Noise Monitoring
   As indicated in the job hazard analyses, employees may be exposed to sound levels exceeding 85 dBA while conducting certain tasks/operations. Consequently, noise monitoring is conducted in accordance with the Hearing Conservation Program. A copy of the Hearing Conservation Program is attached to this HASP as Attachment.

M. Monitoring Instruments
   1. Organic Vapor Monitor Calibration gas
   2. O2 /Explosimeter with Cal. Kit Single gas monitor
   3. Chargers for equipment Equipment logbooks
   4. Noise dosimeter Sound level meter
   5. Draeger pump, tubes Accuro pump, tubes
   6. Real time aerosol monitor Personal real time aerosol monitor
   7. Heat stress monitor Wind gauge, handheld
   8. Relative humidity Probe Relative humidity Pen
   9. pH Meter Anemometer
   10. Sling psychrometer Light meter
   11. Batteries for equipment TLD badge
   12. Radiation alert monitor Pocket dosimeters with charger
   13. RAD meter Portable XRF Device

N. Type of Monitoring Field Calibration Method
   1. Personal Zero Gas
   2. Environmental Span Gas
   3. Area Buffer Solution
      Known Radiation Source
      Bubble Meter
      Rotameter

O. Field Calibration Check Frequency
   1. Daily
   2. Weekly
   3. Monthly

P. Substance-Specific Standards:
   1. 1910.1001,1926.1101 .............Asbestos
   2. 1910.1003,1926.1103 .............13 Carcinogens (This includes 4-Nitro biphenyl, ........................................................ al
      alpha-Naphthylamine, methyl chloromethyl ether,
10.0 Heat Stress Prevention Program

This chapter of the HASP describes how the site-specific environmental conditions (temperature, humidity, air movement), employee work loads, and PPE may expose employees to hazards resulting in injury or illness related to heat stress. This Heat Stress Prevention Program outlines exposure controls to protect employees working in hot environments. The elements of this program are outlined in this section and include the following:

1. Program Implementation Criteria
2. Heat Stress Management
3. Training

The Site Safety and Health Officer (SSHO) is responsible for implementing the Heat Stress Prevention Program, monitoring work area heat conditions and worker physiological parameters, and for ensuring that employees are trained to recognize the signs and symptoms of heat stress illnesses or injury and what to do if these occur.

A. Program Implementation Criteria

1. The use of personnel protective equipment and clothing increases the risk of heat stress to workers because of reduced body ventilation and cooling by perspiration. Heat stress can occur, however, even when protective equipment is not in use.

2. The U.S. EPA presents a strategy using temperature, relative humidity, and work load to calculate an adjusted temperature. This strategy specifies an adjusted temperature of 75°F as appropriate for an acclimatized employee, under the age of 40, wearing Tyvek®/respirator to conduct a moderate work following a “normal schedule”. This value may be used as the criteria for instituting a heat stress protection program. The adjusted temperature is calculated as follows:

   a. \( T_a = DB + WC + RH \)

   b. Acronyms in the equation refer to the following:

   (1.) DB-Dry Bulb
(2.) WC-Weather conditions: Add 13°F if the work is being performed in full sun, add 7°F if the work is being performed in partial sun to overcast conditions, make no adjustment if the work is done in the shade or at night.

(3.) RH-Relative humidity: use the following scale to adjust humidity
   a. 10% subtract 8°F
   b. 20% subtract 4°F
   c. 30% no change
   d. 40% add 3°F
   e. 50% add 6°F
   f. 60% add 9°F

3. The multi-agency “Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities” recommends the use of the current ACGIH guidelines for workers wearing permeable clothing (e.g., standard work clothing), but provides additional guidance for employees wearing impermeable clothing. According to this document, employees wearing impermeable clothing should be monitored when the work area temperature exceeds 70°F. This document also provides a chart identifying the frequency with which employees should be monitored. Work periods are governed by the frequency of monitoring.

<table>
<thead>
<tr>
<th>Adjusted Temperature</th>
<th>Normal Work Ensemble</th>
<th>Impermeable Ensemble</th>
</tr>
</thead>
<tbody>
<tr>
<td>90°F (32.2°C) or above</td>
<td>After each 45 minutes of work</td>
<td>After each 15 minutes of work</td>
</tr>
<tr>
<td>87.5°-90°F (30.8°-32.2°C)</td>
<td>After each 60 minutes of work</td>
<td>After each 30 minutes of work</td>
</tr>
<tr>
<td>82.5°-87.5°F (28.1°-30.8°C)</td>
<td>After each 90 minutes of work</td>
<td>After each 60 minutes of work</td>
</tr>
<tr>
<td>77.5°-82.5°F (25.3°-28.1°C)</td>
<td>After each 120 minutes of work</td>
<td>After each 90 minutes of work</td>
</tr>
<tr>
<td>72.5°-77.5°F (22.5°-25.3°C)</td>
<td>After each 150 minutes of work</td>
<td>After each 120 minutes of work</td>
</tr>
</tbody>
</table>

B. Heat Stress Management
   1. Heat stress prevention and monitoring procedures will be implemented when the temperature exceeds 85 degrees F. To avoid heat stress, the following steps should be implemented:
      a. Personnel will be evaluated every 30 minutes for symptoms of heat stress.
      b. Proper training and preventive measures will help avert serious illness and loss of work productivity.
      c. Adjust work schedules:
      d. Modify work/rest schedules according to monitoring requirements.
      e. Mandate work slowdowns as needed.
f. Rotate personnel: alternate job functions to minimize overstress or overexertion at one task.
g. Add additional personnel to work teams.
h. Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.
i. Maintain workers' body fluids at normal levels. Daily fluid intake must approximately equal the amount of water lost in sweat, i.e., 8 fluid ounces (0.23 liters) of water must be ingested for approximately every 8 ounces (0.23 kg) of weight lost. The normal thirst mechanism is not sensitive enough to ensure that enough water will be drunk to replace lost sweat.

j. Cool drinking water and electrolyte replacement fluids will be available outside the barricaded area at all times. When heavy sweating occurs, encourage the worker to drink more.
   1. Maintain water temperature at 50° to 60 °F (10° to 15.6°C).
   2. Provide small disposable cups that hold about 4 ounces (0.1 liter).
   3. Have workers drink 16 ounces (0.5 liters) of fluid (preferably water or dilute drinks) before beginning work.
   4. Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break.

k. Provide cooling devices to aid natural body heat exchange during prolonged work or severe heat exposure. Cooling devices include:
   1. Field showers or hose-down areas to reduce body temperature and/or to cool off protective clothing.
   2. Cooling jackets, vests, or suits.
   3. Shelters or shaded areas equipped with air conditioning, fans or water misters to protect personnel during rest periods.

l. Train workers to recognize and treat heat stress. As part of training, identify the signs and symptoms of heat stress. These symptoms are:
   1. Increased sweating rate
   2. Increased heart rate
   3. Increased body-core temperature

2. Depending on severity, heat stress may appear as any of several heat-related illnesses. The following summarizes the symptoms and emergency care for these illnesses:

   a. Heat Rash
      1. Symptoms - Red skin rash and reduced perspiration.
      2. Emergency Care - Keep skin clean, change clothing daily, and cover affected areas with corn starch or powder containing corn starch.

   b. Heat Cramps
      1. Symptoms - Severe muscle cramps, exhaustion, sometimes with dizziness or periods of faintness.
      2. Emergency Care - Move the patient to a cool place; administer half-strength electrolyte fluids; if cramps persist, or the patient's condition worsens, seek medical attention.

   c. Heat Exhaustion
      1. Symptoms - Rapid and shallow breathing, weak pulse, cold and clammy skin, heavy perspiration, total body weakness, dizziness which may lead to
unconsciousness.

(2.) Emergency Care - Move the patient to a cool place, keep the patient quiet and at rest, administer half-strength electrolytic fluids, treat for shock, seek medical attention.

d. Heat Stroke

(1.) Symptoms - Deep breaths, then shallow breathing, rapid, strong pulse, then rapid weak pulse; dry, hot skin; dilated pupils, loss of consciousness (possible coma); seizures or muscular twitching may be observed.

(2.) Emergency Care - Cool the patient rapidly. Treat for shock. If cold packs or ice bags are available, wrap them and place one bag or pack under each armpit, behind each knee, one in the groin, one on each wrist and ankle, and one on each side of the neck. Seek medical attention as rapidly as possible. Monitor the patient's vital signs constantly.

**DO NOT TRY TO ADMINISTER FLUIDS TO AN UNCONSCIOUS PERSON**

C. Acclimatization Program

1. Work in heat produces a metabolic transformation called acclimatization. Acclimatized individuals generally have lower heart rates and lower body temperatures than unacclimatized individuals.

2. Acclimatization can occur after just a few days of exposure to a hot environment. Both physical work and heat stress are required to initiate the body changes that result in acclimatization. To achieve acclimatization, the usual practice is to maintain the environmental conditions relatively stable and to gradually increase the workload over a week. NIOSH recommends a progressive 6-day acclimatization period for the unacclimatized worker before allowing him/her to do full work on a hot job. Under this regimen, the first day of work on site is begun using only 50 percent of the anticipated workload and exposure time, and 10 percent is added each day through day 6. With fit or trained individuals, the acclimatization period may be shortened 2 or 3 days. Workers can however lose acclimatization in a matter of days, and work regimens should be adjusted to account for this. When enclosed in an impermeable suit, fit acclimatized individuals sweat more profusely than unfit or unacclimatized individuals and may therefore actually face a greater danger of heat exhaustion due to rapid dehydration. This can be prevented by consuming adequate quantities of water.

3. References vary regarding the specific period away from work (illness or vacation) that may result in a worker’s loss of acclimatization. The OSHA Technical Manual indicates that acclimatization may be lost over a matter of days. NIOSH’s Criteria Document for Work in Hot Environments indicates that “absence from work in the heat for a week or more results in a significant loss” in the adaptive changes acquired as a result of acclimatization. Other references, like the Mine Safety and Health Administration’s (MSHA) Heat Stress in Mining, identify compressed acclimatization schedules for employees that return after 9 days away from work in a cooler climate.

D. Training

Employees receive general training regarding heat stress-related injuries and illnesses during initial HAZWOPER training and subsequent refresher training. The site-specific program and procedures are communicated as identified in Section 4, Training.
E. References


2. *Fundamentals of Industrial Hygiene* - National Safety Council


11.0 Spill Containment Program

This section of the HASP describes the potential for hazardous substance spills at this site and procedures for controlling and containing such spills. The purpose of this chapter of the HASP is to ensure that spill containment planning is conducted and appropriate control measures are established, consistent with OSHA requirements in 29 CFR 1926.120(b)(4)(ii)(J) and (j)(1)(viii).

The spill containment program addresses the following site-specific information:

1. Potential hazardous substance spills and available controls
2. Initial notification and response
3. Spill evaluation and response
4. Post-spill evaluation

A. Potential Spills and Available Controls

It is Preferred Industrial Contractors, Inc.'s policy to operate in a manner, which protects the environment and the health of our employees and the citizens of the surrounding community. Releases into the environment, including spills, gas releases, explosions, etc., are considered a serious matter.

B. Ground / Water Pollution Prevention

1. Any release constitutes potential for ground water contamination, surface water contamination or releases of hazardous materials into the atmosphere, even if the material released is not generally considered hazardous. Releases that could be encountered at the location include, but are not limited to the following:
   a. Oil/Petroleum Spills (diesel, gasoline, etc.)
   b. Hazardous Waste Spills
   c. Hazardous Substance Spills/Releases (solvents, acid, paint, etc.)
   d. Fires or Explosions related to any of the above

2. If a release does occur, Preferred Industrial Contractors shall take the following steps:
   a. Attempt to contain the release, if possible, without risking bodily harm. If there is immediate danger, evacuate the area.
   b. Immediately contact the owner / operator and provide details of the release, even if the material involved is not considered hazardous.

3. When notifying the owner / operator Preferred Industrial Contractors will provide the following information:
   a. Exact location of the release
   b. Type and description of release (what material)
   c. Estimated amount of material released (or size of the fire)
   d. Extent of injury or property damage occurring
e. Extent of actual or potential environmental damage (if known)
f. What actions, if any, have been taken to control the release?

4. Site personnel are trained in the contents of this spill containment program and their roles and responsibilities during spill response operations.

5. Table 11-2 below lists the location and type of potential hazardous substance spills at this site. This table also describes the activities or situations in which an accidental spill could occur and whether an emergency response is likely to be needed.

6. Where spills, leaks, or ruptures can occur, the site must have suitable quantities of proper absorbent and US Department of Transportation-specified salvage drums/containers. Their location is noted in Table 11-2. In addition, all areas subject to potential spills are diked or a means to adequately dike these areas in the event of a spill is available so that the entire volume of the hazardous substance being spilled can be contained and isolated. The type and location of spill containment equipment is also listed in Table 11-2.

<table>
<thead>
<tr>
<th>Location</th>
<th>Hazardous Substance</th>
<th>Source of spill</th>
<th>Potential maximum qty of spill</th>
<th>Spill Containment Equipment</th>
<th>Equipment Location</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

C. Initial Spill Notification and Response
All spills, regardless of size are to be reported to the Site Safety and Health Officer (SSHO) supervisor for immediate clean up. Material is to be identified if possible, samples taken for analysis if needed, and the material placed in drums for proper disposal.

D. Spill Evaluation and Response
1. The Site Safety and Health Officer (SSHO), is responsible for evaluating spills and determining the appropriate response. When this evaluation is being made, the spill area is isolated and demarcated to the extent possible.
2. When an incidental release occurs, clean-up personnel receive instructions in a pre-clean-up meeting as to spill conditions, PPE, response activities, decontamination, and waste handling.
3. The procedures of the Emergency Response Chapter of this HASP are immediately implemented when the spill is determined to require emergency precautions and action. If necessary to protect those outside the clean-up area, notification of the appropriate authorities is made. Table 11-4 below lists the spill conditions that trigger notification of Federal, state, and local agencies.
Table 11-4 Off-site Notification Requirements

<table>
<thead>
<tr>
<th>Location</th>
<th>Hazardous Substance</th>
<th>Spill Volume/Conditions</th>
<th>Required Notification (insert name of organization(s) &amp; contact information)</th>
</tr>
</thead>
</table>

4. The following are general measures that response/clean-up personnel take when responding to a spill:
   a. To minimize the potential for a hazardous spill, hazardous substances, control/absorbent media, drums and containers, and other contaminated materials are properly stored and labeled.
   b. When a spill occurs, only those persons involved in overseeing or performing spill containment operations will be allowed within the designated hazard areas. If necessary, the area will be barricaded or otherwise blocked off. Unauthorized personnel are to be kept clear of the spill area.
   c. Appropriate PPE is donned before entering the spill area.
   d. Appropriate spill control measures are applied during spill response.
   e. Whenever possible without endangerment of personnel, the spill is stopped at the source or as close to the source as possible.
   f. Ignition points are removed if fire or explosion hazards exist.
   g. Surrounding reactive materials are removed.
   h. Drains or drainage in the spill area are blocked or surrounded by berms to exclude the spilled waste and any materials applied to it.
   i. Provisions are made to contain and recover a neutralizing solution, if used.
   j. Small spills or leaks from a drum, tank, or pipe may require evacuation. In the event an evacuation is necessary to allow clean-up and to prevent employee exposure refer to the proper table of isolation and protective action distances referenced in the DOT Emergency Response Guidebook for the material identified. For small spills, sorbent materials such as sand, sawdust, or commercial sorbents (see Table 9-2 for site-specific sorbent media) are placed directly on the spill to prevent further spreading and aid in recovery.
   k. Spill area is sprayed with appropriate foam where the possibility of volatile emissions exists.
   l. If the spill results in the formation of a toxic vapor cloud, from vaporization, reaction with surrounding materials, or the outbreak of fire, further evacuation may be required.
   m. To dispose of spill waste, all contaminated sorbents, liquid waste, or other spill clean-up will be placed in small quantities in approved drums for proper storage or disposal as hazardous waste.

E. Post-Spill Evaluation
   1. A written spill response report is prepared at the conclusion of clean-up operations. The report includes, at a minimum, the following information:
      a. Date of spill incident
b. Cause of incident
c. Spill response actions
d. Any outside agencies involved, including their incident reports
e. Lessons learned or suggested improvements

2. The spill area is inspected to ensure the area has been satisfactorily cleaned. The use of surface and air sampling is utilized in this determination as necessary. The root cause of the spill is examined and corrective steps taken to ensure the engineering and control measures in place have performed as required. If alternative precautions or measures are needed, they are made available and implemented.

3. All durable equipment placed into use during clean-up activities is decontaminated as specified in Chapter 10, Decontamination, for future utilization. All spill response equipment and supplies are re-stocked as required.

12.0 Decontamination

The decontamination section of the HASP describes how personnel and equipment are decontaminated when they leave the Exclusion Zone. This section also describes how residual waste from decontamination processes is to be disposed. Decontamination procedures are designed to achieve an orderly, controlled removal or neutralization of contaminants that may accumulate on personnel or equipment. These procedures minimize worker contact with contaminants and protect against the transfer of contaminants outside designated work zones. They also extend the useful life of PPE by reducing the amount of time that contaminants contact and permeate PPE surfaces. The decontamination procedures described below are designed to meet the requirements of 1910.120(k) and include project-specific information about:

1. The location and type of project decontamination facilities
2. General and specific decontamination procedures for personnel and PPE
3. General and specific decontamination procedures for equipment
4. Disposal of residual waste from decontamination
5. Decontamination equipment and solutions
6. The monitoring procedures used to evaluate the effectiveness of decontamination

Emergency decontamination procedures are detailed in the Emergency Response chapter of this HASP. The Site Safety and Health Officer (SSHO) is responsible for the implementation of project decontamination procedures and for ensuring their effectiveness.

A. Prevention of Contamination

1. The first step in decontamination is to minimize contamination through established Standard Operating Procedures that minimize contact with waste. For example:
   a. Work practices that minimize contact with hazardous substances (e.g., do not walkthrough areas of obvious contamination; do not directly touch potentially hazardous substances).
   b. Use of remote sampling, handling, and container opening techniques (e.g., drum grapplers, pneumatic impact wrenches).
   c. Protect monitoring and sampling instruments by bagging. Make openings in the bags for sample ports and sensors that must contact site materials.
   d. Wear disposable outer garments and use disposable equipment where appropriate.
   e. Cover equipment and tools with a strippable coating which can be removed during decontamination.
f. Encase the source of contaminants, e.g., with plastic sheeting or overpacks.

2. In addition, Standard Operating Procedures should be established that maximize worker protection. For example, proper procedures for dressing prior to entering the Exclusion Zone will minimize the potential for contaminants to bypass the protective clothing and escape decontamination.

3. In general, all fasteners on PPE should be used (i.e., zippers fully closed, all buttons used, all snaps closed, etc.). Gloves and boots should be tucked under the sleeves and legs of outer clothing. Another pair of tough outer gloves are often worn over the sleeves. All these points should be taped to prevent contaminants from running inside the gloves, boots, and jackets (or suits, if one-piece construction).

4. Prior to each use, personal protective equipment (PPE) should be checked to ensure that there are no cuts or punctures that could expose workers to contaminants. Any injuries to the skin surface, such as cuts and scratches, that could increase the potential for chemicals or infectious agents to directly contact the worker's skin, precautions should be taken to protect these areas.

5. All personnel should be trained in the Standard Operating Procedures for minimizing contact and maximizing worker protection, and these procedures are to be enforced throughout site operations.

B. Decontamination Facilities

1. Decontamination is conducted in the contamination reduction zone (CRZ). The CRZ acts as a buffer between the exclusion zone and the support zone. The location and design of decontamination stations minimize the spread of contamination beyond these stations. Separate facilities are used for personnel and for equipment. Unauthorized persons are prohibited from entering decontamination areas.

2. All personnel, clothing, equipment, and samples leaving the contaminated area of a site (generally referred to as the Exclusion Zone) must be decontaminated to remove any harmful chemicals or infectious organisms that may have adhered to them. Depending upon the contaminant, decontamination methods can consist of either (1) physically removing the contaminants, (2) inactivate contaminants by chemical detoxification or disinfection/sterilization, or (3) remove contaminants by a combination of both physical and chemical means.

3. The level and types of decontamination procedures required depend on several site-specific factors including:
   a. The chemical, physical, and toxicological properties of the wastes.
   b. The pathogenicity of infectious wastes.
   c. The amount, location, and containment of contaminants.
   d. The potential for, and location of, exposure based on assigned worker duties, activities, and functions.
   e. The potential for wastes to permeate, degrade, or penetrate materials used for personal protective clothing and equipment, vehicles, tools, buildings, and structures.
   f. The proximity of incompatible wastes.
   g. The movement of personnel and/or equipment among different zones.
   h. Emergencies.
   i. The methods available for protecting workers during decontamination.
   j. The impact of the decontamination process and compounds on worker safety and health.
Table 12.2 Decontamination Methods

<table>
<thead>
<tr>
<th>REMOVAL</th>
<th>INACTIVATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contaminant Removal</strong></td>
<td><strong>Chemical Detoxification</strong></td>
</tr>
<tr>
<td>o Water rinse, using pressurized or gravity flow.</td>
<td>o Halogen stripping.</td>
</tr>
<tr>
<td>o Chemical leaching and extraction.</td>
<td>o Neutralization.</td>
</tr>
<tr>
<td>o Evaporation/vaporization.</td>
<td>o Oxidation/reduction.</td>
</tr>
<tr>
<td>o Pressurized air jets.</td>
<td>o Thermal degradation.</td>
</tr>
<tr>
<td>o Scrubbing/scraping, using brushes, scrapers, sponges and water</td>
<td></td>
</tr>
<tr>
<td>compatible cleaning solutions.</td>
<td></td>
</tr>
<tr>
<td>o Stream jets.</td>
<td></td>
</tr>
<tr>
<td><strong>Removal of Contaminated Surfaces</strong></td>
<td><strong>Disinfection/Sterilization</strong></td>
</tr>
<tr>
<td>o Disposal of deeply permeated materials.</td>
<td>o Chemical disinfection.</td>
</tr>
<tr>
<td>o Disposal of protective coverings/coatings.</td>
<td>o Dry heat sterilization.</td>
</tr>
<tr>
<td>o Dry heat sterilization.</td>
<td>o Gas/vapor sterilization.</td>
</tr>
<tr>
<td>o Gas/vapor sterilization.</td>
<td>o Irradiation.</td>
</tr>
<tr>
<td>o Irradiation.</td>
<td>o Steam sterilization.</td>
</tr>
<tr>
<td>o Steam sterilization.</td>
<td></td>
</tr>
</tbody>
</table>

C. Decontamination Procedures for Personnel and PPE

1. Decontamination procedures are designed for the level of PPE used. Project-specific procedures for personnel and PPE decontamination minimize the potential for hazardous skin or inhalation exposure, cross-contamination, and chemical incompatibilities. The use of showers and change rooms consistent with the requirements of 29 CFR 1910.141 will be based upon the nature of the hazards and/or duration of work.

2. The following are general decontamination procedures established and implemented during the project. Detailed procedures for personnel and PPE decontamination are provided in the Site Specific Safety Plan.
   a. Decontamination is required for all workers exiting a contaminated area. Personnel may re-enter the Support Zone only after undergoing the decontamination procedures described in the next section.
   b. Used protective clothing is decontaminated, cleaned, laundered, maintained and/or replaced as needed to ensure its effectiveness.
   c. PPE that requires maintenance or parts replacement must be decontaminated prior to repairs or service.
   d. PPE is decontaminated or prepared for disposal on the premises. Personnel who handle contaminated equipment must be trained in the
e. Workers are required and trained to immediately exit the work zone, perform applicable decontamination procedures, shower, and change into uncontaminated clothing if their permeable clothing is splashed or becomes wetted with a hazardous substance.

f. Procedures for disposal of all decontamination waste meet all applicable local, State, and Federal regulations.

g. Consistent with the level of protection required for the operation, the Site Specific decontamination plan (Figure 12.3) provides a step by step representation of the personnel decontamination process for either level A, B, C or D, if necessary. These procedures should be modified to suit site conditions and protective ensembles in use.

**Table 12.3**

**Level A Decontamination Steps**

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Segregated Equipment Drop Step</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Boot Cover And Glove Wash Step 3</td>
</tr>
<tr>
<td></td>
<td>Boot Cover And Glove Rinse Step 4</td>
</tr>
<tr>
<td></td>
<td>Tape Removal - Boot And Glove Step 5</td>
</tr>
<tr>
<td></td>
<td>Boot Cover Removal</td>
</tr>
<tr>
<td>6</td>
<td>Outer Glove Removal</td>
</tr>
<tr>
<td>7</td>
<td>Suit/Safety Boot Wash</td>
</tr>
<tr>
<td>8</td>
<td>Suit/Safety Boot Rinse</td>
</tr>
<tr>
<td>9</td>
<td>Safety Boot Removal</td>
</tr>
<tr>
<td>10</td>
<td>Fully Encapsulating Suit Removal</td>
</tr>
<tr>
<td>11</td>
<td>SCBA Backpack Removal</td>
</tr>
<tr>
<td>12</td>
<td>Inner Glove Wash</td>
</tr>
<tr>
<td>13</td>
<td>Inner Glove Rinse</td>
</tr>
<tr>
<td>14</td>
<td>Face Piece Removal</td>
</tr>
<tr>
<td>15</td>
<td>Inner Glove Removal</td>
</tr>
<tr>
<td>16</td>
<td>Inner Clothing Removal</td>
</tr>
<tr>
<td>17</td>
<td>Field Wash</td>
</tr>
<tr>
<td>18</td>
<td>Redress</td>
</tr>
</tbody>
</table>

**Level B Decontamination Steps**

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Segregated Equipment Drop</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Boot Cover And Glove Wash</td>
</tr>
<tr>
<td>3</td>
<td>Boot Cover And Glove Rinse</td>
</tr>
<tr>
<td>4</td>
<td>Tape Removal - Outer Glove And Boot</td>
</tr>
<tr>
<td>5</td>
<td>Boot Cover Removal</td>
</tr>
<tr>
<td>6</td>
<td>Outer Glove Removal</td>
</tr>
<tr>
<td>7</td>
<td>Suit/Safety Boot Wash</td>
</tr>
<tr>
<td>8</td>
<td>Suit/SCBA/Boot/Glove Rinse</td>
</tr>
<tr>
<td>9</td>
<td>Safety Boot Removal</td>
</tr>
<tr>
<td>10</td>
<td>SCBA Backpack Removal</td>
</tr>
<tr>
<td>11</td>
<td>Splash Suit Removal</td>
</tr>
<tr>
<td>12</td>
<td>Inner Glove Wash</td>
</tr>
<tr>
<td>13</td>
<td>Inner Glove Rinse</td>
</tr>
<tr>
<td>14</td>
<td>Face Piece Removal</td>
</tr>
<tr>
<td>15</td>
<td>Inner Glove Removal</td>
</tr>
<tr>
<td>16</td>
<td>Inner Clothing Removal</td>
</tr>
<tr>
<td>17</td>
<td>Field Wash</td>
</tr>
<tr>
<td>18</td>
<td>Redress</td>
</tr>
</tbody>
</table>

**Level C Decontamination Steps**

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Segregated Equipment Drop</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Boot Cover And Glove Wash</td>
</tr>
<tr>
<td>3</td>
<td>Boot Cover And Glove Rinse</td>
</tr>
<tr>
<td>4</td>
<td>Tape Removal</td>
</tr>
<tr>
<td>5</td>
<td>Boot Cover Removal</td>
</tr>
<tr>
<td>6</td>
<td>Outer Glove Removal</td>
</tr>
<tr>
<td>7</td>
<td>Suit/Safety Boot Wash</td>
</tr>
<tr>
<td>8</td>
<td>Suit/SCBA/Boot/Glove Rinse</td>
</tr>
<tr>
<td>9</td>
<td>Safety Boot Removal</td>
</tr>
<tr>
<td>10</td>
<td>Splash Suit Removal</td>
</tr>
<tr>
<td>11</td>
<td>Inner Glove Wash</td>
</tr>
<tr>
<td>12</td>
<td>Inner Glove Rinse</td>
</tr>
<tr>
<td>13</td>
<td>Face Piece Removal</td>
</tr>
<tr>
<td>14</td>
<td>Inner Glove Removal</td>
</tr>
<tr>
<td>15</td>
<td>Inner Clothing Removal</td>
</tr>
<tr>
<td>16</td>
<td>Field Wash</td>
</tr>
<tr>
<td>17</td>
<td>Redress</td>
</tr>
</tbody>
</table>
**Level D Decontamination Steps**

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Remove Outer Garments (i.e.; Coveralls)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2</td>
<td>Remove Gloves</td>
</tr>
<tr>
<td>Step 3</td>
<td>Wash Hands And Face</td>
</tr>
</tbody>
</table>

D. Decontamination Procedures for Equipment

1. All tools, equipment, and machinery from the Exclusion Zone or CRZ is to be decontaminated in the CRZ prior to removal to the Support Zone. Equipment decontamination procedures are designed to minimize the potential for hazardous skin or inhalation exposure, cross-contamination, and chemical incompatibilities.

2. The following are general equipment decontamination procedures. Specific procedures for equipment decontamination are based upon the type of contaminant, the type of equipment and the level of contamination
   a. Equipment in the Exclusion Zone that can be used again, that is still operable, and that will not pose an increased exposure hazard during reuse is left in Exclusion Zone until it is no longer needed. This eliminates unnecessary decontamination and reduces the potential for physical transfer of contaminants outside the Exclusion Zone.
   b. Decontamination is required for all equipment exiting a contaminated area. Equipment may re-enter the Support Zone only after undergoing the equipment decontamination procedures described in the table below (Table 10.4, Equipment Decontamination Procedures).
   c. Equipment that is transported regularly between the contaminated and clean areas of the facility (e.g., monitoring equipment) is carefully decontaminated each time it is removed from the Exclusion Zone and the effectiveness of decontamination is monitored to reduce the likelihood that contamination will be spread outside designated work zones.
   d. Equipment that cannot be successfully decontaminated is disposed of as hazardous waste.

3. Tables 12.4a and 12.4b list project-specific procedures for equipment decontamination and handling of equipment decontamination wastes.

<table>
<thead>
<tr>
<th>Table 12.4a Equipment Decontamination Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Equipment</td>
</tr>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 12.4b Waste Handling for Equipment Decontamination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste Streams/Products for Equipment</td>
</tr>
<tr>
<td>--------------------------------------</td>
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<tr>
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<tr>
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</tr>
</tbody>
</table>

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E. 12.5 Monitoring the Effectiveness of Decontamination Procedures

1. Visual examination and sampling are used to evaluate the effectiveness of decontamination procedures, in compliance with 29 CFR 1910.120(k)(2)(iv). Visual examination is used to ensure that procedures are implemented as described and that they appear to control the spread of contaminants changing conditions. When feasible, visual examination is also used to inspect for signs of residual contamination or for contaminant permeation of PPE.

2. Both air sampling and surface sampling may be used to verify the effectiveness of decontamination. Air samples are taken in the clean zone to ensure that airborne contaminants have not spread to clean areas of the facility. Surface samples are taken from the inside surfaces of PPE, from decontaminated equipment, and from surfaces within clean areas of the facility to ensure that decontamination and control procedures are performing as anticipated. The type and frequency of air and surface sampling used to ensure the effectiveness of decontamination procedures are detailed in the Exposure Monitoring chapter of this HASP.

3. Results of the inspections of decontamination procedures and documentation of any action taken to correct deficiencies are recorded and stored at site.

(1.) Personnel who work in contaminated areas, either the Contamination Reduction Zone (CRZ) or the Exclusion Zone, must be trained in the principles and practices of decontamination described in this chapter of the HASP and in related SOPs. If procedures are changed as a result of inspection and monitoring, all affected employees are notified of these changes.

F. References

(Picklist for Table 10-2a)

1. HEPA vacuum and filters Disposable face piece sanitizer wipes
2. Washtubs Buckets
3. Pressurized sprayer Scrub brushes
4. Solvent (Indicate Type) Detergent [Indicate Type]
5. Distilled water Household bleach solution [Indicate Dilution]
6. De-ionized water Wire brush
7. Facemask sanitizer powder Spray bottle
8. Banner/barrier tape Plastic sheeting
9. Tarps and poles Trash bags
10. Trash cans Masking tape
11. Duct tape Paper towels
12. Folding chairs Step ladders
13. 5-Gallon water jugs Tables

13.0 Emergency Response Plan

This is the site-specific emergency response plan. This chapter of the HASP describes potential emergencies at this site, procedures for responding to those emergencies, roles and under responsibilities during emergency response, and training that workers must receive in order to follow emergency procedures. This chapter also describes the provisions this site has made to coordinate its emergency response planning with other contractors on site and with off-site emergency response organizations.
This emergency response plan is consistent with the requirements of paragraph (l) of HAZWOPER and provides the following site-specific information:

1. Pre-emergency planning
2. On-site emergency response equipment and PPE
3. Emergency maps: evacuation routes and route to nearest hospital
4. Emergency roles and responsibilities
5. Emergency alerting and evacuation procedures
6. Emergency response procedures
7. Emergency decontamination, medical treatment and first aid
8. Response critique and plan updates
9. Emergency response training

During the development of the site-specific emergency response plan, local, state, and federal agency disaster, fire, and emergency response organizations must be contacted to ensure that the plan developed for the site is compatible and integrated with the plans of emergency organizations.

A. Pre-emergency Planning

Emergencies happen quickly and unexpectedly and require immediate response. At a hazardous waste site, an emergency may be as limited as a worker experiencing heat stress, or as vast as an explosion that spreads toxic fumes throughout a community. Any hazard on site can precipitate an emergency: chemicals, biologic agents, radiation or physical hazards may act alone or in concert to create explosions, fires, spills, toxic atmospheres, or other dangerous and harmful situations. The work site must be evaluated for potential emergency occurrences, based on project hazards, the tasks within the work plan, the layout of the work area or facility, and an emergency’s potential for complexity. The following is a list of some common causes of site emergencies:

1. Worker-Related
   a. Minor accidents (slips, trips, falls).
   b. Chemical exposure.
   c. Medical problems (host stress, heat stroke, aggravation of pro-existing conditions).
   d. Personal protective equipment failure, tearing or permeation of protective clothing, face piece fogging).
   e. Physical injury (injuries from hot or flying objects, loose clothing entangling in machinery, serious falls, vehicle accidents).
   f. Electrical (burns, shock, electrocution).

2. Waste-Related
   a. Fire.
   b. Explosion.
   c. Leak.
   d. Release of toxic vapors.
   e. Reaction of incompatible chemicals.
   f. Collapse of containers.
   g. Discovery of radioactive materials.
### Table 13.1 Potential Site Emergencies

<table>
<thead>
<tr>
<th>Type of Emergency</th>
<th>Source of Emergency</th>
<th>Location of Source</th>
</tr>
</thead>
</table>

B. On-Site Emergency Response Equipment

1. Emergency procedures may require specialized equipment to facilitate worker rescue, contamination control and reduction, or post-emergency clean-up. Emergency response equipment stocked on this site is listed in Table 13.2. The equipment inventory and storage locations are based on the potential emergencies described in Table 13.1. This equipment inventory is designed to meet on-site emergency response needs and any specialized equipment needs that off-site responders might require because of the hazards at this site.

2. Any additional PPE required and stocked for emergency response is also listed in Table 13.2 below. During an emergency, the Emergency Response Coordinator is responsible for specifying the level of PPE required for emergency response. At a minimum, personal protective equipment used by emergency responders will comply with Chapter 6, Personal Protective Equipment, of this HASP.

3. Emergency response equipment is inspected at regular intervals and maintained in good working order. The equipment inventory is to be replenished as necessary to maintain response capabilities.

<table>
<thead>
<tr>
<th>Specific Equipment</th>
<th>Quantity</th>
<th>Location</th>
</tr>
</thead>
</table>

### Table 13.2 Emergency Equipment & Emergency PPE

<table>
<thead>
<tr>
<th>Emergency Equipment</th>
<th>Specific Type</th>
<th>Quantity</th>
<th>Location</th>
</tr>
</thead>
</table>

C. Emergency Planning Maps

Figure 13-3a provides a map of the site with key on-site emergency planning information clearly marked. Emergency evacuation route(s), safe havens, muster points, and the locations of key site emergency equipment are identified on this map. Site zone boundaries are shown to alert responders to known areas of contamination. Major building, plant or geographical features that could affect emergency response planning are also marked on this map. Figure 13-3a is posted at site entry points and at locations throughout the work site. Figure 13-3b indicates the route to the nearest emergency medical assistance. Figure 13-3b is posted at the site bulletin board and in the site office.
D. Roles and Responsibilities for On-Site and Off-Site Personnel

The designated the Emergency Response Coordinator is responsible for implementing the emergency response plan and coordinates emergency response activities on this site. He/she provides specific direction for emergency action based upon information available regarding the incident and response capabilities based upon the level of emergency, and initiates emergency procedures, including protection of the public and notification of appropriate authorities.

The site may provide a combination of onsite and off-site emergency response. Emergency personnel may be deployed in a variety of ways. Depending on the nature and scope of the emergency, the size of the site, and the number of personnel, the emergency response may include individuals, small or large teams, or several interacting teams with the deployment determined on a site-by-site basis coordinated with the plant or facility owner and outside response agencies.

1. **On Scene Incident Commander**

Incident commanders, who will assume control of the incident scene beyond the first responder awareness level, shall receive at least 24 hours of training equal to the first responder operations level and in addition have sufficient training, experience and competency in the following areas:

a. Know and be able to implement the site specific incident command system.

b. Know how to implement the site specific emergency response plan.

c. Know and understand the hazards and risks associated with employees working in chemical protective clothing.

d. Know how to implement the local emergency response plan.
e. Know of the state emergency response plan and of the Federal Regional Response Team.

f. Know and understand the importance of decontamination procedures.

2. **Hazardous Materials Specialist**

   Hazardous materials specialists will respond and provide support to hazardous materials technicians. Their duties parallel those of the hazardous materials technician, however, they require a more directed or specific knowledge of the various substances they may be called upon to contain. The hazardous materials specialist would also act as the site liaison with Federal, state, local and other government authorities in regards to site activities. Hazardous materials specialists shall have received at least 24 hours of training and have sufficient experience and competency in the following areas:

   a. Know how to implement the site specific emergency response plan.
   b. Understand classification, identification and verification of known and unknown materials by using advanced survey instruments and equipment.
   c. Knowledge of the state emergency response plan.
   d. Be able to select and use proper specialized chemical personal protective equipment provided to the hazardous materials specialist.
   e. Understand in-depth hazard and risk techniques.
   f. Be able to perform specialized control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available.
   g. Be able to determine and implement decontamination procedures.
   h. Have the ability to develop a site safety and control plan.
   i. Understand chemical, radiological and toxicological terminology and behavior.

3. **Hazardous Materials Technician**

   Hazardous materials technicians respond to releases or potential releases for the purpose of stopping the release. They assume a more aggressive role than a first responder at the operations level in that they will approach the point of release in order to plug, patch or otherwise stop the release of a hazardous substance. Hazardous materials technicians will receive at least 24 hours of training and have sufficient experience and competency in the following areas:

   a. Know how to implement the site specific emergency response plan.
   b. Know the classification, identification and verification of known and unknown materials by using field survey instruments and equipment.
   c. Be able to function within an assigned role in the Incident Command System.
   d. Know how to select and use proper specialized chemical personal protective equipment provided to the hazardous materials technician.
   e. Understand hazard and risk assessment techniques.
   f. Be able to perform advance control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available.
   g. Understand and implement decontamination procedures.
   h. Understand termination procedures.
   i. Understand basic chemical and toxicological terminology and behavior.

4. **First Responder Operations Level.**

   First responders at the operations level are individuals who respond to releases or
potential releases of hazardous substances as part of the initial response to the site for
the purpose of protecting nearby persons, property, or the environment from the
effects of the release. They are trained to respond in a defensive fashion without
actually trying to stop the release. Their function is to contain the release from a safe
distance, keep it from spreading, and prevent exposures. First responders at the
operational level will receive at least eight hours of training and have sufficient
experience and competency in the following areas:

a. Knowledge of the hazardous substances and risks associated with them in an
   incident.
b. Knowledge of the potential outcomes associated when the hazardous
   substances are present.
c. The ability to recognize and identify hazardous substances in an emergency, if
   possible.
d. Knowledge of the basic hazard and risk assessment techniques.
e. Know how to select and use proper personal protective equipment provided to
   the first responder operational level.
f. An understanding of basic hazardous materials terms.
g. Know how to perform basic control, containment and/or confinement
   operations within the capabilities of the resources and personal protective
   equipment available with their unit.
h. Know how to implement basic decontamination procedures.
i. An understanding of the relevant standard operating procedures and
   termination procedures.

5. **First Responder Awareness Level.**

First responders at the awareness level are individuals who are likely to witness or
discover a hazardous substance release and who have been trained to initiate an
emergency response sequence by notifying the proper authorities of the release. At this
level, no further action beyond notifying the authorities of the release is to be taken.

First responders at the awareness level must have sufficient training, experience and
competency in the following areas:

a. Knowledge of the hazardous substances and risks associated with them in an
   incident.
b. Knowledge of the potential outcomes associated when the hazardous
   substances are present.
c. The ability to recognize and identify hazardous substances in an emergency, if
   possible.
d. Understand the role of the first responder awareness as part of the overall
   emergency response plan.

Outside organizations listed in Table 13-4, Emergency Contact Information, may
respond to site emergencies that are not addressed by site personnel. These
organizations have been provided a copy of the site HASP; have been thoroughly
briefed on site operations, hazards, and potential emergencies; have participated
in a site walk-through if necessary; and are appropriately trained, staffed, and
equipped to provide emergency response to this site. These organizations are
contacted at least semi-annually or when changes in operations or new potential
hazards are introduced on site to verify the accuracy of phone numbers and
contact names and to ensure that current points of contact are aware of site operations and hazards.

<table>
<thead>
<tr>
<th>SITE PERSONNEL</th>
<th>Contact</th>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Include the Emergency Response Coordinator and the roles/title of all site personnel that are responsible for sounding the employee alarm system, calling outside assistance, or conducting limited emergency response activities.)</td>
<td>(Identify the individual with the role or title.)</td>
<td>(List the phone number of the individual with the role or title.)</td>
</tr>
<tr>
<td>OUTSIDE ASSISTANCE</td>
<td>Contact</td>
<td>Address/Location</td>
</tr>
<tr>
<td></td>
<td>(Identify a contact name or title for each of the following agencies or groups)</td>
<td>(Identify address or location of each of the following agencies or groups, if applicable)</td>
</tr>
<tr>
<td>Chemtrec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambulance/EMS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Police</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Police</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local Emergency Response Agency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary Medical Facility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary Medical Facility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poison Control Center</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regional EPA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPA Emergency Response Team</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Authority</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Response Center</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center for Disease Control</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### E. Emergency Alerting and Evacuation

1. Upon discovering an emergency situation, personnel notify (insert name and/or title), who will evaluate available information and initiate an appropriate response. Site workers are alerted to emergencies through the use of an employee alarm system. The employee alarm systems at this site are listed in Table 13-5.
Table 13-5 Employee Alarm Systems

<table>
<thead>
<tr>
<th>Type of Alarm</th>
<th>Location</th>
<th>How Alarm is Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Insert type of employee alarm system. If there is more than one alarm or alarm sound, then insert rows as appropriate)</td>
<td>(Insert the location of the alarm(s))</td>
<td>(Use this column to differentiate when multiple alarms or alarm sounds are used. You may also provide a physical description of how the alarm is actuated.)</td>
</tr>
</tbody>
</table>

2. This alarm system meets the requirements of 29 CFR 1910.165 and is tested (insert the text interval, e.g., weekly, monthly) under normal site operating conditions to ensure that it is in good working order and can effectively alert all persons on-site. A log of alarm tests is kept by (insert name and/or title).

3. If an evacuation notice is given, site workers leave the worksite with their respective buddies, if possible, by way of the nearest exit. Emergency decontamination procedures detailed in Chapter 10 (Decontamination) of this HASP are followed to the extent practical without compromising the safety and health of site personnel.

4. Appropriate primary and alternate evacuation routes and assembly areas have been identified and are shown on the Emergency Response Map Fig 11-3a. The routes and assembly area will be determined by conditions at the time of evacuation based on the location of the hazard source and other factors as determined by rehearsals and inputs from emergency response organizations.

5. If any work will be done outside, wind direction indicators will be located so that workers can determine a safe up wind or cross wind evacuation route and assembly area if not informed by the Emergency Response Coordinator at the time the evacuation alarm sounds.

6. Personnel exiting the site gather at a designated assembly point. To determine that everyone has successfully exited, personnel will be accounted for at the assembly site. If any worker cannot be accounted for, notification is given to the Emergency Response Coordinator so that appropriate action can be initiated.

7. Contractors and subcontractors on this site have coordinated their emergency response plans to ensure that these plans are compatible and that source(s) of potential emergencies are recognized, alarm systems are clearly understood, and evacuation routes are accessible to all personnel relying upon them.

F. Emergency Response

1. The Emergency Response Coordinator (or designee), after investigating the incident and reviewing relevant information, determines the level of response required for containment, rescue, medical care, and clean-up. The appropriate emergency response team (on-site or off-site) is mobilized to the incident with sufficient personnel, PPE, and emergency equipment.

2. When the Emergency Response Coordinator (or designee) determines that on-site emergency response capability is inadequate for the emergency or that outside assistance is required, the applicable off-site organization shown in Table 11-4 is
contacted. The Emergency Response Coordinator (or designee) provides relevant information to the responding organizations, including hazards associated with the emergency incident, potential containment problems, and missing site personnel.

G. Emergency Decontamination, Medical Treatment and First Aid
1. Site provisions for medical services and first aid are consistent with 1910.151 as well as HAZWOPER.
2. The site will provide a sufficient number of workers with current first aid certification assigned to provide first aid during each shift. Because of this practice, the site has an exposure control plan in accordance with OSHA’s blood borne pathogens standard, 1910.1030 (c)(1)(i).
3. The primary medical care facility for this site is to be posted onsite as well as listed in the Hazwopper plan. The route to the facility is shown in Figure 13-3b.
4. Site personnel who are contaminated and need medical treatment will be decontaminated before treatment is provided and/or before being transported to a medical facility if decontamination does not delay life-saving treatment, interfere with essential treatment, or aggravate the injury.
5. When emergency decontamination is performed, contaminated protective clothing and equipment is washed, rinsed and/or cut off. If an emergency victim is grossly contaminated with extremely toxic or corrosive material, the victim will be wrapped in blankets, plastic, or rubber before any first aid or medical treatment is performed to reduce potential exposure to other personnel.
6. Personnel who provide first aid and offsite medical treatment will be alerted to the chemicals and hazards to which a victim has been potentially exposed. This will be done by sending relevant MSDSs and other applicable hazard data with the victim or by having the victim accompanied by personnel who are familiar with the incident and the hazards.

H. Post Emergency Response Operations
1. Upon completion of the emergency response, if it is determined that it is necessary to remove hazardous substances, health hazards, and materials contaminated with them, such as contaminated soil, water or other environment contamination, Preferred Industrial Contractors, Inc. will develop and implement a site specific health and safety plan for dealing with any cleanup activities that are necessary.
2. Emergency Response Critique and Plan Updates
   a. After every emergency incident or evacuation of this site, the Emergency Response Coordinator (or designee) will evaluate the quality and safety of response activities. Any deficiencies in response actions will be included in a specific follow-up plan and corrected.
   b. This emergency response plan is evaluated periodically throughout site operations and updated for accuracy. Changes made to emergency response procedures as the result of rehearsals or actual response incidents are recorded in this Plan. Site workers receive notification and training on changes to the Plan (identify the method used to communicate changes in the Plan, e.g., during daily site briefings).

I. Emergency Response Training
1. All persons who enter this worksite, including visitors, receive a site-specific briefing about anticipated emergency situations and the emergency
procedures.

2. Prior to the commencement of work and in accordance with Section 4, Training, site personnel are trained in the contents of this emergency response plan, including potential emergencies, personnel roles and responsibilities, evacuation routes and procedures, and the location of medical assistance.

3. Site personnel designated as emergency responders are trained how to respond to expected emergencies safely, in accordance with 29 CFR 1910.120(e)(7). Training shall be based on the duties and function to be performed by each responder of an emergency response organization.

4. Additionally, site workers participate in emergency response rehearsals as required in HAZWOPER paragraph (l)(3)(iv). Off-site emergency response organizations participate in the rehearsals as necessary. Rehearsals are held every (insert time interval). A log of the rehearsals is kept by the Emergency Response Coordinator.

5. Where this site relies on off-site organizations for emergency response (see Table 11-3), the training of personnel in those off-site organizations has been evaluated and is deemed adequate for response to this site.

6. The site maintains written up-to-date certification of the successful completion of applicable training requirements of each worker. Training records are maintained onsite.
1.0 Scope

Purpose

A. The purpose of this plan is to minimize the potential for worker exposure to Cadmium in a manner, which is consistent with the requirements set forth by OSHA 29 CFR Parts 1910.1027 and 1926.1127. With a few exceptions, the Cadmium standard for
Construction, i.e., 29 CFR 1926.1127 is the compliance standard that applies to all Preferred Industrial Contractors, Inc. projects.

B. The EHS Department will be responsible for reviewing the written program annually or at more frequent intervals based upon exposure levels and any changes to the compliance status.

2.0 Applicability
This plan is applicable to all of the company’s construction projects, unless superseded by a client’s standard, including all Greenfield and brownfield projects, maintenance, alteration, and repair work where employees may be exposed to hexavalent chromium and chromium compounds.

3.0 Authority / Reference
29 CFR 1926.1126 is the governing standard for this plan.

4.0 Definitions
A. **Action Level** - Employee exposure, without regard to the use of respirators, to an airborne concentration of Cadmium of 2.5 micrograms per cubic meter of air (2.5 μg/m3) calculated as an eight-hour time-weighted average (TWA).

B. **Competent Person** - means a person designated by the employer to act on the employer's behalf who is capable of identifying existing and potential cadmium hazards in the workplace and the proper methods to control them in order to protect workers, and has the authority necessary to take prompt corrective measures to eliminate or control such hazards.

C. **Permissible Exposure Limit** - The PEL for Cadmium is 5 ug/m3 averaged over an 8-hour time period. If an employee is exposed to Cadmium for more than eight hours in any work day, the permissible exposure limit, as a time weighted average (TWA) for that day, will be reduced according to the following formula: Allowable employee exposure (μg/m3) = 40 divided by hours worked in that day.

D. **Cadmium** - In its elemental form, cadmium is either a blue-white metal or a grayish-white powder found in lead, copper, and zinc sulfide ores, but most cadmium compounds are highly colored from brown to yellow and red. Cadmium's uses vary from an electrode component in alkaline batteries to a stabilizer in plastics.

E. **Employee Exposure** - means exposure to Cadmium that would occur if the employee were not using a respirator. Thus, exposure levels should be determined outside of the respirator for those employees wearing a respirator.

5.0 Cadmium Sources and Activities
A. Cadmium is a naturally occurring element found in the earth’s crust and was discovered in 1817, but it was not used commercially until the end of the 19th century. This soft, silver-white metal was first used in paint pigments and as a substitute for tin in World War I. Today, about three-fourths of cadmium is used as an electrode component in alkaline batteries, with the remainder used in pigments, coatings, and platings, and as a stabilizer for plastics.

B. Workers in many industries face potential exposure to cadmium. The potential for exposure is highest among workers in electroplating, metal machining, plastics, ceramics, paint, and welding operations. The main exposure routes are through inhalation of dust and fumes and the incidental ingestion of dust from contaminated hands, food, or cigarettes.

C. Workers may also be exposed to cadmium from the smelting and refining of metals or from air in industrial plants that manufacture batteries, coatings, or plastics.
D. The potential for exposure is dependent upon the activity involving the Cadmium containing material. If the proposed activity does not produce cadmium-containing fumes and has a low potential for causing surface cadmium contamination, then the overall potential for Cadmium exposure is probably very low.

6.0 Determining the Presence of Cadmium in The Workplace

A. The presence of Cadmium may be determined by the scope of work, material safety data sheets, historic records, methods of work, or bulk sampling and analysis. Coatings and other treatments, which are suspected of containing Cadmium or Cadmium pigments must be tested to verify Cadmium content before commencing any work that may result in an occupational exposure.

B. If the potential for Cadmium exposure is present in the workplace, Preferred Industrial Contractors, Inc. will develop a site-specific compliance program to include engineering and respiratory programs to achieve compliance with the PEL. Exposure assessments will be conducted for all jobs covered by the Cadmium standard to determine the 8-hour TWA of each employee individually or by representative exposure sampling.

C. Conducting the Exposure Assessment

1. Initial employee exposure monitoring is to be performed to determine if the exposure level will exceed the action level of 2.5 ug/m³ as an 8-hour TWA. PIC, Inc. will conduct initial exposure monitoring to determine employee exposure to Cadmium. This monitoring is performed by sampling the air within the employee’s breathing zone. Representative exposure sampling is permitted when a number of employees perform essentially the same job under the same conditions. Representative personal sampling for employees engaged in similar work involving similar Cadmium exposures is achieved by monitoring the employee(s) reasonably expected to have the highest Cadmium exposures.

2. Exposure monitoring will require that at least one sample be taken for each job classification in each work area demonstrating the highest potential exposure. The sampling must be performed for the entire shift and be representative of the employee's daily exposure. Until initial employee exposure assessments are determined the employee shall be treated as if exposure is above the PEL and personal protective measures will be taken accordingly.

3. If the initial exposure monitoring results indicate no employee exposure at or above 2.5 ug/m³ Cadmium, no further sampling is required unless there is a change in equipment, personnel, materials or work practices. If the initial monitoring shows exposure at or above 2.5 ug/m³ but below 5 ug/m³, personal exposure sampling must be performed every six months. Results in excess of 5 ug/m³ will require personal exposure sampling quarterly (see 29 CFR 1926.1127).

4. Personal breathing zone air samples representative of a full shift exposure will be conducted initially for all similar exposure groups. Samples will be collected in accordance with the Occupational Safety and Health Administration (OSHA) Method ID-215, or equivalent, under conditions that represent each employee’s regular daily exposure to hexavalent chromium.

5. If new equipment is added, raw materials are changed, new personnel are hired, work practices and final products are altered that may result in additional employees
being exposed to cadmium at or above the action level or there is reason to suspect that exposure to cadmium may increase and employees already exposed to cadmium at or above the action level will be exposed above the PEL, additional air monitoring should be undertaken.

D. Employee Notification
Within 5 working days after completion of the exposure assessment, employees shall be notified in writing of the results of their exposure, and the corrective measures taken to reduce that exposure (see 29 CFR 1926.1127 (d)(5)).

7.0 Engineering Controls
A. Engineering controls and work practice controls must be utilized where feasible in order to reduce and maintain employee exposure to Cadmium to or below the PEL. Examples of engineering controls are; substitution (e.g., using a less toxic material instead of Cadmium, or substituting a process that results in lower exposures for another type of process that results in higher exposures); Isolation (e.g., enclosing the source of exposure, or placing a barrier between employees and the source of exposure); and Ventilation (e.g., local exhaust systems that capture airborne Cadmium near its source and remove it from the workplace, or general ventilation that dilutes Cadmium concentrations by circulating large quantities of air.

B. Ventilation needs will vary based on the type of operation. Below are some of the recommended engineering control methods that may be used to reduce exposure levels during welding or cutting operations.
1. Dilution ventilation
2. Negative air equipment and filtration system for containment areas.
3. Source capture using air cleaning devices

C. Ventilation systems will be properly maintained to provide maximum efficiency. Procedures will be developed and implemented to minimize employee exposure to cadmium when performing maintenance on ventilation systems and changing of filters.

8.0 Respiratory Protection
A. Engineering and work practice controls are the most effective and required methods to control Cadmium exposures. Where engineering control is not feasible or is inadequate appropriate respiratory protection together with the feasible engineering controls are to be implemented.

B. Respirators are to be provided as interim protection during the exposure assessment and when engineering or work practices are insufficient to reduce the employee exposure levels to or below the PEL. Employees may request the use of a respirator even if the levels are below the PEL.

C. All negative pressure respirators shall be fitted with P100 filters. Quantitative or qualitative fit tests shall be performed at the time of initial fitting and annually thereafter.

D. Respirators in use must be approved by the Mine Safety and Health Administration (MSHA) and the National Institute of Occupational Safety and Health (NIOSH). Respirators in use must be properly selected and fit tested. Powered, positive pressure air purifying respirators shall be provided to any employee that requests one. In addition, a respiratory protection program is to be implemented (Refer to Section 35 Procedure 35.4) which is to include the following:
   1. Establish written standard operating procedures using Section 35 Procedure 35.4
for the selection and use of respirators on the project.

2. Respirators are to be selected on the basis of the hazards to which the worker is to be exposed.

3. Employees are to be trained in the proper use of respirators and their limitations. Training is to include demonstrating how to wear, adjust and check for proper fit of the respirator.

4. Respirators are to be regularly cleaned and disinfected. If possible, respirators are to be assigned to individual employees. Those respirators used by more than one worker are to be cleaned and disinfected after each use.

5. Respirators are to be stored in a convenient, clean and sanitary location.

6. Respirators are to be routinely inspected during cleaning. Worn or deteriorated parts are to be replaced or the respirator disposed of.

7. Appropriate surveillance of work area conditions, and the degree of employee exposure or stress is to be maintained.

8. The respiratory program is to be regularly inspected and evaluated for its effectiveness.

9. Employees shall not be assigned to tasks requiring the use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. The local physician shall determine what health and physical conditions are pertinent.

9.0 Respirator Selection
Once the criteria for the use of respirators, as specified in the Cadmium OSHA standard have been met, one can use the table below to guide in the selection process. It is important to remember that HEPA filters are the minimum permitted when a protection factor of 10 is acceptable against Cadmium particulates. (A HEPA filter is one that is at least 99.97 percent efficient against particles that are 0.3um in diameter). However, there maybe certain conditions where air monitoring results or the type of work indicates that a more protective respirator is needed.

10.0 Respirator Fit Testing
A. All negative pressure respirators must be subjected to a negative pressure fit-test to ensure a proper face seal.

B. Prior to using a respirator, a valid qualitative fit-test (QLFT) or a quantitative fit-test (QNFT) must be conducted. A QLFT must only be used for testing the fit of half-mask respirators. Both QLFT and QNFT must be done in accordance with 29 CFR 1910.134.

C. Respirator fit-testing using QLFT or QNFT must be completed before beginning any job falling under the hexavalent chromium compliance program where respirators are required. Annual respirator fit recertification is required thereafter.

D. Quantitative fit testing may also be available in areas through accredited fit-testing organizations.

11.0 Respirator Filter Cartridge Change-Out Schedule
A respirator filter cartridge change-out schedule for the respirators used in during Cadmium work will be based on expected usage. However, if increased resistance is experienced during use respirator filter cartridge should be changed out. It is acceptable and safe to use increased breathing resistance with this HEPA filter as an early indicator for change-out.
12.0 Training and Information - Respirator Use
   All respirator users must be trained in the limitations, fitting, usage, cleaning, maintenance, care and storage of their respirators.

13.0 Personal Protective Clothing and Equipment
   A. When there is a possible employee exposure to Cadmium, or when there is the possibility of skin or eye irritation from the work environment, then appropriate protective clothing and equipment is to be provided. This can include but not be limited to coveralls, or full body protection, gloves, hats, shoes and appropriate eye and face protection. Some examples of disposable clothing include: Tyvec 101-1985 or Pyrlon Limited Use Flame Retardant Garments.
   B. Contaminated clothing that is to be disposed of will be placed into labeled closed containers. The container will read:
      CAUTION: CLOTHING CONTAMINATED WITH CADMIUM. DO NOT REMOVE DUST BY BLOWING OR SHAKING. DISPOSE OF CONTAMINATED WASH WATER IN ACCORDANCE WITH APPLICABLE FEDERAL, LOCAL OR STATE REGULATIONS.
   C. Employees are to be instructed that they are not to remove Cadmium from their protective clothing or equipment by blowing, shaking or any other means, which will disperse lead into the air.
Table 1: Respiratory Protection for Cadmium

<table>
<thead>
<tr>
<th>Airborne Concentration</th>
<th>Required Respirator Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 10 times the PEL</td>
<td>A half mask, air purifying equipped with a high-efficiency particulate air (HEPA) filter.</td>
</tr>
<tr>
<td>Up to 25 times the PEL</td>
<td>A powered air-purifying respirator (PAPR) with a loose-fitting hood or helmet equipped with a HEPA filter or a supplied-air respirator with a loose-fitting hood or helmet face piece operated in the continuous flow mode.</td>
</tr>
<tr>
<td>Up to 50 times the PEL</td>
<td>A full face piece air-purifying respirator equipped with a HEPA filter or a powered air-purifying respirator with a tight-fitting half mask equipped with a HEPA filter or a supplied-air respirator with a tight-fitting half mask operated in the continuous flow mode.</td>
</tr>
<tr>
<td>Up to 250 times the PEL</td>
<td>A powered air-purifying respirator with a tight fitting full-face piece equipped with a HEPA filter or a supplied-air respirator with a tight-fitting full-face piece operated in the continuous flow mode.</td>
</tr>
<tr>
<td>Up to 1,000 times the PEL</td>
<td>A supplied air respirator with half mask or full-face piece operated in the pressure demand or other positive pressure mode.</td>
</tr>
<tr>
<td>More than 1,000 times the PEL or unknown levels</td>
<td>A self-contained breathing apparatus with a full face piece operated in the pressure demand of concentration or other positive pressure mode, or a supplied air respirator with a full-face piece operated in the pressure demand or other positive pressure mode and equipped with an auxiliary escape type self-contained breathing apparatus operated in the pressure demand mode.</td>
</tr>
</tbody>
</table>
14.0 Housekeeping
A. As with any project, each employee has the responsibility to maintain good housekeeping practices in their work areas. (Refer to Section 17). All surfaces are to be maintained as free as possible from accumulations of Cadmium dusts. Compressed air is not to be used as a method of cleaning since it will easily disperse fine dust particles. Vacuuming is the preferred method, with shoveling, brushing, and dry or wet sweeping used only when vacuuming or other equally effective methods have been tried and are insufficient.

B. The work area where exposure to Cadmium is possible shall be barricaded and warning signs placed frequently around the barricade to warn other employees.

C. When full, waste containers will be taped closed, decontaminated if necessary, and moved to the disposal or staging area.

D. Large quantities of flammable or combustible wastes should not be allowed to accumulate. Such wastes should be kept away from hot lights, flames, sparks, and other ignition sources.

15.0 Medical Surveillance
A. Medical surveillance must be provided to employees who are exposed to Cadmium at or above the action level (2.5 μg/m³ Cadmium as an 8-hour time-weighted average) for 30 or more days a year;

B. Medical surveillance begins with an initial examination for each employee covered by this requirement within 30 days of employment in a position that involves exposure to cadmium. All medical examinations must be performed by or under the supervision of a physician or other licensed health care professional (PLHCP) who is familiar with the regulatory text of the cadmium standard, including appendices, that provide details on health effects and protocols for sample handling and laboratory selection. Employees have the option to seek a second medical opinion to review any findings, determinations, or recommendations or to conduct additional examinations, consultations, or laboratory tests.

C. Medical surveillance is provided at no cost to employees and at a reasonable time and place consists of:
   1. A medical and work history which focuses on: the employee’s past, present, and anticipated future exposure to Cadmium;
   2. History of renal, cardiovascular, respiratory, hematopoietic, reproductive or musculoskeletal system dysfunction.
   3. Current use of medication with potential nephrotoxic side effects
   4. Smoking history and current status.

D. Biological Monitoring
   1. Cadmium in urine (CdU), standardized to grams of creatinine g/Cr)
   2. Beta-2 microglobulin in urine (β2-M), standardized to grams of creatinine (g/Cr), with pH specified
   3. Cadmium in blood (CdB), standardized to liters of whole blood (lwb)
   4. Levels at or below the trigger levels specified require only the minimum level of periodic medical surveillance, which includes a follow-up exam within one year of the initial exam and a periodic exam every two years from that point forward. Biological sampling must be provided at least annually.
   5. Trigger levels for medical surveillance:
a. CdU level: at or below 3 u/g Cr  
b. β2-M level: at or below 300 u/g Cr  
c. CdB level: at or below 5 u/lwb  

6. If the initial biological monitoring tests for an employee indicate levels exceeding any of the trigger amounts, the employee’s occupational exposure to cadmium will be reassessed within two weeks of receiving the initial test results. The reassessment will include a reevaluation and reassessment of the employee’s work practices and personal hygiene, respirator use (if any) and respirator program, smoking history and current usage, as well as available hygiene facilities and the engineering controls in use. Deficiencies found during the reevaluation are to be corrected.

7. Biological test results indicating elevated levels relative to the trigger amounts noted above require the employee to receive a full medical examination within 90 days after the results from the initial testing are obtained. At this point, the examining physician should make the decision whether to medically remove the employee from cadmium exposure. If the physician decides not to medically remove the employee, biological monitoring must continue on a semiannual basis along with an annual medical exam.

E. Medical Removal  
1. If an employee’s biological testing results during both the initial and follow-up medical examination are elevated above the following trigger levels, that employee must be medically removed from any work where the exposure to cadmium is at or above the action level:  
a. CdU level: above 7 u/g Cr  
b. CdB level: above 10 u/liter of whole blood  
c. β2-M level: above 750 u/g Cr  
d. CdU exceeds 3 μg/g Cr or  
e. CdB exceeds 5 μg/liter of whole blood  

2. Employee removal is mandatory if the second set of biological monitoring results indicates that one of the above mandatory removal trigger levels is exceeded. The employee will be monitored on a quarterly basis along with semiannual medical examinations until such time as the employee’s levels fall within the acceptable trigger levels for medical surveillance. Employee removal is also required if the examining physician determines that the employee needs removal from exposure to cadmium based on other findings during the examination regardless of the above testing results.

F. Required periodic medical exams  
1. The minimum level of medical surveillance for employees who face exposure to cadmium but who do not test above trigger limits during biological sampling includes an exam within one year after the initial exam and thereafter an exam at least every two years. This exam must include the following:  
a. Detailed medical and work history.  
b. Complete physical examination, emphasizing blood pressure, the respiratory system, and the urinary system.  
c. A 14 x 17 inch or a reasonably sized posterior-anterior chest x-ray (frequency to be determined by the examining physician).  
d. Pulmonary function tests.  
e. Blood analysis.
f. Urinalysis.
g. Prostate exam for males over 40 years old.
h. Other tests deemed appropriate by the physician.

2. Annual biological sampling is required, either as part of the medical exam or separately as periodic biological monitoring. When an employee who has been previously provided with medical surveillance is terminated or voluntarily leaves employment, an exit medical examination that includes a chest x-ray will be performed. If the last periodic or other required exam was less than six months prior to the date of termination or departure, no further exam is required.

16.0 Training

A. To protect against illnesses and injuries from Cadmium exposures, it is critically important that employees recognize the hazards associated with exposure to Cadmium and understand the measures they can take to protect themselves. Any employee who is involved in any work where there is a hazard of Cadmium exposure is to receive appropriate training. Training will be provided prior to assignment and at least annually thereafter. Training will depend upon the type of work to be performed and the measured and/or anticipated exposure; however, in all cases the training plan is to include:
   1. The contents of the 29CFR 1926.1127 cadmium standard and its appendices including the adverse health hazards of cadmium exposure.
   2. The specific nature of the operations, which could result in exposure to cadmium above the Action Level.
   3. The engineering controls and work practices which will be used to reduce the cadmium exposure, including any operation and maintenance procedures needed for the ventilation system to be used.
   4. The selection, fitting, use and limitations of the respirators, which will be used for the work.
   5. The purpose of the medical surveillance program and a description of the medical removal program, if applicable.

B. In addition, employees are to receive additional training concerning the chemical and physical hazards associated with the performance of specific job duties and classifications... This training is to consist of but not be limited to:
   1. OSHA Standards General Health And Safety
   2. Material Handling
   3. Ladders And Scaffolding
   4. Health Hazards And Personal Protective Equipment
   5. Electrical Safety
   6. Welding, Cutting, Grinding
   7. Tools
   8. Hazard Communication

C. Proper documentation will be made each time this training is given and will contain the following:
   1. Identity of the employee
   2. The Identity and signature of the person conducting the training
3. Date the training was performed.
D. All Training records are to be maintained for 1 year.
E. A copy of OSHA Cadmium Standard 29 CFR 1926.1127 must be made available upon an employee request.
F. A copy of the written program will be made available upon request to affected employees, their representatives, the Assistant Secretary and the Director.

17.0 Recordkeeping
All employee exposure sampling and medical records shall be maintained for the duration of employment plus 30 years.

18.0 Emergency Procedures
A. If the potential for Cadmium exposure is present in the work place, Preferred Industrial Contractors, Inc. as part of the site-specific compliance program will include an emergency response plan prepared for emergency situations involving substantial releases of airborne cadmium. The plan will include conditions for the use of appropriate respirators and personal protective equipment, and work practice controls. Employees not essential to emergency response shall be evacuated from site and restricted from the area until the emergency is abated.
B. Site personnel who are contaminated and need medical treatment will be decontaminated before treatment is provided and/or before being transported to a medical facility if decontamination does not delay life-saving treatment, interfere with essential treatment, or aggravate the injury.
C. Personnel who provide first aid and offsite medical treatment will be alerted to the chemicals and hazards to which a victim has been potentially exposed. This will be done by sending relevant MSDSs and other applicable hazard data with the victim or by having the victim accompanied by
43.0 - Hot Work On Containers And Piping Systems

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1.0 Scope
Explosions, fires and health hazards may result if welding, cutting or other hot work is performed on containers that contain hazardous substances, such as combustible, reactive, or toxic solids, liquids, vapors, dusts and gases. No container or piping system should be presumed to be clean or safe, but containers can be made safe for work by identifying potential hazards and the required protective systems necessary to control hot work. This section provides guidelines to ensure that containers, pipelines and work area are safe for welding and cutting. The guidelines are intended to protect personnel and equipment by ensuring that the hazards are understood and adequate precautions are properly taken. The qualified person responsible for the work done on the container or pipeline should ensure that adequate safety precautions are followed.

2.0 Applicability
This procedure is applicable to all of the company’s construction projects, unless superseded by a client’s standard, including all greenfield and brownfield projects, maintenance, alteration and repair work where it is necessary to weld, burn or cut into existing metal containers and piping. Cleaning of used containers and/or piping systems are necessary in all cases before starting hot work.
3.0 Authority/References
A. 29 CFR 1926. Subpart J Welding & Cutting is the governing standard for this plan.
B. Preferred Industrial Contractors, Inc. Safety, Health & Environmental Manual (Section 31)
   Welding & Cutting
C. Alcoa EHS Standards 18.14 – Welding and Cutting Containers
D. American Welding Society F4.1 – Recommended Safe Practices for the Preparation for
   the Welding and Cutting of Containers and Piping

4.0 Exceptions
Recognizing that a safety procedure cannot be written to manage every conceivable hazard and
situation, a mechanism is needed to authorize exceptions. An exception does not negate or
disregard the intent of a procedure; it is a means for developing, documenting and communicating
an alternate hazard mitigation plan. Exceptions are written against specific requirements within a
procedure; exceptions should be few and far between. All exception requests will be thoroughly
reviewed, scrutinized and challenged by the appropriate superintendent, manager and the Safety
Department Personnel.

5.0 Definitions
A. Hazardous Substances - Hazardous substances include but are not limited to those that
   are explosive, combustible, toxic or corrosive. They may be present in a container or
   piping system having previously held one of the following:
   1. A volatile liquid that can release potentially hazardous flammable or toxic vapors
      or any combination thereof.
   2. An acid or alkaline material that reacts with metals to produce hydrogen.
   3. A nonvolatile liquid or solid that at ordinary temperatures will not release
      potentially hazardous vapors, but will do so if the container is heated. For
      example vapors or fumes that may be generated by the heat of welding or cutting.
   4. A dust cloud or finely divided airborne particles that may be present in an
      explosive concentration.
   5. A flammable or toxic gas.
B. Competent Person - means a person designated by the employer to act on the employer's
   behalf who is capable of identifying existing and potential hazards in the workplace and
   the proper methods to control them in order to protect workers, and has the authority
   necessary to take prompt corrective measures to eliminate or control such hazards.
C. Lower Explosive Limit (LEL) – The minimum concentration of vapor or gas in air
   below which a flame is not propagated on contact with an ignition source.
D. Flash Point. – The flash point of a liquid is the lowest temperature at which the liquid
   releases vapor in sufficient amount to form an ignitable mixture with air near its surface.
E. Hot Work - Hot work is defined as any work that will generate sufficient heat to ignite
   flammable materials. Examples of hot work include, but are not limited to welding,
   flame cutting, grinding, abrasive blasting, needle gun work, using heaters, electrical tools,
   battery operated tools, arcing devices, opening explosion proof enclosures and/or purged
   enclosures and mobile equipment operation. The use of pagers, cellular phones, radios,
   personal data assistants (PDA's, such as Palm Pilots), flashlights, battery powered test
   equipment and cameras may be considered hot work unless this equipment carries the
   appropriate UL intrinsically safe electrical classification. In general, the use of hand tools,
pneumatic wrenches, and water-cooled cutting, would not be considered hot work. However, personnel should evaluate the actual working conditions and if the potential exists for easily ignitable vapors to be present, then appropriate measures should be taken. Appropriate measures may include performing gas testing for flammable materials, mechanical ventilation systems, or full use of the hot work permit.

F. **Fire Watch** - An individual dedicated to monitoring the hot work site for any change in conditions or for signs of fires including small or smoldering fires. A fire watch is responsible for shutting the job down if a hazardous situation develops, for activating fire protection equipment and for summoning emergency responders if necessary. Following the completion of hot work, the fire watch must survey the work area for any sign of small or smoldering fires; potential ignition sources must be removed or controlled. If appreciable combustible materials within 35’ of the hot work site could not be removed or protected during the hot work, the fire watch must remain on site for 30 minutes.

### 6.0 Determination of Hazardous Contents

Before any container can be cleaned, the hazardous characteristics of the substance previously held by the container should be determined by a qualified person. The container label should not be solely relied upon to identify its contents. When in doubt, sampling and analytical tests should be made to determine the identity of the material. Applying an improper cleaning method might remove the hazardous substance from the container, or it might cause a more hazardous substance to be produced.

### 7.0 Container Location

The container should be moved outdoors, if practical. If the container is cleaned indoors the room should be well ventilated so that hazardous vapors will not accumulate and will be moved away from the worker’s breathing zone quickly and safely.

### 8.0 Container Contents

The container or piping system should be emptied and drained thoroughly, including all internal piping, traps, and standpipes. Sludge and sediment should be removed. All residue and used cleaning agents should be disposed or in an environmentally safe manner according to local, state, and federal regulations. The same safe practices should be used on adjacent or interconnected container compartments regardless of which compartment is to be welded.

### 9.0 Unknown Substances

Cleaning and welding a container or piping that has held unknown substances should not be done since this practice involves unknown risk. If the source and content of the material in the container cannot be determined, and if a chemical analysis cannot be performed, the container should be disposed of in an environmentally responsible manner according to local, state, and federal regulations.

### 10.0 Qualified Personnel

Qualified personnel should designate the cleaning procedure to assure that the cleaning can be carried out safely in an environmentally responsible manner that can render the container free of all hazardous materials. Cleaning of containers that have held hazardous materials must be performed by qualified personnel familiar with the hazardous characteristics of the contents and the proper method of cleaning.
11.0 Other Precautions
Appropriate steps should be taken to protect personnel cleaning the container against exposure to hazardous substances that may be present during the cleaning operation. Many times the cleaning material itself can pose a hazard. Safely equipment may include, but is not limited to; an airline respirator or appropriate cartridge respirator, rubber apron, face shield, impervious gloves impervious boots, rain or slicker suit, and safety glasses.

12.0 Preparation for Welding and Cutting
The immediate area outside and inside the container should be cleared of all obstacles and hazardous materials. When repairing vessels, container or piping in place; care should be taken to prevent entry of hazardous substances released beneath the floor or soil beneath the container.

13.0 Ventilation
Ventilation should be adequate to provide a safe work atmosphere prior to and during welding. It may be necessary to test for toxic or flammable vapors and to verify that the oxygen content of the atmosphere in the work area is maintained within accepted limits where adequate ventilation is not available, an independent source of breathing air must be provided.
44.0 - Environmental Protection Plan

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ENVIRONMENTAL POLICY

1. Respecting our environment is one of Preferred Industrial Contractors, Inc.’s major concerns. It is our policy to operate in a safe, responsible manner which respects the environment and the health of our employees, our customers and the communities where we operate. We will not disregard schedules or compromise environmental, health or safety values for profit or production. We regard environmental responsibility as an essential factor for our continued development.

2. Our environmental management system will be implemented according to the requirements of the environmental standards and regulatory requirements.

3. We commit ourselves to respect the environmental laws and governmental regulations.

4. We commit ourselves to regularly check the application of environmental documents which are identified and apply to our company.

5. The implementation of an environmental pollution prevention system has led us to recognize the environmental aspects of our operations and develop ways to control the technological risks as well as the risk of accidental pollution.

6. In an effort to continuously improve our waste management systems, we will continue to explore ways to reduce or eliminate wastes that may be generated by our operations.

7. The implementation of environmental pollution prevention controls cannot be carried out without the participation of the whole workforce. We will continue to train and inform our employees about the controls implemented by our company and ways to minimize environmental impacts as a result of our operations.

8. As we strive to reduce our environmental impact within the whole organization, we will analyze the life cycle of our processes in order to better control their impacts.

9. Preferred Industrial Contractors, Inc. will provide all necessary resources in order to reach our environmental management objectives.

1.0 Introduction

This Environmental Protection Plan (EPP) has been developed to address the issues of spill control and environmental protection during the course of the project. The EPP provides for the
protection of the environment to the fullest extent practical during project execution and restoration of the environment at the project’s completion; except as otherwise delineated by the Specification. The EPP also defines procedures to be used in the event of an emergency situation for communication, site access, and efficient response.

2.0 Procedures For Environmental Protection
A. Key Personnel and Responsibilities
   1. Responsibilities for environmental protection as required by the specifications, rests with each person working at the site. In addition, certain individuals will have supplemental responsibilities and authorities in this regard:
      a. The Project Manager
      b. The Project Superintendent
   2. A summary of the primary responsibilities of these individuals is provided below:
      a. Project Manager - A Preferred Industrial Contractors (PIC) representative responsible for the overall performance of the work, both on and offsite. The Project Manager has ultimate responsibility for the environment protection during the course of the project.
      b. Project Superintendent - The Project Superintendent will monitor all activities by individual workers and ensure that they do not conflict with the requirements of this EPP.
   3. The address and telephone numbers of all of these personnel will be posted within the site office. Any of these persons will have the authority to terminate any work activity deemed to conflict with the requirements of this EPP.
B. General Procedures
   Noise Levels
   Excessive use of vehicle horns and unmuffled exhaust systems will not be tolerated. PIC will take corrective action to redress such deficiencies.

3.0 Resources Protection
A. Land Resources Protection - PIC will preserve all land resources on the project premises in their present condition or restore them to original condition before PIC arrived on site. Site-specific selective placement of materials will be performed so as to minimize erosion. PIC subcontractors will comply with all applicable laws concerning soil erosion and sediment control, including the use of silt fencing and filter bags when appropriate.
B. Water Resources Protection - PIC will not pollute any streams, rivers, waterways, or drainage channels with fuels, oils, solvents, acids, insecticides, herbicides, trash, or other harmful materials and substances. Soil erosion will be kept to a minimum through out the course of this contract. Storm water run-off will be controlled or limited by the use of curbs, berms or other controls specifically listed in the EPA guidelines for “Storm Water Discharges Associated with Construction Activities”. Run off that is contained in an excavation, treatment cells, or decontamination pad will be pumped into a suitable container for storage until proper disposal can be arranged.
C. Air Resources Protection - PIC will minimize pollution of the air by preventing fires and excessive equipment exhaust. The following actions will be taken during the project...
to minimize air pollution:
1. Instruct operators of earthmoving and demolition equipment (trucks, bulldozers, back-hoes, etc.) and their supervisors in the measures required to minimize the generation (stirring-up) of dust clouds and release into the atmosphere of noxious fumes;
2. Provide and utilize (as needed), equipment and personnel for water and/or chemical spraying to trap and settle dust and fumes.
3. Implement action levels and measures described in the Safety Plan to control dust and fumes.

D. Recording and Preserving Historical and Archaeological Finds - Any object having apparent historical or archaeological values which are discovered in the course of construction activities will be faithfully preserved. Site personnel will leave the archaeological find undisturbed and immediately report the finding to the Contracting Officer so that the proper authorities may be notified.

E. Protection of Fish and Wildlife - Site personnel will perform all work in a manner that will not endanger fish and wildlife. PIC will ensure that activities will not alter water flows or otherwise disturb any identified habitats which are critical to fish and wildlife.

F. Disposal of Debris - All debris resulting from operations on this site will be properly disposed. Transport and disposal will comply with all applicable Federal, State, and local laws. All waste materials will be disposed of in accordance with contract specifications.

G. Maintenance of Pollution Control Facilities - Dumpsters, roll-off boxes, and/or trash drums will be located near the project trailer for disposal of construction debris and nonhazardous waste. The non-hazardous waste containers will be emptied as needed. All facilities provided for pollution control will be maintained until the completion of the project.

4.0 Layout of Access and Work Areas

A. Site drawings will be developed prior to, and during, the project as necessary, and maintained throughout the project. The site drawings will clearly identify the locations of the following features:
1. Excavations
2. Embankments
3. Access roads and routes
4. Stream crossings
5. Materials storage areas
6. Structures
7. Sanitary facilities; and
8. Stockpile soils or materials

B. Work Area Plans
Work area plans and drawings will be developed prior to the start of the activities in each portion of the site. Work area drawings will indicate the layout of the above features, and where applicable, the areas of that are actively used or are not being used during work activities. Work areas will be clearly marked and defined using barricades, caution tape, fencing, or other appropriate means.

C. Traffic Control
All vehicular traffic associated with the project will be confined to areas defined by the site drawings and work area plans. In high traffic areas the use of barricades signs, flagmen, and other traffic safety tools will be employed as appropriate.
5.0 Comprehensive Spill and Discharge Plan

The following section defines contingency for potential spills and discharges from work specified in contract specifications. Emergency spill response will be directed and coordinated by the Project Superintendent. The emergency response is presented as a three-step operation:

A. Preparation for the response to the crisis
   Preparing includes the assessment of the situation, the allocation of personnel and equipment, and obtaining aid from outside sources.

B. Response to the crisis
   Response is the rescuing and treating of victims, the evacuation of personnel and/or the public if necessary, control of the hazard, and the decontamination of the area; and

C. Follow-up to the response to the crisis
   Follow-up is documentation of the incident, reporting to applicable agencies, and review and/or revision of the contingency plan.

D. Preparing and Prevention
   The project operations will be designed, constructed, maintained, and operated to reduce the possibility of fire, explosion, or any unplanned release of hazardous waste to the air, soil, or surface water.
   1. Emergency Equipment
      Safety and emergency equipment are to be kept onsite to control unexpected spills or discharges. This equipment will be kept onsite at all times and periodically inventoried and maintained.
   2. Emergency Telephone Contacts
      Telephone numbers of the local emergency authorities and hospitals, as well as primary contractors and subcontractors personnel and project management will be posted.

E. Spill and Discharge Contingency
   1. The contingency actions in this section will be taken by PIC in the event of any:
      a. Spill of fuel during equipment refueling operations
      b. Other appreciable release of any regulated substance
   2. Upon observing a spill or leak each employee must immediately notify his supervisor and inform him of the location, quantity, rate, and composition (if known) of the spill. The supervisor will immediately contact the Project Superintendent. The Project Superintendent will determine what action will be taken to respond to the leak. If the incident involves non-hazardous material, the Project Superintendent will appoint a member of project management to oversee the clean up as normal maintenance.
   3. If the spill involves a hazardous material, the Project Superintendent will assume responsibility for the clean up while working under guidance from the Corporate SH&E Department. The Project Superintendent and the Corporate SH&E Department will determine the possible hazards to human health.

F. Emergency Measures
   1. Measures to prevent or minimize the effects of hazardous material release will include the following:
      a. Limit to the spill or discharge area will be limited to necessary personnel.
         The emergency spill area will be cordoned off with caution tape to prevent direct
contact with spilled material.
b. Direct all persons to move upwind and out of low areas.
c. Keep combustibles, flames and sparks away from the spilled material
d. Use water or approved chemical spray to reduce vapors, as needed.
e. With approval of the Contracting Officer remove, contain, and dispose of spilled
solid materials in accordance with the client’s waste handling procedures.
f. With approval of the Contracting Officer: (1) absorb liquids and/or sludge spills
with suitable absorbent material. Dispose of the absorbent/spill mixture at
suitable facilities, (2) pump and treat, or (3) transport and dispose of the liquid at
suitable facilities.
g. Collect confirmation samples for analysis to verify that cleanup is adequate.
h. Follow the personnel and equipment decontamination procedures, and other
applicable standards and requirements.

2. The initial response to any emergency will be to protect human health and safety
and then the environment. Identification, containment, treatment, and disposal
assessment will be secondary responses. (All hazardous waste operations will be
performed in compliance with OSHA 1910.120, 1926.65 and Preferred Industrial
Contractors, Inc. EHS Manual Section 41.0 HAZWOPPER)

3. The exact measures used will depend upon the type of material released and the
amount released. If the initial assessment so indicates, the Project Superintendent
will summon local emergency agencies.

G. Notification of Local, State, and Federal Agencies

1. If there are injuries, emergency medical personnel will remove the injured to a
safe location, apply first aid, and prepare them for transport. The seriously injured will
be transported to the designated hospital for treatment. Emergency measures
concerning injuries to personnel will be discussed in accordance with the Project SH&E
Program.

2. If the Project Superintendent determines that the facility has experienced a release, fire,
or explosion, which could threaten human health, safety, or the environment outside
the facility, he/she will immediately notify appropriate local emergency authorities. The
list of local emergency authorities to be notified and their appropriate phone numbers
will be posted in the project field office.

3. If the Project Superintendent determines that the facility has experienced a reportable
quantity release, fire, or explosion, which could threaten human health or the
environment, other than worker exposure, he will immediately notify the appropriate
plant or facility manager, the Contracting Officer and the Project Manager. The report
will include:
   a. Name and telephone number of reporter;
   b. Name and address of facility;
   c. Time and type of incident (e.g., release, fire);
   d. Name and quantity of material(s) involved, to the extent known;
   e. The extent of injuries if any; and
   f. The possible hazards to human health, safety, and/or the environment
      outside the facility.

4. As directed by the appropriate plant or facility manager, the Project Superintendent
may be responsible for notifying the appropriate agencies (notification order will be
local, State, then Federal) having designated response roles if their assistance is needed.

H. Evacuation Plan
I. The Evacuation Plan is intended for safe full or partial egress of personnel from any area of the facility or the entire facility during an emergency situation. The Evacuation Plan normally activated by the Project Superintendent, but any facility personnel will be to activate the plan if necessary.

J. In the event of an emergency requiring evacuation the following actions will be taken:
1. Three long blasts with an air horn or vehicle horns will be sounded;
2. The Project Superintendent will immediately notify and advise the appropriate authorities of the situation.
3. All personnel involved in the evacuation will move immediately to a predetermined rendezvous area.
4. After evacuation, all employees, and visitors will be accounted for by the Site Superintendent and the information relayed to the Project Superintendent.
5. The Project Superintendent will initiate search operations to locate personnel not accounted for.
6. Reentry into affected areas will be made only after clearance is given by the Project Superintendent.

K. Emergency Services Route Maps
An emergency services route map will be prepared and located in company vehicles, posted with the emergency phone numbers listed onsite, and distributed to the airport police/fire department.

L. Material Characterization and Risk Assessment
1. Whenever there is a release, the Project Superintendent is responsible for ensuring that the characteristics, exact source, amount, and extent of any released material are identified as quickly as possible. The Project Superintendent will use spill site observations and facility records (tank storage data, Material Safety Data Sheets, etc.) to make this determination. Chemical analysis of a spill and affected soils may also be used to determine the amount of soil contaminated.
2. The Project Superintendent will immediately assess the resulting hazards to human health and the environment. This assessment will consider the effects of any toxic, irritating, or asphyxiating gases that are generated, and the effects of any contaminated surface runoff. This will be done by reviewing product storage data, tank storage data, and Material Safety Data Sheets. The Project Safety, Health and Environmental Program describes in detail the principal hazardous material which may be involved in an environmental incident at the facility, and the possible direct and indirect effects of each material on human health and the environment. Additional information will be available to the Project Superintendent from the Material Safety Data Sheets for certain materials.

6.0 Waste Disposal
A. Solid Waste Disposal
1. All anticipated wastes generated during project activities, are to be reviewed, identified and characterized for proper disposal or recycling. Preferred Industrial Contractors, Inc. will ensure that all wastes are properly collected, placed in proper containers, labeled, and disposed of as required by Federal, State and Local environmental requirements.
2. The term solid waste means any garbage, refuse, sludge or other discarded material including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations and community activities.

3. The term hazardous waste means a solid waste or combination of solid wastes which because of its quantity, concentration, or physical, chemical or infectious characteristics may:
   a. Cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness or;
   b. Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

4. All wastes anticipated to be generated during project activities are to be reviewed, identified and characterized for proper disposal or recycling. In most situations determining whether the waste is a hazardous waste and requires specific disposal methods is the most important, and sometimes the most complex step in the identification of wastes and waste disposal.

B. Waste Resulting From Spills and Discharges

C. Decontamination materials, absorbents, and personnel protective equipment will be contained in drums and stored in the drum storage area for later disposal. Liquids recovered from a spill or discharge incident will be stored onsite in drums or portable tanks until an appropriate disposal method can be determined. Any impacted soils requiring remediation will be excavated and stockpiled, as practical until an appropriate disposal option can be chosen.

D. Bulk liquids will be removed from the project by vacuum a truck which reduces the risk of a potential spill or release of waste materials during transport to an offsite disposal facility. It will be the responsibility of the waste transporter to ensure that the waste is handled appropriately and any material accidentally released is properly handled.

7.0 Employee Training

MSDS sheets and labels are reviewed with workers during weekly safety meetings and daily pre-task meetings to insure they understand the hazards of the materials they are working with, as well as the methods to use the materials safely. All PIC and subcontracted employees will be required to be knowledgeable with the EPP prior to participating in any activities on the project. The EPP requirements as well as any site specific or facility requirements will be reviewed with each employee. A sign-off sheet will be signed by each employee attesting that the employee has read and is familiar with the EPP. Failure of employees to comply with the EPP may result in disciplinary action up to and including termination.
1.0 Scope
   A. The impact of various elements of the physical environment on the working conditions must be assessed to properly understand and prepare for all potential conditions. These include:
      1. High wind speeds that could adversely affect the integrity of scaffolds, lifting operations, temporary structures and the safety of personnel.
      2. Obtain daily meteorological reports and direct contact with the local meteorological authority/office personnel is essential.
      3. As necessary and in compliance with applicable maritime law, fog-warning devices shall be installed. Consideration must be given when operating in inshore waters, harbors, and estuaries regarding nuisance noise and lights.
      4. Essential historical information concerning tidal range, wave height, tidal surge (bores), and currents will determine methods for:
         a. Mooring floating craft
         b. Height of temporary platforms
         c. Specification and characteristics of rescue craft
         d. Emergency rescue equipment
         e. Landing platforms
         f. Access walkways, steps, revetment, ladders and gangways must be maintained free from mud, seaweed, algae, and slime as far as is reasonably practical.
   B. Proposed work methods, instructions, standards, and procedures shall be developed to address the following types of operations/tasks:

2.0 Drilling Operations
   A. Risk assessment(s) will be developed to identify site-specific hazards and risks.
B. JSA or method statement(s) are to be prepared, as applicable, for drilling activities.
C. The plant and equipment used will be fit for purpose, properly maintained and safe to use.
D. The JSA or method statement will explain what noise mitigation measures will be employed to comply with the agreed noise levels or licenses.
E. Suitable safe access will be provided on the drill mast and operators will wear and attach a full body harness for all work on the mast.
F. All personnel will wear an appropriate and approved lifejacket or buoyancy aid when working from the deck of a barge, above or adjacent to water.
G. All winches, hoists, and lifting gear will be inspected and an inspection/test certificate for each item will be made available for inspection.
H. All hydraulic, lubrication, and fuel hoses will be in good order, free from abrasion and unions tight and free from leaks.
I. Maintenance procedures for the drilling equipment shall include refueling, hydraulic oil and lubrication oil change, and methods to prevent pollution.
J. Environmental protection and spillage control material will be available at all times on the drilling rig.

3.0 Dredging Operations
A. A risk assessment/s will be developed to identify site-specific hazards and risks.
B. JSA or method statement(s) are to be prepared, as applicable, for dredging activity to include mitigation measures for reducing silt disturbance.
C. The JSA or method statement shall list the equipment to be used, the number of vessels including if appropriate and the number of barges and tender vessels.
D. The JSA or method statement will explain what noise mitigation measures will be employed to comply with the agreed noise levels or licenses.
E. All winches, hoists, and lifting gear will be inspected and an inspection/test certificate for each item will be made available for inspection.
F. Suitable safe access will be provided parts of the dredging equipment and operators will wear and attach full body harness for all work on the equipment above deck level.
G. All personnel will wear an appropriate and approved lifejacket or buoyancy aid when working from the deck of a barge, above or adjacent to water including personnel transport to and from shore.
H. All hydraulic, lubrication, and fuel hoses will be in good order, free from abrasion and unions tight and free from leaks.
I. Maintenance procedures for the vessels and dredging equipment shall include refueling, hydraulic oil, and lubrication oil change, and methods to prevent pollution.
J. Environmental protection and spillage control material will be available at all times on the dredger.

4.0 Diving Operations
A. The diving contractors will conduct a risk assessment to identify site-specific hazards and risks.
B. The Diving Contractor will prepare a Diving Project Plan for review and approval by Preferred Industrial Contractors, Inc.

5.0 Piling Operations
A. Risk assessment(s) will be developed to identify site-specific hazards and risks.
B. JSA or method statement(s) are to be prepared, as applicable, for piling activity.
C. The JSA or method statement shall list the equipment to be used, the number of vessels including if appropriate and the number of barges and tender vessels.

D. The JSA or method statement will explain what noise mitigation measures will be employed to comply with the agreed noise levels or licenses.

E. All winches, hoists, and lifting gear will be inspected and an Inspection/test certificate for each item will be made available for inspection.

F. The crane operator must inspect equipment daily to ensure safe operation of the equipment.

G. Suitable safe access will be provided parts of the piling equipment and pile gates, and operators will wear and attach full body harness for all work on the equipment above deck level.

H. All personnel will wear an appropriate and approved lifejacket or buoyancy aid when working from the deck of a barge, above or adjacent to water including personnel transport to and from shore.

I. Continuous positive fall protection, such as a lifeline, a rope grab, and complete standard guardrails, must be used when a person is on a vertical lead or an apron.

J. Every effort must be made to eliminate the need for personnel to occupy the top of a pile. Examples of such efforts include employing mechanical pile threaders and remote release shackles.

K. Ladders and aerial platforms are the preferred means of access to elevated work locations.

L. All hydraulic, lubrication, and fuel hoses will be in good order, free from abrasion and unions tight and free from leaks.

M. Maintenance procedures for the vessels and piling equipment shall include refueling, hydraulic oil, and lubrication oil change and methods to prevent pollution.

N. Environmental protection and spillage control material will be available at all times on the piling rig.

6.0 Tenders, Work Boats, and Passenger Vessels

A. Preferred Industrial Contractors, Inc. will ensure that tenders, workboats and passenger carrying vessels are fit for purpose, designed, maintained, and operated to ensure there is no risk to employees in their use.

B. All vessels will carry adequate and suitable life saving equipment, fire extinguishers and communications equipment and lighting appropriate to the class of vessel.

C. Passenger carrying vessels will display a plaque indicating the maximum number of passengers it can carry. This number must never be exceeded. Passenger carrying vessels will carry a copy of the license stating the class of vessel and a copy of the insurance certificate.

7.0 Life Saving Equipment

The following equipment shall be supplied and installed as a minimum

A. At least one lifesaving skiff shall be immediately available at locations where employees are working over or adjacent to water. The intent of the skiff is to ensure prompt rescue of employees that fall into the water, regardless of other precautions taken to prevent this from occurring.

B. Lifebuoys must be positioned at regular intervals (not more than 165 feet/50 meters) during the construction phase.

C. Lifebuoys provided will be either cork interior with canvas covering or polyurethane foam with rigid PVC covering.
D. A lifeline constructed of material that is able to float shall be attached to the lifebuoys. It shall be of a minimum length of 100 feet/30 meters.

E. The height of the buoy on a revetment, wall or working platforms, will fluctuate with the tide. The length of the lifeline shall therefore accommodate the tidal movement.

F. Where there is a fast flowing current, either river or tidal, then smoke flares shall be located adjacent to lifebuoys.

G. A sufficient number of lifejackets or approved buoyancy aids shall be provided for all personnel and visitors.

H. Lifejackets and buoyancy aids provided shall be to the following specification:
   1. Allow for freedom of movement when worn
   2. Be easily secured
   3. Have a high visibility covering
   4. Fitted with spark proof covers for welders
   5. Require minimum maintenance
   6. Be fitted with self-igniting lights (for night shift workers)

8.0 Emergency Procedures – Rescue Preplan

A. A windsock shall be positioned in an exposed and obvious location in order to indicate speed and direction of the wind.

B. Preferred Industrial Contractors, Inc. will develop protocols and procedures for marine emergencies based upon site conditions and available facilities. These will be incorporated into the JSA’s and hazard assessments for all marine work.

C. The emergency pre-plan will include, but not be limited to, the following:
   1. Conducting of a risk assessments
   2. Command and control structure
   3. Emergency communications
   4. Trained first aid responders and equipment on vessels
   5. Man overboard rescue
   6. Rescue of injured persons from vessels and barges.
   7. Provision of rescue craft.
   9. Use of flares or other signals in the event of radio failure.
   10. Casualty handling and equipment for recovery from water.
   11. Request for the emergency rescue services.
   12. Exercises and drills

D. When doing renovation or remodeling work, the Project Superintendent, and his/her Supervisors shall be alert to the dangers, which might exist for the employees, and subcontractors who work under or near unlabeled pipes, which contain hazardous substances, and shall take proper precautions.
1.0 Purpose/Scope

This safety guide outlines the procedures for opening pipelines and connecting equipment containing materials that could cause injury or illness to employees, if exposed. The contents of the pipeline and connected equipment may be hazardous because of: high pressure, toxicity, corrosives, acidity, temperature extremes, flammability, etc. Measures taken to prevent injury and/or illness must take into account the hazardous effects the materials present in the form of absorption, inhalation, and direct contact with the body.

To safely repair, clean, inspect, replace, or test pipelines and connecting equipment, it must first be isolated from other operational systems. Isolation by closing block valves is usually not sufficient; therefore, the positive isolation provided by the use of blinds is required. The purpose of this section is to establish minimum guidelines for safely opening lines and installing blinds in process equipment, containing, or having contained process chemicals or gases, which could be hazardous to employees and/or the environment.

2.0 Definition

For the purpose of these guidelines, the term, “Line Breaking/Equipment Opening”, refers to any job requiring opening any process line or equipment. This includes, but is not limited to, permanent and/or temporary bypasses, connected fittings, valves, pumps, spools, vessels, or tanks. Hazardous conditions may exist in process lines or equipment which contain or have contained acids, caustics, flammables, or any other hazardous materials in the form of gases, liquids, or solids. In addition, hot materials such as heated water and steam present a significant hazard.

3.0 Preparations

A. The Preferred Industrial Contractors Supervisor/designee over the task shall request a permit from the owner/operator for the group requesting the work. If a permit is not required by the owner/operator, the system lockout/tag-out shall be verified, and the Pre-Task JSA shall be substituted as the permit.

*Note: Potable water and/or process air can present a hazard if under pressure.*
B. Prior to beginning any first break, the Pre-Task JSA shall be completed with specific instructions including (but not limited to) the following:

1. Identification of the last known chemical(s) contained in the line, equipment, vessel, tank etc., being opened. If the line or equipment contained a mixture of chemicals, the MSDS for each shall be reviewed and the precautions required for the more hazardous of the two shall be used.

2. Health hazards associated with the chemicals(s).

3. Method of detection associated with the chemical.

4. The specific Personal Protective Equipment required to complete the task per the MSDS, Client and Preferred Industrial Contractors, Inc. (i.e., respiratory protection, body protection, head/face protection, hand protection, fall protection, etc.).

5. Type containment or container needed to prevent environmental contamination.

*Note: The Pre-Task JSA shall be communicated to all affected employees involved in the first break.*

C. Piping and equipment that has been in service must be positively identified by an individual familiar with that specific process system. Any piping or equipment to be opened or disassembled shall be isolated by having the appropriate upstream and downstream valve(s) closed, disconnected, blinded, or have a mechanical restraining device affixed. “DO NOT OPERATE” tags or equivalent shall be placed at all isolation points.

D. Switches and/or push buttons that operate pumps, blowers, or any other electrical, pneumatic, or hydraulic equipment must be locked and tagged per the “Lockout/Tagout Guidelines”, of this procedure, or the Client’s, if equal to or more stringent. Pumps, motors, or other devices that are activated by mechanical devices such as floats, switches, etc. shall be operated manually to ensure they are properly isolated.

E. Barricades shall be erected to warn other workers of the possible hazard(s). If the line breaking/equipment opening is at an elevated location, all levels below where workers may walk shall be barricaded if a hazard may exist.

F. Coordination between Preferred Industrial Contractors, Inc. personnel and operations shall be such that no other process work, maintenance, or sampling is being performed on the line being opened. If other work is being performed, it shall be evaluated to assure the other activities will not endanger the personnel performing the line breaking operation.

G. Where eyewash/safety shower facilities are not readily available and the potential for hazardous materials exists, a potable water hose with a quick opening valve shall be located at the work site. If a shower facility is readily available, it shall be tested before starting the job.

### 4.0 Personal Protective Equipment (P.P.E.)

A. P.P.E. shall be worn (refer to MSDS) to protect the employees from the type of chemical(s) that have been contained in the line, vessel, tank, equipment, etc. The minimum of P.P.E., to be worn for first break for potable water or process airlines, shall be gloves and a face shield worn over safety goggles.

B. The employees performing the first break shall be trained on the proper use and limitations of the P.P.E. required for the break. See “Personal Protective Equipment” section in the Safety, Health & Environmental manual.

C. The level of P.P.E. required to carry out a first break will depend on the relative hazards associated with the chemical(s) contained in the line or equipment. If positive verification that the system has been decontaminated cannot be obtained, maximum P.P.E. shall be worn for upper limit potential of exposure.
5.0 Training
A. Each employee who is authorized to perform first breaks shall be thoroughly trained in all aspects of these guidelines.
B. Other employees shall be familiarized with these guidelines as it applies to their work area and job responsibilities.
C. Training shall be documented and entered into the Preferred Industrial Contractors, Inc. Training System.
D. All line breaking/equipment-opening incidents and near misses shall be thoroughly investigated and documented. A copy of the investigation report shall be forwarded to the safety department within 24 hours of its occurrence.

6.0 Installation Of Blinds
These procedures and precautions have been established as a guide and are not intended as a substitute for careful observation and consideration of specific conditions, nor for good judgment and safe work practices.

A. Before opening any flanged joint to install a blind, complete the following:
   1. Determine what product or material has been contained in the equipment or piping, and what protective systems are required.
   2. Verify that the equipment or piping has been prepared and properly released for blinding and that valves that will stop the flow of material to the line being opened are closed, locked, and tagged per the Energy Isolation procedure.
   3. Verify that lines and equipment have been depressurized and drained. Verify that drain valves are open and clear by inserting a wire through the valve into the pipe or equipment.
   4. If the equipment to be blinded is under more than slightly above atmospheric pressure, ensure that the owner/operator has approved the work before proceeding.

B. When opening any flanged joint to install a blind observe the following:
   1. Wear personal protective equipment (PPE) as dictated by the Pre-Task JSA and the circumstances. Always wear appropriate eye protection.
   2. Remove flange bolting leaving a minimum of two, then loosen the remaining two bolts, and without completely removing the nuts, spread the flanges to install the blind. Always open the flange on the side away from workers so any sudden release will be directed away.
   3. Flanges should only be open long enough to safely install the blind.
   4. Supplied air respirators must be worn when opening a flange on a line or vessel that may contain a toxic gas, unless it can be definitely established that no toxic gas is present. Supplied air respirators must be worn until gas tests indicate that toxic gases are no longer present.

7.0 Line Breaking
It is difficult to prescribe a general set of rules to cover the precise and safe way for all first breaks. The safest job procedures applicable to the particular job shall be followed including:

A. Regardless of the procedures to render the pipeline and connected equipment nonhazardous, all lines should be treated as though they are under pressure.
B. All piping should be physically traced to determine all sources of pressure such as
pumps, hydrostatic head pressure, and manifold lines to determine which valves and pressure sources need to be blinded, closed, locked, and tagged out.

C. Valves that will stop the flow of material to the line being opened must be closed, locked, tagged and a blind installed between the valve and the location of the line break. Where possible, at least two valves on the upstream and downstream side of the point of work should be closed. Particular attention should be given to some valves, particularly gate valves, because pluggage or foreign materials may hold the valve open though it would appear to be closed. Knowledge of the number of turns required to close the valve may be needed.

D. **NEVER DEPEND ON CHECK VALVES TO PREVENT FLOW OF CONTENTS IN THE PIPELINE.**

E. When required, the line should be flushed or purged to render the line contents nonhazardous.

F. Special consideration should be given to lines that contained flammable materials. For example, inert gas or non-spark producing tools may be required.

G. All physical or instrumentation checks immediately available should be used to verify that the line is de-pressurized.

H. When dismantling or opening begins, the worker(s) should take a defensive position away from directly in front of the opening to be made. Bolts shall be loosened slowly and on the opposite side of the employee(s) performing the first break to prevent any escaping chemicals/materials from injuring workers and/or co-workers. Only after there is assurance that an opening has been made, and all contents have drained, should all the bolts be removed.

I. Flange spreaders shall be used for opening flange joints whenever required and/or practicable. When not possible, due to close clearance, size of pipe, etc., only standard wedges shall be used as an alternative. Steps shall be taken to prevent wedges flying in the event it slips from the joint.

*Note: Drift pins, cold chisels, spud wrenches, or similar tools shall not be used as alternates to new bolts.*

J. Whenever flange bolts are severely corroded, the old bolts shall be removed one at a time, replaced with new bolts and tightened. The new bolts can then be loosened as a wedge is inserted. The use of P.P.E. is required during this procedure.

*Note: No line or equipment containing flammable material shall be opened when there is a “Potential Ignition Source” which may create a hazard from escaping processes.*

K. Dismantled lines, fittings, pumps, etc., shall be washed thoroughly and free of contaminates before being removed from the jobsite, even if the parts are being scrapped.

L. When the line is reassembled, all required flange guards and bonding connections shall be reinstalled before locks/tags are removed, valves are reopened, and pressure sources are returned.

M. Workers and observers should not remove any protective equipment until the job task is complete and all lines/connections have been sealed back to its original state. Note: If uncertain about determining when the area is rendered safe, contact the Operating Supervisor for instructions.

N. Upon completion of the work, those performing the work or in responsible charge shall:
   1. Report to operating personnel completion of the job;
   2. Remove his blinds, locks and tags;
   3. Assure the work area is clean;
   4. Replace any hazard warnings removed or destroyed during the job.
O. If the job cannot be completed, those performing the work shall, before leaving:
   1. Report any temporary or incomplete installation to operating personnel;
   2. Assure all appropriate locks and tags are still in place.
47.0 - Tie-In Procedure

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1.0 Purpose / Scope
The purpose of these procedures is to incorporate additional Levels of Protection LOP for workers when Tie-Ins are made to existing plant systems and processes. This program establishes requirements and guidelines for a multi-point review process that involves engineering, plant production and contractor personnel to coordinate activities to insure that process lines, electrical, mechanical or other energy sources are properly isolated from all potentially hazardous energy sources during the Tie-In and that a system is in place to turn the system back over to plant operations when the Tie-In is complete.

2.0 Definitions
A. **Affected Employee** - For the purposes of making Tie-Ins to existing systems, an affected employee is a construction worker whose job requires him/her to make breaks in or tie into existing process piping, electrical, or mechanical systems.

B. **Construction Tie In Coordinator** - The Tie In Coordinator is the Construction Representative who, in addition to the Area Qualified Person for Lockout / Tagout, locks out and tags machines or equipment to perform the necessary Tie-Ins.

C. **Construction Supervisor** - The Construction Supervisor is the Contractor Supervisor whose duties are to direct construction activities.

D. **Contractor Foreman** - The Contractor Foreman is the direct supervisor of the contractor / subcontractor performing the actual work.

E. **Area Production Supervisor** - The Plant or Operations supervisor with primary responsibility for the Unit / Area.

F. **Project Construction Coordinator** - The Plant or Operations representative responsible for identifying, coordinating, scheduling, and tracking the tie-in points with engineering, construction, and production departments.
3.0 Advance Activities
   A. Plant engineering or operations to issue ORTHO, ISO arrangement, P&ID, or electrical single line drawings indicating system tie in points.
   B. Tie-In Points are to be located in the field by area or operations personnel and the tie in points identified either by drawings, digital photographs, and/or physically marking and tagging the Tie-In location to insure proper placement.
   C. Construction pre-assembly must be performed and in place ready for Tie-In. Review with engineering for completeness.

4.0 Planning
   A. An Initial Tie-In meeting with all affected parties including the Area Production Supervisor, Commissioning or Tie In Manager, Area Qualified Person for Lockout / Tagout, Construction Tie In Coordinator, Engineering and Safety. The purpose of this meeting is to identify isolation points and the specific lockout/Tagout procedures to be used, review the impact and duration of the installation, identify any multiple tie-in points that could be performed during a single operation, the impact on the process, including any isolation requirements which will remain beyond the completion of the tie-in, the allotted time needed to perform the tie-in, and the hand over/commissioning of the system once the Tie-In is complete.
   B. Additional meetings can be held with the Construction Field Supervisor and the Construction Foreman, if needed, or due to scheduling, production, fabrication delays, etc.
   C. The Area Production Supervisor will complete the Area Specific Isolation Sheet listing the energy sources and associated isolation points for Lockout/Tagout prior to performing the Tie-In. The Equipment Specific Isolation Sheet will be attached to the Tie-In / Modification Permit.
   D. Once the schedule for the Tie-In has been set, the Construction Tie-In / Modification Permit will be issued. The Tie-In Permit must be reviewed by the Construction Mechanical and/or Electrical Supervisor and approved by the Construction Tie-In Coordinator and the Area Production Supervisor prior to the start of the Tie-In. This will be initiated by the Construction Tie-In Coordinator.
   E. Construction Field Supervisor completes the Pre-Task JSA for the Tie-In and reviews with Contractor Foreman.

5.0 Performance of the Tie-In
   A. Construction Tie-In Coordinator to review Tie-In Permit, and contact the Area Production Supervisor / Area Qualified Person for Lockout / Tagout to perform isolation of system.
   B. The Area Qualified Person for Lockout / Tagout performs the Equipment Specific Isolation Procedure and places locks and or appropriate tags as required by the isolation procedure.
   C. The Contractor Foreman is to place green craft tags attached with tie wraps to all points where the system has been isolated by the Area Qualified Person for Lockout / Tagout.
   D. The Construction Tie-In Coordinator is to place White Personal Danger tags secured with locks at all points where the system has been isolated by the Area Qualified Person for Lockout / Tagout. Locks with tags will be placed at all isolation points. In the event that an energy isolating device cannot be physically locked, such as valves and valve handles, the lock and tag will be placed in a conspicuous location on the valve handle identifying the device as being locked out as part of a Tie-In procedure and may not be operated until the system has been released.

F. The Construction Tie-In Coordinator will place keys for all locks located at isolation points into a Lockbox located near the work area. The Construction Tie-In Coordinator will place a lock and personal danger tag on the box, indicating that the system is ready to begin the Tie-In as per the prescribed Pre-Task JSA.

G. The Construction Tie-In Coordinator will place the Tie-In / Modification Permit, the Equipment Isolation Sheet, the JSA and associated drawings in a protective cover attached to the Lockbox.

H. The contractor foreman performing the prescribed Tie-In procedures will review the Pre-Task JSA with all affected employees and place a lock with his personal danger tag on the lock box indicating the isolation of the tie in is complete and the Tie-In can be performed.

6.0 Complete Tie-In / Return System

A. Once the Tie-In has been completed, the Contractor Foreman shall notify the Construction Supervisor that the job is complete. At this time any testing or QA can be performed.

B. The Contractor Foreman will then remove his lock and Personal Danger Tag from the Lockbox.

C. The Construction Tie-In Coordinator will notify the Area Production Supervisor/Area Qualified Person for Lockout / Tagout that the Tie-In is complete and to remove his lock and tag from the Lockbox.

D. The Construction Tie In Coordinator and the Contractor Foreman then remove all Construction locks and tags from the isolation points for the Tie-In and fill in the date and time the work is completed on the Tie-In / Modification Permit.

E. The original of the Tie-In Permit is to be turned into the Area Production Supervisor. A copy of the Tie-In Permit and the completed Pre-Task JSA are to be turned into the Construction Safety Department.

F. Any isolation blinds/valves or other system isolation devices that must remain in place between the existing process lines and the new expansion system are to remain tagged by the Department Qualified Person for Lockout / Tagout, the Construction Tie-In Coordinator and the Construction Foreman, at all points where the system has been isolated,

7.0 Forms

A. SAF-47.0-1 – Tie In Permit
**SECTION 1**

**GENERAL TIE IN PERMIT**

<table>
<thead>
<tr>
<th>Tie-In Description:</th>
<th>Requested By:</th>
</tr>
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<tbody>
<tr>
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<td></td>
</tr>
</tbody>
</table>

**Date:**

<table>
<thead>
<tr>
<th>Tie-In Location:</th>
<th>Reference Drawings or Sketches Attached</th>
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<tbody>
<tr>
<td></td>
<td>Yes</td>
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</tbody>
</table>

**Contractor:**

<table>
<thead>
<tr>
<th>Tie-In Type:</th>
<th>Electrical</th>
<th>Mechanical</th>
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</table>

**SECTION 2**

**Construction Checks**

<table>
<thead>
<tr>
<th>Reviewed By</th>
<th>Date</th>
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</thead>
<tbody>
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<td></td>
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</tbody>
</table>

- Yes | No  | Tie In Points Located and Identified
- Yes | No  | Construction Pre-assembly Complete
- Yes | No  | Any Electrical/Instrument Interface
- Yes | No  | Any Associated Tie Ins?
- Yes | No  | Tie-In JSA Complete
- Yes | No  | Work area barricaded off if necessary
- Yes | No  | Source valves shut off / locked and tagged
- Yes | No  | Blinds installed and marked
- Yes | No  | System locked out/denergized and checked
- Yes | No  | Any Blinds to be Left in Place After Tie In Complete
- Yes | No  | Any Other Requirements:

**SECTION 3**

**Operation Checks**

<table>
<thead>
<tr>
<th>Reviewed By</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Yes | No  | Operations Personnel Aware of Tie-In
- Yes | No  | Is There a Time Limit For Tie In
- Yes | No  | Any Restrictions or Controls Needed During Tie-In
- Yes | No  | System Lockout Complete
- Yes | No  | Blinds installed and marked
- Yes | No  | Flow Cut or Shutdown Required

**SECTION 4**

**Authorization**

<table>
<thead>
<tr>
<th>Area Production Supervisor:</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Construction Tie-In Coordinator:</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
</table>

**Date Started:**

**Time:**

**Date Completed:**

**Time:**

**Comments:**

---

DO NOT COMMENCE TIE-IN OR MODIFICATION UNTIL THIS FORM HAS BEEN COMPLETED AND SIGNED OFF
Disciplinary Procedure

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SAF-.01-1 – Violation of Safe Practice.............................................................................................4

1.0 Objective

Employee accountability for following established safety regulations, procedures, and safe work practices is an integral and essential part of a functional accident prevention program. OSHA Standards require Preferred Industrial Contractors, Inc. to have a formal accident prevention program and to have a positive means to enforce the requirements of the program. Safety warning notices will be used by the project to inform employees of violations of safety regulations, procedures, and work practices and to remind these employees that said regulations, procedures, and work practices are designed for their own protection.

2.0 Responsibility

Project management/supervision shall take whatever disciplinary steps are necessary up to and including termination of employees who violate safety regulation procedures and safe work practices in order to ensure compliance with same.

3.0 Scope

A. When an employee is observed violating, disregarding or disobeying established safety regulations, procedures and/or safe work practices, the craft foreman, superintendent or safety supervisor/inspector shall be responsible for issuance of a "Safety Warning Notice". 

   NOTE: Employees who are injured or involved in an injury accident or near miss and who through accident investigation are found to be negligent in obeying project safety procedures shall be issued a Safety Violation Notice. This Violation Notice shall be issued by the craft superintendent and co-signed by the Project Safety Supervisor.

B. Upon receipt of the first written notice the offending employee shall receive a Safety Department verbal reprimand with notification of the employee's department superintendent/manager and a copy of the violation notice sent to the Project Manager.

C. Upon receipt of the second written notice the offending employee shall receive a formal reprimand from the Safety Department and craft/department superintendent or manager and a copy of the violation notice sent to the Project Manager.
D. Upon receipt of the third written notice the offending employee's craft/department superintendent or manager shall take disciplinary action up to and including, if necessary, termination and a copy of the violation sent to the Project Manager.

E. Disciplinary action which can be taken for safety violation of safety rules, procedures, or practice include:
   1. Counseling of employee
   2. Suspension from work without pay
   3. Demotions in classification
   4. Termination of employment

   **NOTE: EMPLOYEES WHO VIOLATE SAFETY RULES, REGULATIONS, OR WORK PRACTICES WHICH ARE CONSIDERED OF A LIFE THREATENING NATURE TO THEMSELVES OR OTHERS ARE SUBJECT TO IMMEDIATE TERMINATION ON THE FIRST VIOLATION.**

F. In some cases, disciplinary action may also be directed beyond employees observed in the actual violation (e.g., failure to report unsafe acts and those cases where it is determined that supervisors or foremen had knowledge that employees were consistently violating safety work practices and the supervisor failed to initiate any action to correct the situation).

4.0 Distribution
   A. All authorized personnel shall use the "Violation of Safe Practice" form or a "Safety Warning Notice" booklet.
   B. Upon issuance of notice, copies will be distributed as follows:
      1. One (1) copy to the offending employee
      2. One (1) copy to the Project Manager
      3. One (1) copy to the craft/department head
      4. One (1) copy to the Safety Department to be placed in the employee's personnel folder
   C. The Safety Department shall track safety violations issued on the project and advise project management/supervision of activity.

5.0 Forms

1. SAF-.01-1 - Violation of Safe Practice
VIOLATION OF SAFE PRACTICE

Project: ________________________________________________________________

Employee: _____________________________________________________________

Job Assignment: ________________________________________________________

Date & Time: ____________________________________________________________

Immediate Supervisor: __________________________________________________

Nature of Violation: ______________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

Action taken to prevent reoccurrence: ______________________________________
_____________________________________________________________________
_____________________________________________________________________

Issued by: ____________________________________________________________

Signature

SAMPLE COPY ONLY
CONTACT THE BAYTOWN OFFICE FOR REPLACEMENT FORMS
Fall Control - Protection And Prevention

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SAF 24.01 FALL PROTECTION PLAN...............................................................................................11

1.0 Scope

2.0 The section outlines the procedures and practices for maximum protection of workers against
falls from elevations when working or traveling those elevations where a fall exposure exist
which may result in a fall. The guidelines are based on the requirements for the proper
maintenance of walking and working surfaces, working at elevated heights, as well as traveling to
and from the elevated jobs. All identified Fall Hazards shall be addressed by one or more of the
following Hierarchy of controls.

A. Elimination of the Hazard - The first step in this approach is to carefully assess the
workplace and the work itself in the engineering and planning stages of the project. The
objective is to eliminate all fall hazards. This assessment of the site and the work cannot
only help eliminate hazards, but can also identify alternative approaches to the work that
can considerably improve productivity.

B. Preventing the Hazard - The second step in continuous fall protection also requires
assessing the workplace and work processes. If fall hazards cannot be completely
eliminated, try to prevent falls by improving the workplace. Avoid relying on a worker’s
behavior or fall-arresting equipment to prevent injuries. Early installation of stairs,
guardrails, barriers, and travel restriction systems can ensure a safe work environment. Establish proper workplace positioning and help eliminate the fall.

C. Fall Arrest - The third step, the last line of defense against falls, is to use fall-arrest equipment. Use fall-arrest equipment, however, ONLY after determining that potential falls cannot be eliminated by changing work procedures or the workplace. Equipment such as harnesses, lanyards, shock absorbers, fall arresters, lifelines, anchorages, and safety nets can reduce the risk of injury if a fall occurs. 100% Fall Protection is the requirement. Employees shall be secured whenever they leave the ground for any reason and are exposed to a fall from more than 6 feet (1.8 meters), provided there are no guardrails or equivalent protection. In most cases, this requires the use of a “double lanyard” system.

D. Administrative / Training - Fall-protection work plans must be prepared for elevated work if fall hazards exist. Employees must be trained to (1) recognize the hazards of falling from heights and (2) to avoid falls to lower levels through holes or openings in walking/working surfaces and walls. Training programs shall include prevention, control, and fall-arrest systems.

3.0 Definitions
A. **Aerial Lifts** - Mechanical devices such as articulated booms personnel lifts, man baskets, scissors lifts, JLGs and bucket trucks used for access to heights.
B. **Anchorage** - A secure point of attachment, not part of the work surface, to which lifelines, retractable lifelines, drop lines, or lanyards are affixed. An anchorage must be capable of supporting a minimum dead weight of 5,000 pounds (2,270 kilograms) for every person attached to it. An anchorage is often a pipeline, beam, girder, column, or floor.
C. **Anchorage Connector** - A component or device that is installed on an anchorage and is specifically intended for attaching a fall-arrest system to the anchorage. An anchorage connector must be capable of supporting a minimum dead weight of 5,000 pounds (2,270 kilograms).
D. **Competent Person** - One who is capable of: 1) Identifying existing and predictable hazards in the surrounding or working conditions. 2) Training personnel in correct procedures for erecting maintaining disassembling and inspecting fall arrest systems. 3) Training personnel in their role in Fall Prevention techniques 4) Taking prompt corrective action where hazards are identified.
E. **Deceleration Distance** - The vertical distance between the harness attachment point at the activation of the fall arrest equipment and that point once the individual comes to a complete stop.
F. **Energy Shock Absorber** - A device that limits shock-load forces on the body.
G. **Fall-Arrest System** - A system specifically designed to secure, suspend, or assist in retrieving a worker in or from a hazardous work area. A fall-arrest system does not prevent a fall, but rather minimizes the fall distance to prevent or reduce injury. The basic components of a fall-arrest system include an anchorage, anchorage connector, lanyard, shock absorber, harness, and self-locking snap hook.
H. **Fall Prevention** - A process for eliminating fall hazards during all phases of work at heights, including access and egress. Examples of fall prevention measures include using complete scaffolds, aerial lifts, and secured ladders.
I. **Free Fall Distance** – The distance of the fall from the point of attachment to the
activation of the equipment. For example; a 6 ft. lanyard anchored at waist level can result in a 6 ft. free fall.

J. **Full-Body Harness** - A device with straps that can be attached to a fall-arrest system. The straps are fastened around a person's body to contain the torso and distribute fall arrest forces over at least the upper thighs, pelvis, chest, and shoulders. A full-body harness system consists of a full-body harness, lanyard, energy shock absorber, and self-locking snap hook.

K. **Guard Rail System** - Barrier system of top rail, mid rail and toe plate erected to prevent personnel from falling from elevated work levels.

L. **Horizontal Lifelines** - allow horizontal movement while providing protection against falls, provided the equipment is properly installed and used. A horizontal lifeline may serve a mobile fixed point for the attachment of lanyards, lifelines, or retractable lifelines.

M. **Lanyard** - A flexible line that secures a person wearing a harness to an anchorage, anchorage connector, lifeline, or drop line. A lanyard must have a nominal breaking strength of 5,000 pounds (2,270 kilograms)

N. **Lifeline** - A flexible vertical or horizontal line, secured to an anchorage or between two anchorages, to which a lanyard or harness may be attached.

O. **Maximum Arresting Force (MAF)** – The maximum or peak force applied to the body during arrest of a fall by the fall arrest system.

P. **Positioning Device System** - Equipment that allows a person to work with both hands free while standing in such a way that a fall could result. Positioning device systems are often used on framework construction and concrete rebar placement.

Q. **Qualified Person** - One who by the possession of a recognized degree, certificate, or professional standing or who by extensive knowledge training and experience has demonstrated their ability to solve or resolve problems relating to the subject matter.

R. **Rope Grabs (Cable Grabs)** – An automatic fall-arresting device connected to the lifeline that acts by inertia to grab the lifeline if a fall occurs.

S. **Retractable Lifeline** - A fall-arrest device that allows free travel without slack rope but locks instantly when a fall begins.

T. **Total Fall Distance** – Is the total distance including free fall distance, deceleration distance, plus any other condition such as the stretch or sliding of the harness or the elongation of a lifeline. Total fall distance can be measured as foot level before the fall to foot level after the fall.

---

**Table: Time vs. Distance**

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<th>Time (Seconds)</th>
<th>Distance (Feet)</th>
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**Approximate Free Fall Speed**

- 1 Second: 10 MPH
- 2 Seconds: 20 MPH
- 3 Seconds: 60 MPH
4.0 Preparing Fall-Protection Plans

A. One of the most important aspects of personal fall protection systems is fully planning the system before it is put into use. The Project Superintendent, with assistance from the Corporate SH&E Department, is responsible for developing the fall protection plan for elevated work if fall hazards exist. Where fall hazards are significant, the plans shall be in writing. Probably the most overlooked component is the planning for suitable anchorage points. Such planning should ideally be done before the construction activity on the structure or building so anchorage points can be incorporated during construction for later use for building maintenance. A complete analysis should be done before designing or specifying the fall protection that is necessary for each job. The following topics must be addressed in the fall protection plan:

1. Identify the fall hazards that are associated with the work to be done, including access and egress to the elevated location.
2. Plan work to eliminate exposure to falls whenever possible, and restrict access to areas where falls of 6 feet or more may occur.
3. Consider the feasibility of installing guardrails or other barriers to prevent falls.
4. Consider feasibility of scaffolding, or use of man-lifts, aerial lifts, or suspended platforms.
5. When the use of fall prevention measures is not possible due to the work location or sequence of tasks, select a suitable fall arrest system.
6. Evaluate requirements for vertical and horizontal mobility.
7. Identify anchor points for lifelines or lanyards.
8. Evaluate any environmental conditions or other factors that may require additional precautions and/or maintenance of the systems selected.
9. Controlled Access - All controlled accesses will be posted, barricaded and a watch individual will be assigned to ensure that unauthorized personnel are prevented from entering the controlled area.
10. Safety Monitoring - Safety Monitoring is strictly PROHIBITED, alternate means of protection will be implemented such as; Barricades, 100% Fall Protection, Guard Rails.
11. Use of a fall protection plan, allowed by OSHA 29CFR1926.502(k)(1-10) for certain types of work, such as residential construction, in lieu of providing adequate fall protection / prevention measures is strictly PROHIBITED.

B. Project management and front line supervision are responsible for implementation and enforcement of this program to ensure 100% compliance by all personnel.

C. The Project Safety Department shall have full authority to ensure 100% enforcement of the program. The Safety Department's primary responsibility is to support program implementation and monitor the program for compliance, advising project management on program status.

D. Subcontractors shall provide equivalent fall protection equipment to their employees.

5.0 Fall Prevention Systems

A. Fall prevention systems provide safe walking and working surfaces in elevated areas and are free from floor openings and are equipped with standard guardrail systems on all open sides. These systems may also include; scaffolds, aerial lifts (JLG, scissor lifts, etc.) and other approved personnel hoisting devices.
B. A standard guardrail system consists of a top rail of 2 X 4 lumber or equivalent materials approximately forty-two inches (42") above the walking/working surface and be able to support 200 pounds force in any direction with minimal deflection. A mid rail capable of supporting 150 pounds must be installed at approximately twenty-one inches (21") above the walking/working surface with a four-inch (4") tall toe board mounted at the walking/working surface. Support posts spacing must not exceed eight feet (8'). These systems are used to guard open sides of floors, platforms, and walkways in elevated areas.

C. Floor opening/hole covers are used to close openings and holes in floors, platforms and walkways. These covers must be capable of supporting four times the maximum potential load they may be subjected to. Typically these will be at least 3/4" plywood of a single thickness unless a stronger cover is needed. The hole cover shall support any anticipated load. The cover must completely cover the opening/hole and to prevent accidental displacement resulting from wind, equipment, or workers' activities, all covers must be secured against accidental displacement. These covers must be marked "HOLE COVER - DO NOT REMOVE".

D. If floor grating or floor plates are to be removed or left out from the work surface, the floor openings must be protected by either hole covers or a guard rail barricade erected at least six (6') feet away from the planned area. This barricade must be equipped with handrail, mid rail and toe boards as outlined above and secured to post located no more than eight (8') feet apart which themselves are secured to the existing floor. Employees required to pass through the barricade will use the 100% Fall Protection Policy starting at or before the time of entry and will use this policy until the floor is re-installed and the guardrail removed. Signs or tags will be attached to the guardrail stating "Caution 100% Fall Protection Required".

E. All controlled accesses zones will be posted, barricaded and a watch individual will be assigned to ensure that unauthorized personnel are prevented from entering the controlled area.

F. The use of a Safety Monitoring system is strictly PROHIBITED, alternate means of protection will be implemented such as; Barricades, 100% Fall Protection, Guard Rails.

G. Use of a fall protection plan, allowed by OSHA 29CFR1926.502(k)(1-10) for certain types of work, such as residential construction, in lieu of providing adequate fall protection / prevention measures is strictly PROHIBITED.
6.0 Fall Arrest Systems

A. Employees working over any operating machinery, open spaces, hazardous substances, unguarded heights, steep slopes or otherwise subjected to falls 6 feet or greater and not protected by fixed scaffolding, guard rails or safety nets shall be secured with a safety harness, a shock absorbent lanyard and/or lifeline.

B. Safety/Body harness means a design of straps which may be secured about the employee in a manner to distribute the fall arresting forces over at least the thighs, pelvis, waist, chest, and shoulders with means for attaching it to other components of a personal fall arrest system.

C. A personal fall arrest system is designed to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, and a body harness and will include a shock absorbent lanyard with double locking snap hooks, deceleration device, lifeline, or suitable combination of these.

D. All personnel will be required to wear an approved full body harness with a twin shock absorbing lanyard when working or traveling at elevations where a fall exposure exist.

E. Safety harnesses, lanyards and lifelines shall be used only for safeguarding employees and for no other purposes.

F. Safety belts shall be used only as part of an employee work positioning system and shall no longer be used for fall protection.

G. Safety harnesses, lanyards, and lifelines shall be inspected and maintained in safe condition. Prior to use, they shall be visually inspected for any signs of damage or deterioration such as wear, fraying, cuts, tears, or damage caused by heat (melting, charring, burning). Safety harnesses shall be inspected also for stitch failures in fabric or worn, cracked, or deformed buckle and D-rings. Lanyards found to have one or more damaged areas which exceed .25 by .25 by .03 inch deep, or eight or more damage areas which exceed .20 by .20 by .01 inch deep, and any other fall protection equipment which is found to be damaged, shall be removed from service. Defective equipment shall be removed from service and repaired or destroyed. Must meet ANSI/ASTM standards.

H. Any safety harness, lanyard, or lifeline, subjected to in-service loading as a result of a fall shall be removed from service.

I. Lifelines, lanyards and safety straps shall be free of knots or splices except at the terminals.

J. Lifelines, lanyards and safety straps shall be so arranged that the worker cannot free fall more than six feet or contact any lower level.
K. All Personal Fall Arrest Systems, Subsystems and Components shall meet the safety standard requirements of ANSI Z359.1-2007
L. All safety harness and lanyard hardware, except rivets, shall be capable of withstanding a tensile loading of 5,400 pounds without cracking, breaking, or making a permanent deformation.
M. Employees shall be provided with and be required to use an approved safety harness, adjusted to the correct size to properly fit them.
N. The safety harness shall be attached by means of a lanyard with double locking snap hooks to either a fixed anchor or a lifeline.
O. Persons tying reinforced steel over 6 feet above the ground or surface shall wear safety harnesses equipped with appropriate closed type hooks or snaps. Positioning lanyards shall be attached to the d-rings located at the waist belt location and be supported by an appropriate work belt. Positioning lanyards need not be of shock absorbing type and must not be used for fall protection. The positioning lanyard must always be backed up by a properly secured shock absorbing fall protection lanyard.
P. Each employee will wear a safety harness with a lanyard secured to a separate vertical lifeline while working from swing scaffolds, bos’n chairs or other suspended platforms where a falling hazard is present.
Q. Where the employee must be lifted through a manhole or other opening of such size as to necessitate lifting him in a vertical attitude, that worker shall wear a harness, which will permit lifting him in such a manner. A waist-harness alone is not acceptable for this purpose.

7.0 Lanyards
A. “Lanyard” means a rope or strap, suitable for supporting one person. One end is fastened to a safety harness and the other end is secured to an approved attachment point or a safety line.
B. Lanyards must be of the shock absorbing, double locking snap type when used for fall protection.
C. The fall protection lanyard shall be attached to the d-ring located in the middle back of the safety harness.
D. The safety harness lanyard will have a maximum length to provide a fall of no greater than 6 feet. To provide 100% fall protection, in most cases, requires the use of a “double lanyard” system.
E. When tools are used which are likely to sever, abrade or burn the nylon lanyard or lifeline protective covers or wire rope lanyard systems must be used to prevent damage.
F. Lanyard connectors (snap hooks and carabiners) are designed to be used only as specified by manufacturer’s recommendations. Examples of inappropriate connections include;
   1. Two snap hooks connected to a single D-ring.
   2. A manner that would result in a load on the gate.
   3. Two snap hooks connected to each other.
   4. Snap hooks are not to be connected back to the lanyard (unless the manufacturer’s instructions for both the lanyard and connector specifically allow such a connection).
   5. To any non-compatible object which is shaped or dimensioned such that the snap hook or carabiner will not close and lock, or that rollout could occur.
G. Large throat opening snap hooks should not be connected to standard size D-rings or similar objects which will result in a load on the gate if the hook or D-ring twists or rotates unless specifically designed for that use by the manufacturer. Large throat snap hooks are generally designed for use on fixed structural elements such as rebar or cross members such as tube and clamp or system scaffolding that are not shaped in a way that can capture the gate of the hook.

8.0 Lifelines
A. A lifeline is a component consisting of a flexible line for connection to an anchorage point at one end to hang vertically (vertical lifeline), or for connection to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting a lanyard or safety harness to the anchorage. Lifelines must be capable of supporting at least 5400 pounds.
B. Secure attachment points shall be used and each shall be visually inspected for damage or deterioration immediately prior to use. Any visual damage or deterioration will be considered adequate reason for replacement or repair of the questionable attachment point.
C. Each employee must have a separate lifeline when the lifeline is vertical, such as when working from suspended scaffolds, bos’n chairs or other suspended work platforms where a falling hazard is present, or when required to work on stored materials in silos, hoppers, tanks and similar storage.
D. The design of systems using horizontal lifelines must be done by a qualified person.
E. Extreme care should be taken in considering a horizontal lifeline for multiple tie-offs. Horizontal lifeline and anchorages strength should be increased for each additional employee to be tied-off.
F. Lifelines used shall be of sufficient length to reach the bottom of the potential drops and fastened to approved attachment points located above the personnel being protected.
G. Thimbles shall be installed to protect ropes from chaffing at points of connection to eyes, rings and snaps.
H. Lifelines shall be secured above the point of operation to an anchorage or structural member capable of supporting a minimum dead weight of 5,400 pounds.
I. Lifelines used in areas where the lifeline may be subjected to cutting or abrasion, shall be a minimum of 7/8-inch wire core manila rope. For all other lifeline applications, a minimum of 3/4-inch manila or equivalent, with a minimum breaking strength of 5,400 pounds, shall be used.
J. When a worker is employed under circumstances where he/she might become entrapped by material, or be overcome by any other cause, he/she shall wear a safety harness attached to a lifeline or other device, attended by another person who shall be stationed, equipped and capable of immediately affecting a rescue.

9.0 Safety Nets
A. Safety nets shall be provided when work places are more than 25 feet above the ground, water or other surfaces where the use of ladders, scaffolds, platforms, or safety belts and lifelines are impractical.
B. Nets shall be inspected daily for damage from abrasion, chemicals or heat and repairs shall be made before work above the net is resumed.
C. Nets shall extend 8 feet beyond the edge of the work surfaces where employees are exposed and shall be no more than 25 feet below the work surfaces.
D. Maximum mesh of nets shall be 6 inches by 6 inches.
E. Where public traffic, pedestrians or other workmen are required to be under a work area, safety nets or other suitable protection devices or structures such as enclosed walkways shall be used. Nets should be lined with material having a maximum mesh of 1 inch by 1 inch out of 22-gauge wire or no. 18 synthetic twine.

F. The net suspension shall be designed and constructed with at least a safety factor of four and as a minimum shall withstand the test loading without permitting contact between the net and any surface or object below the net.

G. Forged steel safety hooks or shackles shall be used to fasten the net to its supports.

H. Connections between net panels shall develop the full strength of the net.

10.0 Training – Fall Protection

A. A training program shall be provided for each employee who might be exposed to fall hazards. The program shall enable each employee to recognize the hazards of falling and shall train each employee in the procedures to be followed in order to minimize these hazards.

B. The Corporate SH&E Department is responsible for the training development and also ensure that each Project Superintendent is trained as the competent person. The Project Superintendent will conduct the fall protection training on the project unless there is a full time SH&E Supervisor assigned.

C. Employees will be re-trained if work conditions change or if the training program has been revised.

D. Each employee must be trained by a competent person qualified in the following areas:
   1. The nature of fall hazards in the work area.
   2. The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used.
   3. The use and operation of guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones and other protection to be used.
   4. The role of each employee in the safety monitoring system when this system is used.
   5. The limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs.
   6. The correct procedures for the handling and storage of equipment and materials and erection of overhead protection.
   7. The role of employees in fall protection plans.

E. Preferred Industrial Contractors, Inc. will maintain a copy of the latest written certification records of fall protection training containing the name of the employees trained, the date(s) of the training, and the signature of the person who conducted the training. If the training was conducted by another employer, the certification record shall indicate the date it was determined the prior training was adequate.

F. Preferred Industrial Contractors, Inc. will perform re-training when any of the following are noted:
   1. Changes in the workplace render previous training obsolete.
   2. Changes in the types of fall protection systems or equipment to be used render previous training obsolete.
   3. Inadequacies in an affected employee’s knowledge or use of fall protection systems or equipment indicate that the employee has not retained the requisite understanding or skill.
11.0 Schedule Of Inspections
A. It is the responsibility of the USER to inspect his safety equipment daily before each use, regardless of ownership.
B. Quarterly inspections are to be performed and documented by a qualified person using the criteria listed in this program or other recognized procedures, which will ensure the integrity of, fall protection systems in use.
C. **ANY EQUIPMENT FOUND TO BE DEFECTIVE SHALL BE REMOVED FROM SERVICE!** DEFECTIVE EQUIPMENT IS TO BE REMOVED FROM THE PROJECT SITE AND DESTROYED!

12.0 In Service Testing
A. Safety harnesses, lanyards, lifelines or other components of an in service fall arresting system (FAS) are not to be tested. Any tests performed to prove whether the system can take the maximum impact loading are to be considered as destructive tests, and the components tested are to be considered unsafe for further use and must be destroyed. Components of a fall arresting system, which have been subjected to an actual fall impact, are to be destroyed to prevent reuse. Retractable lanyards subjected to actual fall impacts are to be tested and re-certified by the manufacturer.

13.0 Cleaning
A. Clean synthetic rope and webbing by removing dust, dirt, and other foreign matter with a damp sponge. Then with a mild solution of commercial soap and warm water, work up to a thick lather with a vigorous back and forth motion. Wipe dry with a clean cloth and hang to dry, but away from excessive heat.
FALL PROTECTION PLAN

1. Identify all fall hazards 6 ft or more in the work area:
   - Leading Edge
   - Stairways
   - Wall Opening
   - Perimeter Edge
   - Ladders
   - Floor Opening
   - Scaffold Erection/Disassembly
   - Excavation
   - Steel Erection
   - Other (describe):

2. Identify Method of Fall Protection:
   - Full Body Harness
   - Guardrails
   - Banicades / Warning Lines 6 ft from Edge
   - Sock Absorbing Lanyard
   - Platforms / Aerial Lifts
   - Perimeter Cables
   - Horizontal Lifeline
   - Baniers / Covers
   - Safety Nets
   - Vertical Lifeline
   - Walls /Fences
   - Roof Permit
   - Other
   - Describe:

J. Describe the procedures for assembly, maintenance, and disassembly of fall protection systems to be used:

4. Scaffold Erection and Use Procedures:
   - Scaffold Type: System Scaffold
   - 4x4 Maximum Intended Load
   - Safety Access
   - Authorization Tags
   - Fully Decked
   - Guardrails
   - Competent Person
   - Describe:

S. Describe the procedures for handling, storage, and securing of tools and materials:
### FALL PROTECTION PLAN (CONT'D)

6. **Identify Method used to determine the adequacy of attachment points:**

   - [ ] Manufacturer’s Data
   - [ ] Assessment by competent person
   - [ ] Existing engineering/design documents
   - [ ] Evaluation by qualified engineer

   **Describe:**

7. **Identify Method of Providing overhead protection for workers who may be in, or pass through, the area below the work site:**

   - [ ] Barricading
   - [ ] Warning Signs
   - [ ] Canopies/Overhead Protection
   - [ ] Hard Hats Required
   - [ ] Toeboards
   - [ ] Guardrails with Paneling or Screens
   - [ ] Other:

   **Describe:**

8. **Identify Method of Providing for prompt, safe removal of injured workers:**

   - [ ] Use Ladders
   - [ ] Drop Lines or Retraction
   - [ ] Initiate Emergency Response
   - [ ] Lift Truck or Personnel Platform
   - [ ] Utilize Scaffolds
   - [ ] Other:

   **Describe:**

---

Participants: Signature certifies that participants have received fall protection/prevention training and have reviewed and understand the requirements covered in this Fall Protection Work Plan.

**Name:**

---


FALL PROTECTION PLAN
CRANE CAPACITY CHART

IC-80.;3F

RADIUS IN FEET FROM ft. R_otation TO LOAD

USE SINGLE PART LOAD LINE FOR LOADS TO 9000 LBS.
(WT. 90LBS.)

USE TWO PART LOAD LINE FOR LOADS TO 18000 LBS.
(WT. 124LBS.)
### IC-80-3F

**CAPACITIES APPLY TO OPERATION ON FIRM SURFACE**

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**BOOM EXTENSION LOADS MUST NOT EXCEED MAIN BOOM CAPACITY.**

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- **USE 0° FOR STRAIGHT BOOM EXTENSION.**
- **USE 25°, 30° OR 35° FOR OFFSET BOOM EXTENSION.**

**MAIN BOOM ANGLE**

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</table>
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