PROGRAM OVERVIEW

ACCESS TO EXPOSURE AND MEDICAL RECORDS

REGULATORY STANDARD: OSHA 29CFR1910.1020 and 1913.10

INTRODUCTION: Records that pertain in any way to exposures or to employee specific health information must be maintained confidentially by the company. Employees must understand what records are kept, why, and how to access these records. This would include medical exams, facility surveys for air contaminants, noise surveys, hearing exams, etc.

TRAINING:

- Employees informed on the types of records, location, and access procedures.

ACTIVITIES:

- Identify the what records must be maintained
- Maintain manufacturer's records confidentially
- Ensure access to records by employees, as required

FORMS:

- Access to Employee Exposure and Medical Records
- As exposure or incident occurs:
  - Exposure Incident Process Flow
  - Exposure Incident Physician Evaluation Statement
  - Exposure Incident Report
- Recordkeeping Requirements for Exposure Records (reference)

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Access to Employee Exposure and Medical Records Program

1. Purpose. This document provides written guidance for specific exposure monitoring, testing results, medical surveillance, and similar documents required by OSHA regulations with regard to employee-specific information. Records that contain health related information specific to an employee or employee exposure must be maintained for specific timeframes.

2. Scope. Applies to any medical or exposure monitoring records, and medical surveillance monitoring records maintained by the company.

3. Responsibilities.

3.1 Area Management:

3.1.1 Determines what records must be maintained. (Reference Recordkeeping Requirements for Medical and Exposure Records form)

3.1.2 Ensures medical and exposure records are maintained confidentially.

3.1.3 Ensures employees have access to medical and exposure records.

3.2 Employees:

3.2.1 Understand where records are kept, why they are required, and how to access them.

3.3 Safety Representative must (as needed):

3.3.1 Assist in the implementation of this program.

4. Procedure.

4.1 Access Rules.

4.1.1 Employee access to records must be provided within 15 working days from the date of request.

4.1.1.1 Except for trade secrets, employers are to disclose the specific chemical identity [chemical name and Chemical Abstract Service (CAS) number] of materials for which exposure records are requested

4.1.1.2 Requests need not be in writing, unless trade secret information is involved in the request.

4.1.1.3 Delays of more than 15 days must be documented in writing and the employee informed (also in writing) of the reason for the delay and include the date of release of the record.

4.1.1.4 Access may be to employees to whom the records pertain or to that employee's legal representative. The records of other employees are not to be considered part of this information, unless the information is part of objective data evaluations.

4.1.2 OSHA may access these records at any time without written consent of the employee.

4.1.2.1 OSHA representatives must govern the records in accordance with their policy which includes

4.1.3 Health professionals (physicians, occupational health nurses, industrial hygienists, toxicologists, and epidemiologists) who require information for non-emergency medical treatment may request access to medical records with the written consent of the patient or their legal representative.

4.1.4 Health professionals (physicians, occupational health nurses, industrial hygienists, toxicologists, and epidemiologists) who require information for emergency or medical treatment of an exposed employee will be granted immediate access to pertinent information about the exposure without delay.

4.1.4.1 If trade secret information is part of this record, confidentiality agreements may be obtained at a future point, however, immediate information will be transmitted as it pertains to the emergency medical treatment.

4.1.5 Employers must inform their workers initially and at least annually of their rights to access to medical and exposure records.

5. Safety Information.

5.1 Records Retention:

5.1.1 Exposure records are generally required to be maintained for 30 years.

5.1.2 Medical records are generally required to be maintained for the duration of employment plus 30 years.

5.1.3 Biological and Chemical monitoring results are generally maintained for the duration of employment plus 30 years.

5.1.4 First aid records and experimental toxicological research records are excluded from the 30-year retention requirements.

5.1.5 Material Safety Data Sheets and Chemical Inventory Information is generally not required to be maintained, provided the specific information on chemical name, manufacturer and date is maintained in the exposure record.

5.1.6 Personal medical records for short-term employees (less than one year) do not have to be retained if they are provided to the employee on termination

5.1.7 X-rays (except chest x-rays) may be microfilmed for easier storage. Chest x-rays must be maintained in their original condition.

5.2 Copies of Records

5.2.1 Employees are entitled to view their records at any time.

5.2.2 One copy of the record will be provided within 15 days of a written request at no charge to the employee.

5.2.2.1 X-rays may be viewed at the site or at a convenient off-site location.

5.3 Transfer of Records

5.3.1 Should the company cease to do business during the record retention time frame, the company will contact OSHA to determine the disposition of the records.

5.3.1.1 OSHA may request the records be forwarded to OSHA for retention, or

5.3.1.2 OSHA may request disposal of the records. If disposal is determined, complete destruction of the record through incineration or shredding is required.

6. Training and Information

6.1 Employees must be informed of the types of records maintained by the company, who maintains these records, and the process for accessing their personal records.

7. Definitions.

- *Access* – The right to read, examine and copy.

- *Exposure Record* - Environmental (workplace) monitoring or measuring of a toxic substance or harmful physical agent, including personal, area, grab, wipe, or other form of sampling, as well as related collection and analytical methodologies, calculations, and other background data relevant to interpretation of the results obtained; or Biological monitoring results which directly assess the absorption of a toxic substance or harmful physical agent by body systems (e.g., the level of a chemical in the blood, urine, breath, hair, fingernails, etc.) but not including results which assess the biological effect of a substance or agent or which assess an employee's use of alcohol or drugs;

- *Medical Record* – Documentation concerning the health status of an employee which is made or maintained by a physician, nurse, or other health care personnel, or technician, including: Questionnaires or histories, medical examination results or laboratory test results (including x-rays), medical opinions, descriptions of treatments and prescriptions, detailed first aid descriptions, and employee medical complaints. Health insurance claims and voluntary employee assistance program information (drug or alcohol counseling, and/or personal counseling programs) are not considered part of the medical record if they are maintained in a separate system, nor are voluntary employee assistance program information.

- *Objective Data Evaluations* - a type of exposure evaluation using area or personnel sampling where the data is representative of employee exposures in the work environment.

- *Trade Secret* – Confidential information that pertains to the chemical make up of a substance or mixture that, when disclosed, will have a negative impact on the company’s business activities with regard to trademarked or similarly protected products.

PROGRAM OVERVIEW

ACCIDENT INVESTIGATION AND REPORTING SAFETY PROGRAM

REGULATORY STANDARD: OSHA - 29 CFR 1904

INTRODUCTION: The accident investigation and reporting program is a tool used to ensure notification of accidents and assist in the correction action process. Accident investigation is primarily a fact-finding procedure - the facts revealed are used to prevent recurrences of similar accidents in the future.

TRAINING:

- Supervisors should be trained in accident investigation
- Employees should be trained on when and how to report accidents and incidents

ACTIVITIES:

- Determine who is a part of the Accident Investigation Team, which may include supervisors, management, and employees
- Determine accident and near miss reporting procedures
- OSHA Recordkeeping, forms 300 and 301 or equivalent
- Injury trending

FORMS:

- Accident, Incident, Near Miss Investigation Report
- Training Attendance Roster

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Accident Investigation and Reporting Safety Program

1. Purpose. Accidents and Incidents result from a failure of people, equipment, supplies, or surroundings. A successful accident investigation determines not only what happened, but also attempts to find out how and why the accident occurred. Investigations are an effort to prevent a similar or perhaps more disastrous sequence of events. The company will review and evaluate this safety program:

1.1 On an annual basis

1.2 When changes occur that prompt revision of this document (within the company or to regulatory documents)

1.3 When facility operational changes occur that require a revision of this document

2. Scope. This program applies to the total workplace regardless of the number of workers employed or the number of work shifts.

3. Responsibilities:

3.1 Management:

3.1.1 Ensure supervisors are trained in accident investigation, as needed or required.

3.1.2 Encourage employees to report accidents and incidents.

3.1.3 Provide resources, as needed or required, to implement corrective actions based on results of incident investigations.

3.1.4 Review incident reports and any incident trends to establish corrective and preventive actions.

3.1.5 Communicate incident information to other areas of the company where similar incidents may occur, and implement preventive actions to eliminate the potential for future incidents.

3.1.6 Maintain required documentation.

3.1.7 Train appropriate personnel to review and implement Job Hazard Analysis and Trend Analysis as needed.

3.2 Supervisor:

3.2.1 Provide or arrange for adequate medical treatment for any injured employee.

3.2.2 Promptly investigate any incidents or near miss incidents that occur.

3.2.3 Provide recommendations to management on corrective actions to prevent recurrence of similar incidents.

3.3 Employees:

3.3.1 Promptly report incidents or near misses that occur.

3.3.2 Report hazardous conditions to your supervisor.

3.3.3 Participate in incident investigations, as needed or required.

3.4 Safety Officer (as needed or required):

3.4.1 Participate in incident investigations.

3.4.2 Review hazard reports and incident reports.

3.4.3 Recommend corrective or preventive actions to eliminate similar incidents.

3.4.4 Track corrective and preventive actions to ensure completion.

3.4.5 Prepare incident trend summaries and present to management.

3.4.6 Maintain required documentation.

4. Procedure:

4.1 Accident Investigation Team Composition. Supervisors, in conjunction with the safety officer as needed or required, are primarily responsible for the investigation of accidents and incidents. In addition, members of the safety committee or a separate Accident Investigation Team may serve as incident investigators.

4.2 Hazard Reporting:

4.2.1 Hazards or potential hazards identified by employees will immediately be reported to management or supervision.

4.2.1.1 Person reporting hazard:

4.2.1.1.1 Notify department Supervisor of the hazard.

4.2.1.1.2 Initiate lock-out/tag-out, if required, on the machine.

4.2.1.2 Supervisor:

4.2.1.2.3 Notify all affected workers of hazard.

4.2.1.2.4 Notify Maintenance Department of hazard, if required.

4.2.1.2.5 Ensure hazard is properly marked and controlled until corrected.

4.3 Accident Investigation, Analysis and Reporting. Accident investigation is primarily a fact-finding procedure; the facts revealed are used to prevent recurrences of similar accidents. The focus of accident investigation will be to prevent future accidents and injuries to increase the safety and health of all our employees.

4.3.1 Immediate concerns:

4.3.1.1 Ensure any injured person receives proper care.

4.3.1.2 Ensure co-workers and personnel working with similar equipment or in similar jobs are aware of the situation. This is to ensure that procedural problems or defects in certain models of equipment do not exist.

4.3.1.3 Start the investigation promptly.

4.3.2 Accident Investigation and Reporting. OSHA Form 301 (or a standardized investigation report form which details specific company requirements for investigation) will be developed and used to gather data to determine causes and corrective actions. As a minimum the form will contain the following areas of concern.

4.3.2.1 Injured employee's name and any other identifier

4.3.2.2 Employee's address

4.3.2.3 Date and time of injury

4.3.2.4 Shift and department

4.3.2.5 Sex/DOB

4.3.2.6 Length of service (hire date) and length of time at specific job

4.3.2.7 Time shift started

4.3.2.8 Physician's and hospital name (if transported)

4.3.2.9 Indication if employee was hospitalized as an in-patient (i.e. overnight)

4.3.2.10 Type of injury

4.3.2.11 Body part or body system injured

4.3.2.12 Resulting fatalities (date of death)

4.3.2.13 Occupation or task being performed just prior to being injured

4.3.2.14 Description and analysis of accident

4.3.2.15 Indication of the object or substance that directly harmed the employee

4.3.2.16 Name of person completing form, their title, phone number and the date

4.3.3 Additional information that is recommended on the form is:

4.3.3.1 Time shift started

4.3.3.2 Overtime length when injury occurred

4.3.3.3 Action taken to prevent recurrence

4.3.3.4 Employee's statement

4.3.3.5 Witnesses' statement

4.3.3.6 Employer's statement

4.3.3.7 Name of person(s) reviewing form and date of review

4.4 Accident Investigation Review Team. A member of management responsible will review all Incident Reports for the department/section involved ensuring pertinent information is transmitted to all concerned and remedial action(s) taken.

4.5 Accident Investigation Final Report. The report will include but is not limited to the following:

4.5.1 Investigation report form and pertinent data

4.5.2 Photographs/drawings/exhibits of scene

4.5.3 Narrative of accident

4.5.4 Sequence of events

4.5.5 Contributing information

4.5.6 Findings and recommendations of review team

4.5.7 Action items and completion dates

4.5.8 Responsible persons

4.5.9 Follow-up procedures to ensure completion

4.5.10 Distribution list

4.6 Safety and Job Hazard Analysis. The company will identify through the use of information sources, screening and job surveys any activities that place employees at risk. After any accident or near miss, the task or job in question will have a job hazard analyses routinely performed by a qualified person(s). This analysis will help to verify that all required actions are being taken to determine if risk factors for a work position have been reduced or eliminated to the maximum extent feasible.

4.6.1 Workstation Analysis. Workstation analysis will be conducted to identify risk factors present in each job or workstation.

5. Safety Information:

5.1 Administrative Controls. Once data has been gathered from the Incident Report, administrative controls will be used where needed to eliminate or reduce the frequency and severity of accidents and near misses. Examples of administrative controls include the following:

5.1.1 Reducing the production rates and or line speeds where possible.

5.1.2 Providing rest pauses to relieve fatigued muscle-tendon groups.

5.1.3 Increasing the number of employees assigned to a task to alleviate severe conditions, especially in lifting heavy objects.

5.1.4 Using job rotation and as a preventive measure, not as a response to physical symptoms. The principle of job rotation is to alleviate physical fatigue and stress of a particular set of muscles and tendons by rotating employees among other jobs that use different muscle-tendon groups. If rotation is utilized, the job analyses must be reviewed to ensure that the same muscle-tendon groups are not used when they are rotated.

5.1.5 Providing sufficient numbers of standby/relief personnel to compensate for foreseeable upset conditions on the line (e.g., loss of workers).

5.1.6 Job enlargement. Having employees perform broader functions which reduce the stress on specific muscle groups while performing individual tasks.

5.1.7 Machine maintenance/guarding. Ensure regular maintenance is performed on machines and/or tools used by employees are properly guarded and that maintenance is routinely performed.

5.1.8 Employee training. Ensure all employees are properly trained in the hazards associated with the job before work is performed unsupervised.

5.2 Medical Management. The Safety Officer or other designated person will manage the safety program. Employees of each work shift should have access to health care providers or designated alternates in order to facilitate treatment, surveillance activities, and recording of information. During an accident investigation the medical management safety program will, as a minimum, address the following issues:

5.2.1 Injury and illness recordkeeping

5.2.2 Early recognition of problems such as strains and muscle fatigue that could lead to accidents

5.2.3 Systematic evaluation and referral

5.2.4 Conservative treatment after an accident

5.2.5 Conservative return to work after an accident

5.2.6 Systematic monitoring

5.2.7 Recordability criteria. The accident must be work related. Simply stated, unless the illness was caused solely by a non-work-related event or exposure off-premises, the case is presumed to be work related.

5.2.8 Occupational injuries. Injuries are caused by instantaneous events in the work environment. To keep recordkeeping determinations as simple and equitable as possible, back cases are classified as injuries even though some back conditions may be triggered by an instantaneous event and others develop as a result of repeated trauma. Any occupational injury involving any of the following circumstances is to be recorded on the OSHA-Form 300:

5.2.8.1 Medical treatment resulting from significant injury/illness as diagnosed by a physician or other licensed health care professional

5.2.8.2 Loss of consciousness

5.2.8.3 Restriction of work or motion

5.2.8.4 Contaminated needle stick or sharp exposure

5.2.8.5 Work related tuberculosis infection

5.2.8.6 Cases of medical removal as required under specific OSHA Regulatory Standard

5.2.8.7 Transfer to another job

5.2.9 When an incident is recorded on the OSHA Form 300, that same incident must also be recorded on OSHA Form 301.

5.2.10 Periodic Workplace Walk-throughs. Supervisors, in conjunction with the Safety Officer or Health Care provider as needed or required, will conduct periodic, systematic workplace walk-throughs on a monthly basis (OSHA recommended) to remain knowledgeable about operations and work practices, to identify potential light duty jobs, and to maintain close contact with employees. Safety Officers and Health care providers also should be involved in identifying accident risk factors in the workplace as part of the Accident Investigation Team. A record will be kept documenting the date of the walk-through, area(s) visited, accident risk factors recognized, and action initiated to correct identified problems. Follow-up will be initiated and documented to ensure corrective action is taken when indicated.

5.3 Accident Trend Analysis:

5.3.1 The information gathered from incident investigations, OSHA logs and hazard reports will help to identify areas or jobs where potential accident or injury conditions could or do exist. This information may be shared with anyone in the company since employees' personal identifiers are not solicited. The analysis of medical records (e.g., sign-in logs and individual employee medical records) may reveal areas or jobs of concern, but it may also identify individual workers who require further follow-up. The information gathered while analyzing medical records will be of a confidential nature, therefore care must be exercised to protect the individual employee's privacy.

5.3.2 The information gained from the trend analysis may help determine the effectiveness of the various safety programs initiated to decrease accidents in our facility.

5.3.3 Employee survey or Job Hazard Analysis. A survey may be used to provide a standardized measure of the extent of progress in reducing work-related accidents for each area of the plant or facility. This will determine which jobs are exhibiting problems and measure progress of the overall safety program.

5.3.3.1 Design of the survey. A survey of employees will be conducted to measure employee awareness of work-related accident and to report the location, frequency, and type of accidents likely to occur.

5.3.3.2 Surveys normally will not include an employee’s personal identifiers. This is to encourage employee participation in the survey.

5.3.3.3 Frequency. Surveys will be conducted as a minimum on an annual basis or anytime deemed necessary by the Accident Investigation Team. Conducting the survey annually should help detect any major change in the prevalence, incidence, and/or location of reported and unreported accidents.

5.3.4 List of Jobs. The company will compile a list of jobs, tasks and activities. This listing should be prioritized, based on the risk factors for type of injury (s) sustained. Jobs will be analyzed to determine the physical procedures used in the performance of each job including lifting requirements, postures, handgrips, frequency of repetitive motion, and general safety requirements of the job. This information will assist health care providers in recommending assignments to light or restricted duty jobs. Supervisors should periodically review and update the lists.

6. Training and Information:

6.1 The purpose of accident investigation training and education is to ensure those members of the Accident Investigation Team and all of our employees are sufficiently informed about the Accident Investigation Safety Program.

6.1.1 Employees will be adequately trained about the company's Accident Investigation Safety Program. Proper training will allow managers, supervisors, and employees to understand the procedures to follow to report an accident, hazards associated with a job or production process, their prevention and control, and their medical consequences.

6.1.2 Training program design. The program will be designed and implemented by the Safety Officer, Senior Manager or other designated person. Appropriate special training will be provided for personnel responsible for administering the program.

6.1.3 Learning level. The safety program will be presented in language and at a level of understanding appropriate for the individuals being trained. It will provide an overview of the potential risk of illnesses and injuries, their causes and early symptoms, the means of prevention, and treatment.

6.1.4 Training for affected employees will consist of both general and specific job training:

6.1.4.1 General Training. Employees will be given formal instruction on the hazards associated with their jobs and with their equipment. This will include information on the varieties of hazards associated with the job, what risk factors cause or contribute to them, how to recognize and report hazardous conditions, and how to prevent accident with their respective jobs. This instruction will be repeated for each employee as necessary. This training will be conducted on an annual basis. (OSHA experience indicates that, at a minimum, annual retraining is advisable).

6.1.4.2 Job-Specific Training. New employees and reassigned workers will receive an initial orientation and hands-on training before being placed in a full-production job. Each new hire will receive a demonstration of the proper use of and procedures for all tools and equipment before assignment.

6.1.5 Training for Supervisors. Supervisors are responsible for ensuring that employees follow safe work practices and receive appropriate training to enable them to do this. Supervisors therefore will undergo training comparable to that of the employees. Such additional training as will enable them to recognize and correct hazardous work practices, proper accident reporting/investigation requirements, and to reinforce the company safety program.

6.1.6 Training for Managers. Managers will be made aware of their safety and health responsibilities and will receive sufficient training pertaining to issues at each workstation and in the production process as a whole so that they can effectively carry out their responsibilities.

6.1.7 Training for Engineers and Maintenance Personnel. Plant engineers and maintenance personnel will be trained in the prevention and correction of job hazards through job and workstation design and proper maintenance, both in general and as applied to the specific conditions of the facility.

6.2 Employee Training and Education. Health care providers will participate in the training and education of all employees, as needed or required. This training will be reinforced during workplace walk-throughs and the individual health surveillance appointments. All new employees will be given such education during orientation. This demonstration of concern along with the distribution of information should facilitate early recognition of accident conditions before their development, an elimination or reduction in accidents, and increased likelihood of compliance with recognition, prevention, and control.

7. Definitions.

- *Accident* - An injury or substance exposure that results in a detrimental health effect to an individual.

- *Incident* – An event that results in an accident, near miss or property damage.

- *Near Miss* – An avoided accident. An incident that could have occurred, but due to mitigating circumstances (or luck) did not occur.

PROGRAM OVERVIEW

AERIAL LIFT SAFETY PROGRAM

REGULATORY STANDARD OSHA – 29 CFR 1926.453

INTRODUCTION: Aerial Lift includes boom-supported aerial platforms, such as cherry pickers or bucket trucks. This safety program is intended to address the issues of employee training, safety requirements, maintenance, and general operation of Aerial Lift.

TRAINING:

- Employees trained prior to use in both a classroom component and an assessment of the operator performance with the equipment.

ACTIVITIES:

- Identify the tasks that require an aerial lift
- Write and communicate workplace specific procedures that outline the operation, and limitations, of aerial lifts
- Maintain manufacturer's requirements, limits and documentation
- Conduct documented daily inspections prior to use
- Implement, maintain, and inspect fall arrest systems as required
- Annually evaluate the aerial lift program to assure it is relevant and functioning properly

FORMS:

- Aerial Lift Operator Checklist
- Aerial Lift Operator Evaluation Assessment
- Aerial Lift Operator Performance Requirements
- Aerial Lift Training Wallet Cards
- Training Attendance Roster

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AERIAL LIFT SAFETY PROGRAM

1. **Purpose.** This document defines the process for managing Aerial Lift.

2. **Scope.** Applies to all locations where Aerial Lift are used or maintained. This procedure covers operator selection, training, equipment operations, and maintenance.

3. Responsibilities.

3.1. Management will:

3.1.1. Identify the tasks that require an aerial lift.

3.1.2. Assure the correct type of equipment is purchased.

3.1.3. Document workplace specific procedures that outline the operation, and limitations, of Aerial Lift.

3.1.4. Assure operators are initially trained and evaluated every 3 years.

3.1.5. Annually evaluate the aerial lift program to assure it is relevant and functioning properly.

3.2. Safety Officer will (as needed):

3.2.1. Work with management to assure appropriate PPE and emergency equipment is provided.

3.2.2. Assist in the development of workplace specific aerial lift operation rules and procedures.

3.2.3. Evaluate the course content of the various aerial lift training courses, assuring they meet the requirements of the OSHA standard, and any additional company requirements as outlined in this procedure.

4. Procedure.

4.1. Aerial Lift Requirements:

4.1.1. Any use of an aerial lift must be in accordance with the requirements and limits identified in the owner's manual from the manufacturer. Develop and document appropriate workplace specific rules and procedures, where required.

4.1.2. Aerial Lift may be "field modified" for uses other than those intended by the manufacturer, provided the modifications have been verified in writing by the manufacturer or by any other equivalent entity to be in conformity with all applicable provisions of ANSI A92.2 – 1969 and OSHA 1926.453 and to be at least as safe as the equipment was before modification.

4.1.3. The insulated portion of an aerial lift shall not be altered in any manner that might reduce its insulating value.

4.1.4. Articulating boom and extensible boom platforms, designed as personnel carriers, shall have both platform (upper) and lower controls. Upper controls shall be in or beside the platform within easy reach of the operator. Lower controls shall provide for overriding the upper controls. Controls must be plainly marked as to their function.

4.1.5. Manufacturers' manuals are available and stored in the weatherproof containers on the lifts or in the mobile units.

4.1.6. The aerial lift must have a reverse signal alarm audible above the surrounding noise level or the vehicle is backed up only when a spotter is used.

4.2. **Lift Operations:**

4.2.1. Ensure that equipment is inspected each day prior to use to determine that controls are in safe working condition.

4.2.2. Fall arrest system lanyards must be used and attached to the anchor point on the floor of the basket or the boom of the lift. Securing the lanyard to an adjacent pole, structure, or equipment, or to the railings of the basket while working from an aerial lift shall NOT be permitted. If employees are required to leave the basket and are subjected to a fall hazard, as second lanyard must be used to ensure that fall protection requirements are continuous.

4.2.3. Employees shall always stand firmly on the floor of the basket and shall not sit or climb on the edge of the basket or use planks, ladders, or other devices for a work position.

4.2.4. Full body harnesses (as part of a personal fall arrest system) will be worn and a lanyard attached to the boom or basket when working.

4.2.5. The manufacturer's boom and basket weight limits shall not be exceeded.

4.2.6. The brakes shall be set and when outriggers are used, they shall be positioned on pads or a solid surface. Wheel chocks shall be installed before using an aerial lift on an incline provided they can be safely installed.

4.2.7. The base or body of the aerial lift truck shall not be moved when the boom is elevated in a working position with employees in the basket, except for equipment which is specifically designed for this type of operation.

4.2.8. Climbers (or similar spiked shoes) may not be worn while performing work from the aerial lift.

4.2.9. Never allow an aerial lift to be used as a crane or material-lifting device.

4.2.10. A hard hat shall be worn at all times when operating Aerial Lift.

4.2.11. Entry gates or chains shall be closed before operating the lift.

4.2.12. For aerial lifts that have both upper and lower controls, the lower controls shall not be operated unless permission has been obtained from the employee in the lift, except in case of emergency.

4.2.13. Before moving an aerial lift for travel, the boom must be inspected to see that it is properly cradled and outriggers are in the stowed position.

4.2.14. When moving the vehicle in reverse, the signal alarm must be audible above the surrounding noise level or a spotter must be used to signal that it is safe.

4.2.15. When required to exit or climb out of an elevated aerial lift to a location not otherwise protected by guardrails, floor, or other continuous means of fall protection, operators shall use a second shock-absorbing lanyard to connect to the new location before disconnecting from the aerial lift. When entering an aerial lift from an unprotected location, operators shall connect a shock-absorbing lanyard to the anchorage point in the aerial lift before entering.

4.2.16. Employees should not position themselves between overhead hazards, such as joists and beams, and the rails of the basket. If such positioning is required, the fall protection system must account for the shorter distance to the hazard in case of a fall.

4.2.17. Never override hydraulic, mechanical, or electrical safety devices.

4.2.18. Always treat power lines, wires and other conductors as energized, even if they are down or appear to be insulated.

4.2.19. Operators shall maintain safe distances from electrical power lines, conductors or bus bars. Operators must allow for boom or platform movement or electrical line sway or sag. Operators shall follow minimum safe approach distances (MSAD). <u>At no time will an operator position the bucket closer than 10’ from any electrical source.</u>

MSAD (Minimum Safe Approach Distance) to Energized (Exposed or Insulated) Power Lines

Voltage Range (Phase to Phase)	Minimum Safe Approach Distance
0 to 300V	10’
Over 300 to 50KV	10’
Over 50KV to 200KV	15’
Over 200KV to 350KV	20’
Over 350KV to 500KV	25’
Over 500KV to 750KV	35’
Over 750KV to 1000KV	45’

4.3. Records and Documentation:

4.3.1. Workplace specific training (initial and retraining) records. An Operator Evaluation Form must be retained.

4.3.2. Training records for current operators must be retained for the duration they will operate the lift. Records should be retained for 3 years after this point.

4.3.3. Documentation of daily lift inspection must be maintained.

5. Safety Information.

5.1. Fuel tanks may not be filled while the engine is running.

5.2. Fuel caps must be in place before starting.

5.3. Liquid fuels such as gasoline and diesel fuel must be handled in accordance with NFPA standards for Flammable and Combustible Liquids.

5.4. The operator must conduct a safety / circle check of the vehicle to determine hazards.

5.5. The operator must conduct a worksite inspection.

5.6. Perform electrical system safety tests on aerial lift devices per ANSI/SIA A92.2 requirements.

5.7. Inspect hydraulic and pneumatic system components (Busting Safety Factor) on aerial lift devices per ANSI/SIA A92.2 requirements.

5.8. Conduct welding operations on aerial lift devices per Automotive Welding Society (AWS) Standards.

6. Training and Information.

6.1. Training must occur before operators are allowed to operate an aerial lift unsupervised, and such operations may not endanger either the operators or the trainee.

6.1.1. Initial information (classroom, discussion)

6.1.2. Evaluation and instruction on the operation of the aerial lift at the workplace.

6.2. Initial Training must provide for:

6.2.1. Operation training provides skills and knowledge related to the lift the operator is authorized to drive. These include: inspections, controls, vehicle stability and capacity and any specific operating limitations.

6.2.2. An evaluation of the operator, in the workplace, performing typical aerial lift tasks must occur initially.

7. Definitions.

7.1. *Aerial Lift* – Aerial Lift include the following types of devices used to elevate personnel to job-sites above ground, extensible boom platforms, aerial ladders, articulating boom platforms and vertical towers. The equipment may be powered or manually operated and are deemed to be Aerial Lift whether or not they are capable of rotating about a substantially vertical axis.

PROGRAM OVERVIEW

BACK SAFETY IN THE WORKPLACE PROGRAM

REGULATORY STANDARD: OSHA - 29 CFR 1903. (General Duty Clause)
OSHA - 29 CFR 1910.151 (Medical Services)
Best Practices - Ergonomics

INTRODUCTION: Outlines the methods for identifying back disorder risk factors and for implementing protective measures to prevent back injuries.

TRAINING:

- Recommended for most workplaces

ACTIVITIES:

- Identify risk factors for back injury in the operations
  - Repetitive or prolonged activities
  - Awkward postures
  - Unusual size or weight objects
- Implement any required controls to minimize or eliminate hazards.

FORMS:

- Training Attendance Roster, as needed

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Back Safety in the Workplace Program

1. Purpose. This safety program is designed to establish clear company goals and objectives with regard to back safety and will be communicated to all required personnel. The company will review and evaluate this safety program:

1.1 On an annual basis

1.2 When changes occur to 29 CFR that prompt revision of this document

1.3 When facility operational changes occur that require a revision of this document

1.4 When there is an accident or close-call that relates to this area of safety

1.5 Review the safety program any time these procedures fail

2. Scope. This program applies to the total workplace regardless of the number of workers employed or the number of work shifts

3. Responsibilities.

3.1.1 Management and Supervisor:

3.1.1.1 Evaluate the workplace for potential back safety issues

3.1.1.2 Implement controls and awareness training to prevent back injuries

3.1.1.3 Review this program and information at least annually to assure it remains effective.

3.1.2 Employees:

3.1.2.1 Follow workplace rules and procedures

3.1.2.2 Immediately report injuries or symptoms of back disorders

3.1.3 Safety Officer (as needed or required):

3.1.3.1 Assist in the implementation of the back safety program

4. Procedure.

4.1 Back Disorder Risk Factors. Identification of hazards will be based on risk factors such as conditions of a job process, workstation, or work methods that contribute to the risk of developing problems associated with back disorders. Not all of these risk factors will be present in every job containing stressors nor is the existence of one of these factors necessarily sufficient to cause a back injury. Supervisors will use the following known risk factors to isolate and report suspected problem areas:

4.1.1 Repetitive and/or prolonged activities

4.1.2 Bad body mechanics such as:

4.1.2.1 Continued bending over at the waist

4.1.2.2 Continued lifting from below the knuckles

4.1.2.3 Continued lifting above the shoulders

4.1.2.4 Twisting at the waist

4.1.2.5 Twisting at the waist while lifting

4.1.2.6 Lifting or moving objects of excessive weight

4.1.2.7 Lifting or moving object of asymmetric size

4.1.2.8 Prolonged sitting with poor posture

4.1.2.9 Lack of adjustable :

4.1.2.9.1 Chairs

4.1.2.9.2 Footrests

4.1.2.9.3 Body supports

4.1.2.9.4 Work surfaces at workstations

4.1.2.10 Poor grips on handles

4.1.2.11 Slippery footing

4.1.2.12 Frequency of movement

4.1.2.13 Duration and pace

4.1.2.14 Stability of load

4.1.2.15 Coupling of load

4.1.2.16 Type of grip

4.1.2.17 Reach distances

4.1.2.18 Work height

4.2 Safe Lifting Techniques. First, use a pushcart or other material-handling device! Second, ask a co-worker for help if no device is available! If you must lift alone here are some tips. Before starting to lift or carry anything, check your entire walkway to make sure your footing will be solid. Your shoes should give you good balance, support and traction. Keep loads as close to your body as possible. The following situations show basic lifting techniques to avoid injury:

4.2.1 Lifting or lowering from a high place

4.2.1.1 Stand on a platform instead of a ladder

4.2.1.2 Lift the load in smaller pieces, if possible

4.2.1.3 Slide the load as close to yourself as possible before lifting

4.2.1.4 Grip firmly and slide it down

4.2.1.5 Get help when you need it to avoid injury

4.2.2 Lifting from hard-to-get-at places

4.2.2.1 Get as close to the load as possible

4.2.2.2 Keep back straight, stomach muscles tight

4.2.2.3 Push buttocks out behind you

4.2.2.4 Bend your knees

4.2.2.5 Use leg, stomach, and buttock muscles to lift -- not your back

4.2.3 Lifting drums, barrels, and cylinders

4.2.3.1 Use mechanical assists

4.2.3.2 Always be aware that loads can shift

4.2.3.3 Get help if load is too heavy

4.2.4 Awkward objects

4.2.4.1 Bend your knees with feet spread

4.2.4.2 Grip the top outside and bottom inside corners

4.2.4.3 Use your legs to lift, keeping back straight

4.2.5 Shoveling

4.2.5.1 Make sure your grip and balance are solid

4.2.5.2 Tighten your abdomen as you lift

4.2.5.3 Keep the shovel close to your body

4.2.5.4 Use the strength of your thigh muscles to bring you to an upright position

4.2.5.5 Increase your leverage by keeping your bottom hand low and toward the blade

4.2.6 General safety tips

4.2.6.1 Don't lift objects over your head

4.2.6.2 Don't twist your body when lifting or setting an object down

4.2.6.3 Don't reach over an obstacle to lift a load

4.2.6.4 Pace yourself to avoid fatigue

5. Safety Information.

5.1 Job Hazard Analysis and Work Station Analysis Surveys. Job hazard analysis surveys will be routinely performed by a qualified person for jobs that put workers at risk. This analysis survey will help to verify risk factors and to determine if risk factors for a work position have been reduced or eliminated to the extent feasible.

5.1.1 Upper extremities. For upper extremities three (3) measurements of repetitiveness will be reviewed:

5.1.1.1 Total hand manipulations per cycle.

5.1.1.2 The cycle time.

5.1.1.3 The total manipulations or cycles per work shift.

5.1.2 Force measurements. Force measurements will be noted as an estimated average effort and a peak force (unless quantitative measurements are feasible). They will be recorded as "light," "moderate," or "heavy".

5.1.3 Tools. Tools will be checked for excessive vibration and weight. (The NIOSH criteria document on hand/arm vibration should be consulted.) The tools, personal protective equipment, and dimensions and adjustability of the workstation will be noted for each job hazard analysis.

5.1.4 Postures. Hand, arm, and shoulder postures and movements will be assessed for levels of risk.

5.1.5 Lifting Hazards. Workstations having tasks requiring manual materials handling will have the maximum weight-lifting values calculated. (The NIOSH *Work Practices Guide for Manual Lifting* should be used for basic calculations.)

5.1.6 Videotape Method. The use of videotape, where feasible, will be used as a method for analysis of the work process. Slow-motion videotape or equivalent visual records of workers performing their routine job tasks will be used where practical to determine the demands of the task on the worker and how each worker actually performs each task. A task analysis log/form will be used to break down the job into components that can be individually analyzed.

5.2 Hazard Prevention and Control. Company management understands that engineering solutions, where feasible, are the preferred method of control for ergonomic hazards. The focus of this safety program is to make the job fit the person, not to make the person fit the job. This is accomplished by redesigning the workstation, work methods, or tools to reduce the demands of the job. Such as high force, repetitive motion, and awkward postures. This safety program will whenever possible research into currently available controls and technology. The following examples of engineering controls will be used as models for workstation design and upgrade.

5.2.1 Workstation Design. Workstations when initially constructed or when redesigned will be adjustable in order to accommodate the person who actually works at a given workstation. It is not adequate to design for the "average" or typical worker. Workstations should be easily adjustable and either designed or selected to fit a specific task so that they are comfortable for the workers using them. The workspace should be large enough to allow for the full range of required movements especially where hand held tools are used. Examples include:

5.2.1.1 Adjustable fixtures on work tables so that the position of the work can be easily manipulated.

5.2.1.2 Workstations and delivery bins that can accommodate the heights and reach limitations of various-sized workers.

5.2.1.3 Work platforms that move up and down for various operations.

5.2.1.4 Mechanical or powered assists to eliminate the use of extreme force.

5.2.1.5 Suspension of heavy tools.

5.2.1.6 The use of diverging conveyors off of main lines so that certain activities can be performed at slower rates.

5.2.1.7 Floor mats designed to reduce trauma to the legs and back.

5.2.2 Design of Work Methods. Traditional work method analysis considers static postures and repetition rates. This will be supplemented by addressing the force levels and the hand and arm postures involved. The tasks will be altered where possible to reduce these and the other stresses. Examples of methods for the reduction of extreme and awkward postures include the following:

5.2.2.1 Enabling the worker to perform the task with two hands instead of one.

5.2.2.2 Conforming to the NIOSH *Work Practices Guide for Manual Lifting*.

5.2.3 Excessive force. Excessive force in any operation can result in both long-term problems for the worker and increased accident rates. Ways to reduce excessive force will be continually emphasized by first line supervisors and employees. Examples of methods to reduce excessive force include:

5.2.3.1 The use of automation devices.

5.2.3.2 The use of mechanical devices to aid in removing scrap from work areas.

5.2.3.3 Substitution of power tools where manual tools are now in use.

5.2.3.4 The use of articulated arms and counter balances suspended by overhead racks to reduce the force needed to operate and control power tools.

5.2.4 Repetitive motion. All efforts to reduce repetitive motion will be pursued. Examples of methods to reduce highly repetitive movements include:

5.2.4.1 Increasing the number of workers performing a task.

5.2.4.2 Lessening repetition by combining jobs with very short cycle times, thereby increasing cycle time. (Sometimes referred to as "job enlargement.")

5.2.4.3 Using automation where appropriate.

5.2.4.4 Designing or altering jobs to allow self-pacing, when feasible.

5.2.4.5 Designing or altering jobs to allow sufficient rest pauses.

5.3 Administrative Controls. Administrative controls will be used to reduce the duration, frequency, and severity of exposures to ergonomic stressors that can cause back injury. Examples of administrative controls include the following:

5.3.1 Reducing the total number of repetitions per employee by such means as decreasing production rates and limiting overtime work.

5.3.2 Providing rest pauses to relieve fatigued muscle-tendon groups. The length of time needed depends on the task's overall effort and total cycle time.

5.3.3 Increasing the number of employees assigned to a task to alleviate severe conditions, especially in lifting heavy objects.

5.3.4 Using job rotation, with caution and as a preventive measure, not as a response to symptoms. The principle of job rotation is to alleviate physical fatigue and stress of a particular set of muscles and tendons by rotating employees among other jobs that use different muscle-tendon groups. If rotation is utilized, the job analyses must be reviewed to ensure that the same muscle-tendon groups are not used when they are rotated.

5.3.5 Providing sufficient numbers of standby/relief personnel to compensate for foreseeable upset conditions on the line (e.g., loss of workers).

5.3.6 Job enlargement. Having employees perform broader functions which reduce the stress on specific muscle groups while performing individual tasks.

6. Training and Information.

6.1 Types of training. Supervisors will determine whether training required for specific jobs will be conducted in a classroom or on-the-job. The degree of training provided shall be determined by the complexity of the job and the associated hazards.

6.1.1 Initial Training. Prior to job assignment the company shall provide training to ensure that the hazards associated with pre-designated job skills are understood by employees. Also the knowledge and skills required for the safe application and usage of work place procedures and equipment is acquired by all employees. The training shall include the following:

6.1.1.1 Each affected employee shall receive training in the recognition of back injury hazards involved with a particular job, and the methods and means necessary for safe work.

6.1.1.2 Training course content. All new and current workers, who work in areas where there is reasonable likelihood of back injury, will be kept informed through continuing education programs. Initial and refresher training will, as a minimum, cover the following:

6.1.1.2.1 Back hazards associated with the job.

6.1.1.2.2 Lifting techniques.

6.1.1.2.3 Potential health effects of back injury.

6.1.1.2.4 Back injury precautions.

6.1.1.2.5 Proper use of protective clothing and equipment.

6.1.1.2.6 Use of engineering controls.

6.1.1.3 Responsibility. Employees are responsible for following proper work practices and control procedures to help protect their health and provide for the safety of themselves and fellow employees, including instructions to immediately report to the Supervisor any significant back injury.

6.1.2 Refresher Training. Scheduled refresher training will be conducted on an as needed basis.

6.1.2.1 Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in equipment or processes that present a new hazard, or when their work takes them into other hazard areas.

6.1.2.2 Additional retraining shall also be conducted whenever a periodic inspection reveals, or when there is reason to believe that there are deviations from or inadequacies in the employee's knowledge of known hazards and use of equipment or procedures.

6.1.2.3 The retraining shall reestablish employee proficiency and introduce new equipment, new lifting procedures or revised control methods and procedures.

6.1.3 Verification. The company shall verify that employee training has been accomplished and is being kept up to date. The verification shall contain a synopsis of the training conducted, each employee's name, and dates of training.

6.2 New Employee Acclimatization Period. Supervisors will ensure that new or transferred employees are allowed an appropriate acclimatization period. New and returning employees will be gradually integrated into a full work schedule as appropriate for specific jobs and individuals. Employees will be assigned to an experienced trainer for job training and evaluation during this period. Employees reassigned to new jobs should also have an acclimatization period.

- *Important:* Supervisors will closely monitor employees that fall into this category throughout their acclimatization period.

7. Definitions.

- *None at this time*

PROGRAM OVERVIEW

INCIDENTAL BLOOD AND BODILY FLUID EXPOSURE PROGRAM

REGULATORY STANDARD: OSHA - 29 CFR 1910.1030 (LIMITED REFERENCES)

INTRODUCTION: Exposure to another person's blood or bodily fluids can potentially place your health at risk. Contracting diseases such as the Human Immunodeficiency (HIV) and Hepatitis B (HBV) viruses is unlikely, but possible, in the performance of emergency first-aid, housekeeping and janitorial staff duties, and similar tasks. This program outlines the protective measures that can be taken during potential exposure situations and training that can be provided to reduce or eliminate these types of exposures.

TRAINING:

- Recommended for employees who may encounter human blood or body fluids but such exposure is not a part of their normal job duties.

ACTIVITIES:

- Identify risk situations
- Train employees, as appropriate

FORMS:

- Training Attendance Roster, as needed

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Incidental Blood and Bodily Fluid Exposure Program

1. Purpose. Where employees can be exposed (through injury or illness in the workplace) to the blood and/or bodily fluid of another person, information and training in the potential health effects of such exposures may be provided. This procedure assists in compliance with implementing this type of "incidental" Bloodborne Pathogen Exposure program and references Federal Regulation 29CFR1910.1030.

2. Scope. Applies to all locations within company buildings or facilities where incidents involving exposures to a person's blood or bodily fluids may occur.

3. Responsibilities.

3.1 Management and Supervisor:

3.1.1 Determine where exposures are present

3.1.2 When it is difficult to distinguish body fluids, all body fluids will be considered potentially infectious.

3.1.3 Ensure employees are trained, based on their level of exposure to blood or Bloodborne pathogens

3.1.4 Implement bio-safety controls, where required

3.1.5 Maintain appropriate documentation (including exposure incident reports and post-exposure follow up records)

3.2 Employees:

3.2.1 Follow established written procedures

3.2.2 Attend training, as needed or required

3.3 Safety Officer (as needed or required):

3.3.1 Assist with the development and implementation of this program.

4. Procedure.

4.1 Determine where exposures or potential exposures exist

4.2 Provide controls to eliminate or reduce exposures

4.3 Train employees, as needed

4.4 Document exposures through accident/incident reports or exposure incident reports and maintain records for 5 years.

4.5 All medical records are kept for the employees duration of employment plus 30 years.

4.6 Review the program at least annually

5. Safety Information.

5.1 Determine where exposures or potential exposures are present

5.2 Make hand washing stations available at all work locations or keep antiseptic and towels available.

5.3 All employees will be give complete access to the exposure control plan.

5.4 Document and maintain written processes and procedures in work areas where exposure could potentially occur. This includes:

5.4.1 Any first aid procedures or supplies maintained at the company

5.4.2 PPE (Personal Protective Equipment) that may be used or required. At no cost to the employee.

5.4.3 Training provided, as needed

5.5 Training is recommended for all employees and supervisors with exposures or potential exposures to assure they understand their responsibilities and safeguards/controls implemented.

5.6 Assure a system is in place for a medical evaluation for any exposed employee who has had contact with the blood or bodily fluids of another person.

5.7 All equipment or environmental surfaces will be cleaned & disinfected after contact with blood or other infectious fluids.

5.8 A hepatitis B shot will be made available, at no cost to the employee, after exposure.

5.9 These records or reports should include:

5.9.1 Name of the exposed employee

5.9.2 Information (if known) on if the exposed employee has had a Hepatitis B Vaccination previous to the exposure.

5.9.3 Circumstances of the exposure and any PPE used

5.9.3.1 Written opinion of the healthcare provider (PLHCP Statement) and copies of any other documentation provided to the healthcare professional responsible for post-exposure follow up.

5.10 Review this program annually for applicability, control measures, and compliance.

6. Training and Information.

6.1 Training requirements for employees is voluntary and not required. Train all employees and Supervisors with exposures or potential exposures to assure they understand their responsibilities and safeguards/controls implemented. Training is to be conducted at initial employment and annually.

6.2 Training includes:

6.2.1 Information on how bloodborne pathogens and diseases can be contracted by employees during their work.

6.2.2 How exposures are prevented (controls used, PPE, etc.)

6.2.3 Whom to contact at the company and what to do (and what to expect) if an employee has an exposure.

6.2.4 Training records should be maintained for at least 3 years.

7. Definitions.

- *Biohazards/Bloodborne Pathogens* - Infectious agents (human pathogens), materials from human sources or primates that may contain pathogens, and organism-produced toxins, venom, allergens, etc. that causes disease in humans.

- *Contact or Exposure* – Blood or body fluids must have the potential to be absorbed into the blood stream (such as through a break in the skin (cut or other skin opening) or through the eyes, nose, mouth to be considered contact. Exposure is considered to be any contact with another person's blood or bodily fluids (saliva, vomit, urine, feces, etc).

- *Exposure Control Program* - A written program that outlines the exposures that are present (or potentially present) in the workplace and the steps taken to eliminate or control those exposures.

- *OPIM* - Other Potentially Infectious Materials, such as contaminated waste, tissue samples, Human body fluids, including: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids.

- *Potentially Exposed* - An exposure that can reasonably occur at some time.

- *Sharps* - a non-needle sharp or needle device used for withdrawing blood or body fluids, accessing a vein or artery or administrating medication or other fluids.

- *Universal Precautions* - An approach to infection control. According to the concept of universal precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

PROGRAM OVERVIEW

COMPRESSED GAS SAFETY PROGRAM

REGULATORY STANDARD: OSHA - 29 CFR 1910.101 - 105
CGA - G-1, 4, 4.1, 5, 6, 8.1, P-1, 2, V-1, SB-2

INTRODUCTION: Some compressed gases are flammable, toxic, or both and all are under pressure. Cylinders must be used, handled, and stored with extreme care. An exploding cylinder can have the same destructive effect as a bomb. The hazards of compressed gases must be evaluated, safety procedures implemented, and proper hazard information must be communicated to all affected workers.

TRAINING:

- Required for employees who move, handle or use compressed gas cylinders.

ACTIVITIES:

- Ensure storage areas are identified and inspected frequently.
- Cylinders must be secure and prevented from tipping.
- Cylinders must be labeled with the type of gas, hazard warnings, and indication if the cylinder is empty or full. All empty cylinders should be grouped together.
- Full oxygen cylinders must be located 20 feet from, or have a half hour rated fire wall separating them from, any flammable gases while in storage.

FORMS:

- Compressed Gas Handling and Storage of Acetylene in Tanks and Cylinders
- Compressed Gas Program Assessment
- Compressed Gas Storage Locations
- Training Attendance Roster

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Compressed Gas Safety Program

1. Purpose. Effective implementation for job safety and health of our employees requires a written safety program fully endorsed and advocated by the highest level of management within the company. This safety program is designed to establish clear company goals and objectives for the use and handling of compressed gases, and will be communicated to all required personnel. The company will review and evaluate this safety program:

1.1 On an *annual* basis

1.2 When changes occur to the regulatory standard governing this safety program that prompt revision of this document

1.3 When facility operational changes occur that require a revision of this document

2. Scope. It encompasses the total workplace regardless of the number of workers employed or the number of work shifts. This program applies to any compressed gas cylinder larger than 1 liter in size.

3. Responsibilities.

3.1 Management and Supervisor:

3.1.1 Assure safe handling procedures are in place and followed

3.1.2 Ensure containers are labeled, color coded, inspected and that all components are functioning normally. Leaking or defective containers must be immediately removed from service.

3.1.3 Ensure defective containers are returned to the supplier as soon as possible.

3.1.4 Provide the appropriate tools and equipment to handle, use, store and transport cylinders safely.

3.2 Employees:

3.2.1 Inspect gas cylinders before use to assure that the proper gas is utilized and that the cylinders are not defective.

3.2.2 Notify management or supervisor immediately if a cylinder or a component is defective.

3.3 Safety Officer (as needed or required)

3.3.1 Assist in the implementation of this program

4. Procedure.

4.1 Safe Handling Procedures for Compressed Gases.

4.1.1 Filling. Containers will not be filled except by the supplier of the cylinder or with the supplier's consent. Where filling is authorized it will be accomplished in accordance with DOT, OSHA, and CGA Regulatory Standards.

4.1.2 Content identification

4.1.2.1 Warning labels. All employees, whose work operations are or may be in an area where compressed gas may be utilized, shall be instructed in the recognition and use of warning labels. Warning labels are essentially warning devices and must be legible at all times. The following will be addressed as a minimum:

4.1.2.1.1 Removal. When a warning label is attached to a compressed gas cylinder, it is not to be removed without authorization of the person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated.

4.1.2.1.2 Legibility. In order to be effective, warning labels must be legible and understandable by all authorized employees, affected employees, and other employees whose work operations are or may be in the area. Non-legible or missing labels will be reported to the Safety Officer immediately.

4.1.2.1.3 Durability. Labels and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace.

4.1.2.1.4 Labels may evoke a false sense of security, and their meaning needs to be understood as part of the overall Compressed Gas Safety Program.

4.1.2.1.5 Labels must be securely attached to cylinders so that they cannot be inadvertently or accidentally detached during use.

4.1.2.2 Labeling. Each container will bear the proper label for the compressed gas contained.

4.1.2.3 Maintenance.

4.1.2.3.1 Authorization. Containers and their appurtenances used by the company will be maintained only by the container supplier or authorized representative. Any employee who is not sure of the type of maintenance allowed on containers should contact the Safety Officer for further information.

4.1.2.3.2 Changing prescribed markings. The prescribed markings, supplier/owner markings or symbols stamped into containers will not be removed or changed unless in accordance with pertinent regulatory standards.

4.1.2.3.3 Changing content markings. No employee will deface or remove any markings, labels, decals, tags or stencil marks applied by our supplier and used for the identification of content. Like markings may be affixed if the original becomes illegible or detached.

4.1.2.3.4 Pressure relief devices. No employee will change, modify, tamper with, obstruct, or repair pressure relief devices in container valves or in containers.

4.1.2.4 Painting.

4.1.2.4.1 Containers will not be painted. If a container shows signs of corrosion it will be removed from service and returned to the supplier.

4.1.2.4.2 Cylinder color. All employees should be aware that containers may only be painted by the supplier for the purpose of recognition and segregation. Should the company change suppliers' of compressed gas the color codes could also change, always double-check to ensure you have the correct cylinder for the intended use. Never rely solely on the cylinder color for identification.

4.1.2.5 Contamination or improper contents. Any container found suspected to be contaminated or having its contents suspect will be immediately removed from service and reported to the Safety Officer. The supplier will be immediately notified.

4.1.2.6 Leaking or defective containers.

4.1.2.6.1 Leaking Containers. Supervisors will ensure all employees under their control understand the following. Any employee discovering a leaking container should attempt to take the following actions:

4.1.2.6.1.1 Notify workers in the immediate area of the leak.

4.1.2.6.1.2 If the container could contain hazardous material (or if you're not sure) evacuate personnel in the area to fresh air (preferably up-wind or side-wind relative to the source).

4.1.2.6.1.3 Report the following as soon as possible to the Safety Officer.

4.1.2.6.1.3.1 Contents.

4.1.2.6.1.3.2 Location.

4.1.2.6.1.3.3 Number of employees in immediate area.

4.1.2.6.1.3.4 Circumstances of the release.

4.1.2.6.1.3.5 Condition of container.

4.1.2.6.1.3.6 Other pertinent information as required.

4.1.2.6.2 Defective Containers. Supervisors will ensure all employees under their control understand the following. Any employee discovering a defective or corroded container should attempt to take the following actions:

4.1.2.6.2.1 Notify the Supervisor of the department where the container was discovered.

4.1.2.6.2.2 If the container could contain hazardous material (if you're not sure), evacuate personnel in the area to fresh air (preferably up-wind or side-wind relative to the source).

4.1.2.6.2.3 Report the following as soon as possible to the Safety Officer:

4.1.2.6.2.3.1 Contents

4.1.2.6.2.3.2 Location

4.1.2.6.2.3.3 Number of employees in immediate area

4.1.2.6.2.3.4 Circumstances

4.1.2.6.2.3.5 Condition of container

4.1.2.6.2.3.6 Other pertinent information as required

4.1.2.7 Container usage requirements.

4.1.2.7.1 Content Identification. Where company employees are responsible to handle and connect the container for use, the operation will not proceed unless the contents can be verified by legible markings and labels.

4.1.2.7.2 Container caps, valve outlet caps, and plugs.

4.1.2.7.2.1 Container caps. Where removable caps are provided by the gas supplier for valve protection, company employees shall keep such caps on containers at all times except when containers are connected to dispensing equipment.

4.1.2.7.2.2 Valve outlet caps and plugs. Where valve outlet caps and plugs are provided by the supplier, employees will keep such devices on the containers and valve outlets at all times except when containers are connected to dispensing equipment.

4.1.2.7.3 Misuse. No container will be used for anything other than its intended purpose. Containers will not be used as rollers, supports or for any purpose other than to contain the content as received. No employee will allow an unsafe condition such as this to occur without notifying his or her Supervisor.

4.1.2.7.4 Containers not in use (configuration). When containers are not being used the valves will remain closed at all times except when operational constraints apply.

4.1.2.8 Movement of compressed gas containers.

4.1.2.8.1 Trucks. Containers will not be rolled, dragged, or slid. A suitable hand truck, fork truck, roll platform, or similar device will be used to move containers.

4.1.2.8.2 Rough handling. Containers will not be dropped or permitted to strike violently against each other or other surfaces.

4.1.2.8.3 Lifting requirements.

4.1.2.8.3.1 Container caps. Container caps will not be used for lifting containers except for the use of hand trucks which grip the container cap for lifting on to the hand truck. In any case the container will not be lifted higher than six inches above the operating surface.

4.1.2.8.3.2 Magnetic lifting devices. Magnetic lifting devices are prohibited from use with compressed gas containers.

4.1.2.8.3.3 Ropes, chains, or slings. Ropes, chains, or slings are prohibited from use with compressed gas containers unless lugs or lifting attachments are provided by the manufacturer.

4.1.2.8.3.4 Cradles or platforms. Where approved lifting attachments have been provided by the manufacturer, cradles or platforms are authorized for use.

4.1.2.9 Container storage requirements.

4.1.2.9.1 Posting requirements.

4.1.2.9.1.1 No Smoking. No Smoking signs will be posted in the storage area.

4.1.2.9.1.2 Type gas. Signs designating the type gas stored in the area will be posted.

4.1.2.9.2 Grouping requirements. Where different types of gases are stored in the same general area the following apply.

4.1.2.9.2.1 Like gases. Gases will be stored with like gases and segregated from dissimilar gases.

4.1.2.9.2.2 Full and empty containers. Full and empty containers will not be intermingled. Separate storage areas will be delineated for each.

4.1.2.9.3 Stock rotation. Stock will be rotated so that the oldest material will be the first to be used. The storage layout will be such that old stock can be removed first with a minimum handling of other containers.

4.1.2.9.4 Storage rooms. Storage rooms used by the company will be well ventilated and dry. Room temperature will not exceed 125 degrees F. Storage in subsurface location will be avoided.

4.1.2.9.5 Separation from combustibles. Containers will not be stored near readily ignitable substances such as gasoline or waste, or near combustibles in bulk, including oil.

4.1.2.9.6 External corrosion requirements. Containers will not be exposed to continuous dampness and should not be stored near salt or other corrosive chemicals or fumes. Corrosion may damage the containers and may cause the valve protection caps to stick.

4.1.2.9.7 Mechanical damage requirements. Containers shall be protected from any object that will produce a harmful cut or other abrasion in the surface of the metal. Containers will not be stored near elevators, gangways, and unprotected platform edges or in locations where heavy moving objects may strike or fall on them.

4.1.2.9.8 Storage and use requirements.

4.1.2.9.8.1 Store upright. All compressed gas containers in service or in storage will be stored standing upright where they are not likely to be knocked over.

4.1.2.9.8.2 Restrain. All compressed gas containers in use will be restrained above the midpoint to prevent accidental fall-over of the container.

4.1.2.9.8.2.1 Gas containers with a water volume up to 305 cu. in. (5.0 L) may be stored in a horizontal position.

4.1.2.9.8.3 Container valve end up. Liquefied gas containers except those designed for use in a horizontal position on tow motors, etc., will be stored and used valve end up. Acetylene containers will be stored and used valve end up. Storage of acetylene containers valve end up will minimize the possibility of solvent being discharged. Note: Valve end up includes conditions where the container axis is inclined as much as 45 degrees from the vertical.

4.1.2.9.9 Outdoor storage. Containers may be stored in the open, but will be stored on a clean dry surface to prevent corrosion to the bottom of the container.

4.1.2.9.9.1 Sunlight. Containers may be stored in direct sunlight, except in localities where extreme temperatures prevail (above 125 degrees F.). If our supplier recommends storage in the shade for a particular gas, this recommendation will be observed.

4.1.2.9.9.2 Public area. Containers used or stored in public areas will be protected to prevent tampering.

4.1.2.9.10 Interference with egress. Containers when stored inside will not be located near exits, stairways, or in areas normally used or intended for the safe exit of employees.

4.1.2.10 Connecting containers and withdrawing content.

4.1.2.10.1 Trained personnel. Compressed gases will be handled and used only by properly trained employees. Employees must have had initial training in order to handle and use compressed gases.

4.1.2.10.2 Content identification. Employees will verify that a label exists and review the label before beginning operations with a compressed gas. Unmarked containers will not be used. Such containers will be reported to the Safety Officer. The container color will never be relied on for identification of a container.

4.1.2.10.3 Container caps. Caps will be retained and not removed until the container is placed in service.

4.1.2.10.4 Secure containers. The company will ensure that compressed gases will be secured above the midpoint to prevent them from being knocked over.

4.1.2.10.5 Pressure regulator. A suitable pressure regulating device will be used where gas is admitted to a system of lower pressure rating than the supply pressure, and where, due to the gas capacity of the supply source, the system rating may be exceeded.

4.1.2.10.6 Pressure relief device. A suitable pressure relief device will be used to protect a system using a compressed gas where the system has a pressure rating less than the compressed gas supply source and where, due to the gas capacity of the supply source, the system pressure rating may be exceeded.

4.1.2.10.7 Connection requirements. Connections that do not fit will not be forced. Threads on regulator connections or other auxiliary equipment will match those on container valve outlets.

4.1.2.10.8 Manifold. Where compressed gas containers are connected to a manifold, the manifold, and its related equipment will be of proper design for the product(s) they are to contain at the appropriate temperatures, pressures, and flows.

4.1.2.10.9 Equipment compatibility. Regulators, gauges, hoses, and other appliances provided for use with a particular gas or group of gases, will not be used on containers containing gases having different chemical properties unless information obtained from the supplier indicates that this can be done safely.

4.1.2.10.10 Container valve requirements.

4.1.2.10.10.1 Container valves will be opened slowly and pointed away from personnel and sources of ignition.

4.1.2.10.10.2 For valves having no hand wheel the wrench provided by, or recommended by the supplier will be used.

4.1.2.10.10.3 On valve containing a hand wheel wrenches will not be used.

4.1.2.10.10.4 Valves will never be forced open or closed. If valves become frozen for whatever reason, the supplier will be contacted to provide instructions.

4.1.2.10.11 Dusting clothing, cleaning work areas. Compressed gas will not used to dust off clothing or clean work areas of debris. This may cause serious injury to the eyes or body or create a fire hazard.

4.1.2.10.12 Residual empty container pressure. When withdrawing a non-liquefied compressed gas from a container, it should not be reduced to below 20 psig so as to preclude the back flow of atmospheric air or other contaminants into the container. The container valve should be closed tightly to retain this residual pressure.

4.1.2.10.13 Check valves. Compressed gases will not be used where the container may be contaminated by the feedback of process materials unless protected by suitable traps or check valves.

4.1.2.10.14 Gas tightness. Connections to piping, regulators and other appliances will be kept tight to prevent leakage. Where hose is used, it shall be kept in good condition.

4.1.2.10.15 Removing pressure regulator. Before a regulator is removed from a container, the container valve shall be closed and the regulator drained of gas pressure.

4.2 General Safety Rules for Specific Types of Gases.

4.2.2 Flammable gases.

4.2.2.1 Adjoining exposures. Provisions will be made to protect flammable gases from hazardous exposure to and against hazardous exposure from adjoining buildings, equipment, property, and concentrations of people.

4.2.2.2 Heating requirements. Where storage areas are heated, the source will be by steam, hot water, or other indirect means. Heating by flames or fire is prohibited.

4.2.2.3 Electrical equipment requirements. Will conform to the provisions of NFPA 70, National Electrical Code, article 501, for Class 1 Division 2 locations.

4.2.2.3.1 Sources of ignition will be forbidden.

4.2.2.3.2 Storage buildings will be well ventilated.

4.2.2.4 Combustibles and ignition sources. Flammable gas containers stored inside of buildings with other occupancies will be kept at least 20 feet from combustibles or ignitions sources.

4.2.2.5 Capacity limitations. Flammable gas containers stored inside industrial buildings on company property. (Except those in use or those attached for use are limited to a total gas capacity of 2500 cubic feet of acetylene or non-liquefied flammable gas, or a total container content water capacity of 735 pounds for liquefied petroleum gas or stabilized methylacetylene-propadiene).

4.2.2.6 Fire protection requirements.

4.2.2.6.1 Fire extinguishers. Adequate portable fire extinguishers of carbon dioxide or dry chemical types will be made available for fire emergencies at company storage locations.

4.2.2.6.2 No smoking signs. Signs will be posted around the storage area of buildings or at the entrance to storage rooms.

4.2.2.6.3 Leak testing. A flame or other ignition source will not be used for detection of flammable gas leaks. Use either a flammable gas leak detector, soapy water, or other suitable solution.

4.2.3 Oxygen (Including oxidizing gases).

4.2.3.1 Cleanliness. Oxygen containers, valves, regulators, hose and other oxygen apparatus will be kept free at all times from oil or grease and will not be handled with oily hands, oily gloves, or with greasy equipment.

4.2.3.2 Separation of oxygen from combustibles. Oxygen containers in storage will be separated from flammable has containers or combustible materials (especially oil and grease) a minimum distance of 20 feet or by a noncombustible barrier at least 5 feet high having a fire resistance rating of at least one-half hour.

4.2.3.3 Oxygen-rich atmospheres. The oxygen content in work areas (other than hyperbaric chambers) must not exceed 23 percent by volume.

4.2.3.4 Compatibility of materials. Any materials used by the company that come into contact with oxygen in valves, piping, fittings, regulators, and utilization equipment must be suitable for use with oxygen, and at the pressures and conditions involved at the specific use point of material. The handling and use of oxygen above 3000 psi may involve greater fire potential, adequate safety systems analysis need to be made.

4.2.4 Acid and alkaline gases.

4.2.4.1 Personal protective equipment. Supervisors will ensure that precautions are taken to avoid contacting skin or eyes with acid or alkaline gases. Chemical goggles or face shields, rubber (or other suitable chemically protective material) gloves and aprons will be worn. Long sleeves and trousers will be worn. Open toed shoes or sneakers are prohibited.

4.2.4.2 Respiratory equipment. Employees handling and using acid and alkaline gases will have gas masks or self-contained breathing apparatus (SCBA) immediately available for use. SCBA must be used when the concentration of the gas could be higher than the mask canister rating, and or where the oxygen content of the atmosphere could be below 19 percent by volume.

4.2.4.3 Emergency showers and eyewash fountains. Supervisors will ensure that areas where acid or alkaline gases are used are equipped with an emergency shower and eyewash fountain.

4.2.4.4 Quantity on site. Because of their hazardous nature, Supervisors will limit the quantity of this type of gas to the minimum requirements for the foreseeable future.

4.2.4.5 Ventilation. Acid and alkaline gases will only be used in well ventilated areas.

4.2.5 Highly toxic gases.

4.2.5.1 Respiratory equipment. Employees handling and using highly toxic gases will have gas masks or self-contained breathing apparatus (SCBA) immediately available for use. SCBA must be used when the concentration of the gas could be higher than the mask canister rating, and or where the oxygen content of the atmosphere could be below 19 percent by volume.

4.2.5.2 Storage locations. Storage of highly toxic gases will be:

4.2.5.2.1 Outdoors, or in a separate noncombustible building without other occupancy, or in a separate room without other occupancy.

4.2.5.2.2 Of noncombustible construction with a fire-resistance rating of at least one hour.

4.2.5.2.3 Well ventilated to preclude development of hazardous concentrations.

4.2.5.2.4 Protected against tampering.

4.2.5.3 Ventilation. Highly toxic gases will be used only in forced ventilated areas or in hoods with forced ventilation, or outdoors. Hazard analysis will be conducted on equipment emitting high concentrations. The gas will be discharged into appropriate scrubbing equipment which will remove or neutralize the toxic effects before entering the effluent gas stream.

4.2.5.4 Toxicity. Supervisors will ensure the following. Before using a highly toxic gas, employees must read and understand all warning labels and material data sheet information. All employees working in the immediate area where these gases are handled will be instructed as to the toxicity of the gases and methods of protection against harmful exposure. Employees will not be exposed to concentrations greater than those determined to be safe levels by OSHA 29 CFR 1910.1000 and the threshold limit values guidance by the ACGIH.

4.2.5.5 Quantity on site. Because of their hazardous nature, Supervisors will limit the quantity of this type of gas to the minimum requirements for the foreseeable future.

4.2.6 Cryogenic liquefied gases.

4.2.6.1 Cryogenic liquids are gases which are handled in liquid form at relatively low pressure and extremely low temperatures, usually below -238 degrees F. Because of their low temperature, cryogenic liquids are handled in multi-wall, vacuum-insulated containers, tank trucks, tank cars, and storage tanks to minimize evaporation and venting of the gas. Some cryogenic liquids in small quantities are also handled in open, low pressure thermos type containers in laboratory work.

4.2.6.2 Personal protective equipment. Cryogenic liquids and cold gases can cause frostbite injury upon contact with the body. When handling cryogenic liquids Supervisors will ensure that employees use suitable eye protection, such as a face shield, safety glasses, or safety goggles, hand protection, such as insulated loose fitting gloves, and proper clothing to prevent other bodily exposure.

4.2.6.3 Ventilation. Cryogenic liquid containers will only be stored and handled in well ventilated areas to prevent excessive concentrations of the gas. Containers are equipped with pressure relief devices which permit venting of gas intentionally.

4.2.6.4 Container handling. Cryogenic liquid containers will be handled and stored in an upright position. The containers must not be dropped, tipped over, or rolled on their sides. A four wheeled handling truck will be used to move cryogenic liquid containers over 20 gallons capacity.

4.2.6.5 Containers. Containers designed for specific gas storage will not be used for any other type of gas.

4.2.6.6 Pressure relief devices. Containers entering this facility will be provided with DOT approved devices to prevent excessive buildup of pressure from warming gas. Where cryogenic liquids or cold gas may be trapped between valves, piping will be equipped with appropriate pressure relief devices.

4.2.6.7 Transfer of cryogenic liquids. Only transfer lines designed for cryogenic liquids will be used. Transfer of cryogenic liquids will be performed slowly enough to minimize excess evaporation and stress due to rapid cooling and contraction of warm containers and equipment.

4.2.6.8 Liquid oxygen. Liquid oxygen containers, piping and equipment will be kept clean and free of grease, oil, and organic materials. Ignitions sources are not permitted in areas where liquid oxygen is stored or transferred.

4.2.6.9 Liquid hydrogen. Ignitions sources are not permitted in areas where liquid hydrogen is stored or transferred. Liquid hydrogen must be stored and transferred under positive pressure to prevent the infiltration and solidification of air or other gases.

4.2.6.10 Liquid helium and liquid neon. Liquid helium and liquid neon must be stored and transferred under positive pressure to prevent the infiltration and solidification of air or other gases.

4.2.6.11 Liquefied natural gas. Ignitions sources are not permitted in areas where liquefied natural gas is stored or transferred. Liquefied natural gas must be stored and transferred under positive pressure to prevent the infiltration of air or other gases.

4.2.6.12 Inert gases. In areas where inert gases are used or stored employees will have self-contained breathing apparatus (SCBA) immediately available for use. SCBA must be used in the even the oxygen in the room is displaced by the inert gas creating an oxygen deficient atmosphere where the oxygen content of the atmosphere could be below 19 percent by volume.

4.3 General Safety Rules for Use of Compressed Gas.

4.3.1 Pre-operation safety rules:

4.3.1.1 Read the Material Safety Data Sheet before use.

4.3.1.2 Inspect cylinder for damage before use.

4.3.1.3 Ensure "In use" label is present.

4.3.1.4 Ensure all labels/warnings are readable.

4.3.1.5 Place upright on stable dry surface.

4.3.1.6 Ensure cylinder is restrained above mid-point.

4.3.1.7 Keep heat, flame, and electrical sources from gas.

4.3.1.8 Operate in accordance with established procedures.

4.3.2 Post-operation safety rules:

4.3.2.1 Ensure "empty" or like label is present.

4.3.2.2 Remove from operation using established procedures.

4.3.2.3 Close valve completely and cap cylinder.

4.3.2.4 Transport cylinder using a hand-truck.

4.3.3 Full cylinder storage rules:

4.3.3.1 Read the Material Safety Data Sheet before use.

4.3.3.2 Do not smoke.

4.3.3.3 Mark cylinder with date of storage.

4.3.3.4 Ensure stock is properly rotated.

4.3.3.5 Use oldest stock first.

4.3.3.6 Inspect cylinder for damage before storage.

4.3.3.7 Store with like kind of gas.

4.3.3.8 Ensure all labels are readable.

4.3.3.9 Ensure valve assembly is tightly capped.

4.3.3.10 Ensure cylinder is restrained above midpoint.

4.3.3.11 Store upright on stable dry surface.

4.3.3.12 Keep electrical devices away from gas.

4.3.3.13 Keep combustible materials away from gas.

4.3.3.14 Keep heat and flame away from gas.

4.3.4 Empty cylinder storage rules.

4.3.4.1 Read the Material Safety Data Sheet before use.

4.3.4.2 Do not smoke.

4.3.4.3 Label cylinder "empty" before storage.

4.3.4.4 Ensure valve assembly closed tightly.

4.3.4.5 Ensure valve assembly capped tightly.

4.3.4.6 Inspect cylinder for damage before storage.

4.3.4.7 Store with like kind of gas cylinders.

4.3.4.8 Ensure all labels are readable.

4.3.4.9 Ensure cylinder is restrained above midpoint.

4.3.4.10 Store upright on stable dry surface.

4.3.4.11 Keep electrical devices away from gas.

4.3.4.12 Keep combustible materials away from gas.

4.3.4.13 Keep heat and flame away from gas.

5. Safety Information.

5.1 Visual Inspection of Compressed Gas Cylinders.

5.1.1 Employees will use the following for general inspection of compressed gas cylinders. Our supplier has the first responsibility for inspection of cylinders used by the company in accordance with CGA and NFPA guidelines. Only the following inspection criteria will be followed by employees:

Inspect For:	Possible Result:
Dents	Weakening of cylinder wall
Cuts, gouges, or digs	Decrease in wall thickness
Corrosion	Decrease in wall thickness
Pitting	Decrease in wall thickness
Crevice corrosion	Weakening of cylinder wall
Bulges	Weakening of cylinder wall
Neck defects	Leak or cylinder explosion
ARC/Torch burns	Weakening of cylinder wall
Valve ease of movement	Corrosion leading to leak
Valve thread serviceability	Leak during operation

5.1.2 Suspect cylinders. Cylinders that are suspected to be deficient in any manner will be removed from service. The supplier will then be notified and a representative of the supplier will be asked to inspect the cylinder. Employees discovering a cylinder suspected to be deficient in any manner should notify the Safety Officer.

5.1.3 Cylinders will be stored upright and chained to an external wall when not in use.

5.2 Facility/Department Evaluation.

5.2.1 An evaluation of our facility(s) will be conducted to identify, designate, and prioritize Compressed Gas use and storage.

5.2.2 Existing Compressed Gas Systems. A process hazard analysis will be conducted for existing systems. Existing systems where possible, will be designated and managed as a complete and separate process.

5.2.3 Future Compressed Gas Systems. For new systems, a process hazard analysis will be conducted. The PHA will be used to improve the design and construction of the process from a reliability and quality point of view. The safe operation of the new process will be enhanced by making use of the PHA recommendations before final installations are completed.

5.3 Gas System listing.

5.3.1 Designated gas systems will be stored in locations so as not to cause undue hazards to employees.

5.3.2 All pipes and delivery components will be inspected annually at a minimum.

5.4 Compressed Gas Association Safety Manuals.

5.4.1 To obtain any of the CGA safety manuals you can contact the CGA for a current literature catalog at: www.cganet.com. These include: the Handbook of Compressed Gases; Equipment such as regulators, hose lines, valve connections and pressure relief devices; information on specific gas types and their handling; Insulated cargo tanks, and the protection and safe handling of specific cylinders

6. Training and Information.

6.1 Initial Training. Initial training will be provided before job assignment. The company shall provide training to ensure that the purpose and function of the Compressed Gas Safety Program is understood by employees and that the knowledge and skills required for the safe application and usage of compressed gases are acquired by employees. The training shall include the following:

6.1.1 Applicable hazards. Each authorized employee shall receive training in the recognition of applicable hazards associated with compressed gases, and the methods and means necessary for safe operation.

6.1.1.1 Purpose and use. Each affected employee shall be instructed in the purpose and use of the compressed gas they will come in contact.

6.1.1.2 Awareness level training. All other employees whose work operations are or may be in an area where compressed gas may be utilized, shall be instructed about the emergency procedure, and about the prohibition(s) relating to compressed gases used in their work area.

6.1.1.3 Warning labels. All employees, whose work operations are or may be in an area where compressed gas may be utilized, will be instructed in the recognition and use of warning labels.

6.1.1.4 Storage requirements. Storing and handling requirements will be covered in accordance with this safety program.

6.1.1.5 Handling requirements. Handling requirements will be covered in accordance with this safety program.

6.1.1.6 Moving requirements. Moving requirements will be covered in accordance with this safety program.

6.1.1.7 Connecting and disconnecting requirements. Connecting and disconnecting requirements will be covered in accordance with this safety program.

6.1.1.8 Health hazards regarding specific gases. Health hazard regarding specific gases will be covered in accordance with this safety program.

6.1.1.9 General safety precautions. General safety precautions will be covered in accordance with this safety program.

6.1.1.10 Verification. The company shall verify that employee training has been accomplished and is being kept up to date. The documentation shall contain each employee's name and dates of training.

6.1.1.11 Authorized trainers. The compressed gas suppliers will be requested to provide training as needed or required for all compressed gas users and handlers.

6.2 Refresher Training. Refresher will be conducted on an as needed basis. Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in the type of gas used, equipment or processes that present a new hazard, or when there is a change in operating procedures.

6.2.1 Additional retraining shall also be conducted whenever a periodic inspection reveals, or whenever there is reason to believe, that there are deviations from or inadequacies in the employee's knowledge or use of the compressed gas safety procedures.

6.2.2 The retraining shall reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary.

6.3 Verification. The company shall verify that employee training has been accomplished and is being kept up to date. The documentation includes employee's name and dates of training.

7. Definitions.

- *CGA* – Compressed Gas Association

PROGRAM OVERVIEW

CONFINED SPACE ENTRY (PERMIT REQUIRED) SAFETY PROGRAM

REGULATORY STANDARD: OSHA - 29 CFR 1910.146

INTRODUCTION: This program allows for evaluation and identification of potential confined spaces and the associated potential hazards, while ensuring the communication of potential hazards to the employees. It details duties for authorized entrants, attendants and supervisors. The program outlines training requirements, entry permits, atmospheric testing procedures and rescue and emergency services.

TRAINING:

- Entrants, Team Leaders, Emergency/Rescue Team Members and Attendants require training on the hazards that will be encountered in each confined space. Paychex can provide general entry training, not space-specific hazard training.
  - As hazards change inside the space, additional training may be required
  - Training may include: permit procedures, air monitoring, entry and exit procedures, emergency response, and protective equipment to be used
- Supervisors of entrants will be trained at least to the same level of the employees for whom they are responsible
- Other employees may need to be informed to maintain their distance from any confined spaces.

ACTIVITIES:

- Identify any confined spaces present in the work environment and clearly label them as either permit required or non-permit required spaces, and maintain a listing of these spaces
- Ensure permits are established and posted and that conditions of entry have been met
- Prevent non-trained employees from entering the permit-required confined spaces
- Write and communicate policies and procedures including safe entry requirements
- Audit (annually) permits to ensure effectiveness of procedures
- Retain entry permits for at least one year beyond termination of the job or permit
- Identify rescue procedures, team members and responsibilities, and provide equipment necessary (rescue, personal protective, safe lighting etc.)

FORMS:

- Confined Space Atmospheric Testing Form
- Confined Space Entry Assessment Form
- Confined Space Entry Listing Form
- Confined Space Entry Permit
- Confined Space Entry Program Assessment
- Training Attendance Roster

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Confined Space Entry (Permit Required) Safety Program

1. Purpose. This procedure relates to the necessary steps to ensure safe entry into confined spaces. NO ENTRY SHALL BE MADE INTO A CONFINED SPACE until a Confined Space Permit is completed, all conditions have been met, and the permit is posted at the site of entry. This procedure references OSHA 29CFR1910.146. The company will establish confined space operational procedures through the use of this document. Company management will review and evaluate this safety program:

1.1 On an annual basis, and more frequently as needed or required

1.2 When changes occur to 29 CFR 1910.146 that prompt revision of this document

1.3 When facility operational changes occur that require a revision of this document

2. Scope. This program applies to all confined spaces at the company or to which company employees are exposed. There are two types of confined spaces, permit-required spaces and standard or regular confined spaces that do not require permits (called 'confined spaces').

2.1 A confined space must meet *all* the following criteria:

2.1.1 It is large enough and so configured that an employee can bodily enter and perform assigned work.

2.1.2 Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.)

2.1.3 Is not designed for continuous employee occupancy.

2.2 A permit required confined space includes the features of a space that does not require a permit and *one or more* of the following:

2.2.1 Contains or has a potential to contain a hazardous atmosphere.

2.2.2 Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.

2.2.3 Contains any other recognized serious safety or health hazard.

3. Responsibilities.

3.1 Management/Supervisors:

3.1.1 Identify all Confined Space Locations and entry requirements. Maintain a listing of all permanent confined spaces in the facility, their associated hazards, and the protective measures required for entry.

3.1.2 Restrict access to these spaces through confined space training, signage, restricted physical access, or through any combination therein. Take effective measures to prevent non-trained employees from entering the permit-required confined spaces.

3.1.3 Develop safe entry requirements for all confined spaces to ensure the safety and health of all entrants, (accounting for issues such as: atmospheric testing, isolation of energy sources, provision for PPE, rescue plans, communication, etc.)

3.1.4 Complete the permit, including the entry requirements, for all employees and contractors involved in any permit-required confined space entry (e.g. operating department supervisor, entry team leader, entry team members)

3.1.5 Designate an Entry Team Leader

3.1.6 Train all persons involved in confined space entry to their level of involvement. Training includes: understanding of the duties and requirements of safe entry, the hazards they may encounter and the necessary precautions to eliminate or control those hazards, permit requirements and extraction/rescue equipment.

3.1.6.1 Ensure that all team members required to wear respiratory protection are fit tested and properly trained.

3.1.6.2 Ensure all entry team members have completed Confined Space Entry Training. Other training such as respiratory protection or LOTO may be required as well.

3.1.7 Become thoroughly familiar with ALL hazards associated with the confined space entry.

3.1.8 Sign all Confined Space Entry Permits.

3.1.9 Audit (annually) permits to ensure effectiveness of procedures.

3.1.10 Retain entry permits for at least one year beyond termination of the job or permit.

3.1.11 Ensure this written safety program is available for inspection by employees, their authorized representatives, and authorized government inspectors.

3.1.12 Ensure communication with contractors.

3.1.12.1 Inform the contractor that the workplace contains permit spaces and that permit space entry is allowed only through compliance with a permit space safety program meeting the requirements of this safety program.

3.1.12.2 Apprise the contractor of the elements, including the hazards identified and the host employer's experience with the space, that make the space in question a permit space.

3.1.12.3 A lead employer will be assigned to arrange for employees of a contractor employer to perform work shall inform about:

3.1.12.3.1 Permit spaces & program

3.1.12.3.2 Identified hazards

3.1.12.3.3 Precautions/procedures

3.1.12.3.4 Entry operations (& coordinate them)

3.1.12.3.5 Entries completed & hazards found

3.1.12.4 Apprise the contractor of any precautions or procedures that the company has implemented for the protection of employees in or near permit spaces where contractor personnel will be working.

3.1.12.5 Coordinate entry operations with the contractor, when both company personnel and contractor personnel will be working in or near permit spaces.

3.1.12.6 Debrief the contractor at the conclusion of the entry operation regarding the permit space safety program, and any hazards confronted or created in the concerned permit spaces during entry operations

3.2 Employees:

3.2.1 Maintain safe distances from confined spaces, unless authorized to enter them.

3.3 Safety Officer:

3.3.1 Assist in the development and implementation of this program, as needed or required.

3.4 Entry Team Leader:

3.4.1 Assist in the planning of confined space entries. Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.

3.4.2 In conjunction with management, contractors and other qualified personnel, determine appropriate PPE to be worn by entrants.

3.4.3 Verify that the appropriate information has been entered on the permit, that all tests specified by the permit have been conducted by qualified persons and that all procedures and protective equipment specified by the permit are in place and at the site before endorsing the permit and allowing entry to begin.

3.4.4 Terminate the entry and cancel the permit as required.

3.4.5 Verify that rescue services are available and that the means for summoning them are operable.

3.4.6 Ensure removal of unauthorized individuals who enter or who attempt to enter the permit space during entry operations.

3.4.7 Whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, determine that entry operations remain consistent with the terms of the entry permit and that acceptable entry conditions are maintained.

3.4.8 Perform field checks to ensure prescribed entry procedures and PPE requirements have been met.

3.4.9 Stop work if conditions are considered unsafe and immediately initiate evacuation of the Confined Space.

3.4.10 Remain at confined space site at all times during occupancy.

3.4.11 A site specific Confined Space Pre-Entry Check List must be completed by the Entry Team Leader before entry into a confined space.

3.4.12 Sign Entry Permit and ensure procedures specific to the permit are understood and followed, and that entrant training is completed prior to allowing entry to begin.

3.5 Entry Team Members:

3.5.1 Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure, and the protective measures to be taken to prevent exposure to hazards.

3.5.2 Properly use protective equipment, including full body harness, as required.

3.5.3 Communicate with attendant as necessary to ensure that if contact is lost, all entrants exit the confined space immediately.

3.5.4 Alert the attendant whenever:

3.5.4.1 The entrant recognizes any warning sign or symptom of exposure to a dangerous situation.

3.5.4.2 The entrant detects a prohibited condition.

3.5.5 Exit from the permit space as quickly as possible whenever:

3.5.5.1 An order to evacuate is given by the attendant or the entry team leader.

3.5.5.2 The entrant recognizes any warning sign or symptom of exposure to a dangerous situation.

3.5.5.3 The entrant detects a prohibited condition.

3.5.5.4 An evacuation alarm is activated.

3.5.6 Understand and follow site emergency procedures associated with rescue.

3.5.7 If any member believes that the work is not being performed safely or that a potential hazard exists, that member shall stop the job, exit with other entrants, and immediately inform your supervisor.

3.5.8 Must read, understand, and follow the requirements of the permits and sign the permit to indicate understanding

3.6 Attendants:

3.6.1 Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.

3.6.2 Be aware of possible behavioral effects of hazard exposure in authorized entrants.

3.6.3 Conduct continuous atmospheric monitoring if required. (Additional training may be needed.)

3.6.4 Continuously maintain an accurate count of authorized entrants in the permit space and ensures that the means used to identify authorized entrants under this section accurately identifies who is in the permit space.

3.6.5 Remain in a pre-designated location outside the permit space during entry operations until relieved by another attendant.

3.6.5.1 Note: When the Confined Space Entry Safety Program allows attendant entry for rescue, attendants may enter a permit space to attempt a rescue if they have been trained and equipped for rescue operations as required by the "rescue and emergency services" section of this program and if they have been relieved from attendant duty.

3.6.6 Communicate with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space. If contact is lost, all entrants must exit the confined space immediately.

3.6.7 Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space, as well as the activities outside the confined space to maintain a safe environment for the entrants.

3.6.8 Order the authorized entrants to evacuate the permit space immediately under any of the following conditions.

3.6.8.1 If the attendant detects a prohibited condition.

3.6.8.2 If the attendant detects the behavioral effects of hazard exposure in an entrant.

3.6.8.3 If the attendant detects a situation outside the space that could endanger the entrants.

3.6.8.4 If the attendant cannot effectively and safely perform all the duties required under this section.

3.6.9 Summon rescue and other emergency services as soon as the attendant determines that entrants may need assistance to escape from permit space hazards. Be familiar with location of nearest phone, fire alarm, eyewash and safety shower, or other defined criteria on the permit check list.

3.6.10 Take the following actions when unauthorized persons approach or enter a permit space while entry is underway:

3.6.10.1 Warn the unauthorized persons that they must stay away from the permit space.

3.6.10.2 Advise the unauthorized persons that they must exit immediately if they have entered the permit space.

3.6.10.3 Inform the authorized entrants and the entry team leader if unauthorized persons have entered the permit space.

3.6.11 Performs non-entry rescues as specified by the rescue procedure.

3.6.12 Performs no duties that might interfere with the attendant's primary duty to monitor and protect the entrants.

3.6.13 Remain present at all times during entry by any team members.

3.6.14 Assist, as appropriate, with safe non-entry rescues.

3.6.15 Signs confined space permit.

3.7 Emergency/Rescue Team Members:

3.7.1 Ensure that each member of the rescue service is provided with, and is trained to use properly, the personal protective equipment and rescue equipment necessary for making rescues from permit spaces.

3.7.2 Each member of the rescue service will be trained to perform the assigned rescue duties, including first aid and CPR. Each member of the rescue service will also receive the training required of authorized entrants.

3.7.3 Each member of the rescue service will practice making permit space rescues at least once every 12 months, by means of simulated rescue operations in which they remove dummies, mannequins, or actual persons from the actual permit spaces or from representative permit spaces. Representative permit spaces will, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which any anticipated rescue is to be performed.

3.7.4 Each member of the rescue service will be trained in basic first-aid and in cardiopulmonary resuscitation (CPR). At least one member of the rescue service holding current certification in first aid and in CPR will be available.

3.7.5 Non-company rescue personnel. When non-company rescue personnel are designated to perform permit space rescue, the company will:

3.7.5.1 Inform the rescue service of the hazards they may confront when called on to perform rescue.

3.7.5.2 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.

3.7.6 To facilitate non-entry rescue, retrieval systems or methods will be used whenever an entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. Retrieval systems used will meet the following requirements.

3.7.6.1 Each authorized entrant will 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. Wristlets may be used in lieu of the chest or full body harness if it is demonstrated that the use of a chest or full body harness is infeasible or creates a greater hazard and that the use of wristlets is the safest and most effective alternative.

3.7.6.2 The other end of the retrieval line will be attached to a mechanical device (such as w winch, block and tackle or similar device for retrieval that is capable of being operated by manpower) or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device will be available to retrieve personnel from vertical type permit spaces more than 5 feet deep.

3.7.7 If an injured entrant is exposed to a substance for which a Material Safety Data Sheet (MSDS) or other similar written information is required to be kept at the worksite, that MSDS or written information will be made available to the medical facility treating the exposed entrant.

3.8 Contractors:

3.8.1 Obtain any available information regarding permit space hazards and entry operations from the company.

3.8.2 Coordinate entry operations with company management, when both company personnel and contractor personnel will be working in or near permit spaces.

3.8.3 Inform the company of the permit space safety program that the contractor will follow and of any hazards confronted or created in permit spaces within this facility or others belonging to the company, either through a debriefing or during the entry operation.

3.8.4 Be required to comply with the "Contractors Safety Program" or other safety work practices document(s) and any designated contractual agreements.

4. Procedure.

4.1 Confined Space Identification:

4.1.1 Confined Space listing. Company management, or their specific designee, will maintain a detailed listing that identifies permanent locations meeting the criteria for a confined space.

4.1.2 Permit-required confined spaces. Those spaces meeting the criteria of a confined space and having a known potential to contain hazardous atmospheres will be designated as permit-required confined spaces. All spaces will be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise. The company will inform exposed employees, by posting danger signs, conducting awareness training, or by any other equally effective means, of the existence and location of and the danger posed by the permit confined spaces. A sign reading "DANGER PERMIT REQUIRED CONFINED SPACE, DO NOT ENTER" or similar language will be used to satisfy the requirement for a sign.

4.1.3 Work will be ceased when immediately dangerous to life and health (IDLH) conditions are found confined spaces.

4.1.4 Confined Space (standard space for which a permit is not required) Those spaces meeting the criteria of a confined space that does not have a known potential to contain a hazardous atmosphere will be designated as confined spaces.

4.1.4.1 Confined spaces will be designated where the atmosphere and safety conditions can be controlled. Confined spaces may be entered without the need for a written permit or attendant provided that:

4.1.4.1.1 The space is determined not to be a permit-required confined space.

4.1.4.1.2 The space can be maintained in a safe condition for entry by mechanical ventilation alone.

4.1.4.2 All spaces will be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise. The company will ensure that any employee required or permitted to pre-check or enter a confined space will have successfully completed the appropriate training. A written copy of operating and rescue procedures will be at the work site for the duration of the job. A site specific Confined Space Pre-Entry Check List completed by the Entry Team Leader will verify completion of the items required to verify safe entry. This check list will be kept at the job site for the duration of the job. If circumstances dictate an interruption in the work, the permit-required confined space must be re-evaluated and a new check list must be completed.

4.1.4.3 The elements of the permit required confined space safety program need not be complied with if:

4.1.3.3.1 It can be demonstrated that the only hazard posed by the permitted space is an actual or potentially hazardous atmosphere.

4.1.3.3.2 It can be demonstrated that continuous forced air ventilation alone is sufficient to maintain the space safe for entry.

4.1.3.3.3 Monitoring and inspection data supports the demonstrations.

4.1.3.4 If an initial entry of the permit space is necessary to obtain monitoring and inspection data, the worst case will be assumed and the full provisions of permit-required confined space entry procedures will be implemented.

4.1.3.5 Entry can be performed by company personnel, once determinations and supporting data are documented, and are made available to each employee who enters the permit space.

4.1.4 Alternate Procedures - Controlling the hazards in a space to eliminate the need for a permit (after all other hazards within the space have been eliminated). No company personnel will enter the confined space unless:

4.1.4.1 Conditions making it unsafe to remove an entrance cover are eliminated before the cover is removed.

4.1.4.2 The opening at entrance covers are guarded by a railing, temporary cover, or other temporary barrier that will prevent accidental fall-through and will protect each employee working in the space from foreign objects entering the space.

4.1.4.3 The internal atmosphere has been tested, with a calibrated direct-reading instrument, for the following conditions in the order given:

4.1.4.3.1	Oxygen content. (19.5% - 23.5%)	*OSHA Mandated*
4.1.4.3.2	Flammable gases and vapors.	*OSHA Mandated*
4.1.4.3.3	Potential toxic air contaminants.	*OSHA Mandated*
4.1.4.3.4	Airborne combustible dusts	*Site Specific*

4.1.4.4 There may be no hazardous atmosphere within the space whenever any employee is inside the space.

4.1.4.5 Continuous forced air ventilation will be used, as follows:

4.1.4.5.1 No employee may enter the space until testing confirms that the forced air ventilation has eliminated any hazardous atmosphere.

4.1.4.5.2 The forced air ventilation will be so directed as to ventilate the immediate areas where an employee is or will be present within the space and will continue until all employees have left the space.

4.1.4.5.3 The air supply for the forced air ventilation will be from a clean source and may not increase the hazards in the space.

4.1.4.5.4 The atmosphere within the space will be periodically tested as necessary to ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere. Entrants are able to partake in and evaluate calibrated air monitoring data prior to entering the confined space.

4.1.4.5.5 If a hazardous atmosphere is detected during entry:

4.1.4.5.5.1 All employees will evacuate.

4.1.4.5.5.2 The space will be evaluated to determine how the hazardous atmosphere developed.

4.1.4.5.5.3 Measures will be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place.

4.1.5 Permit Required Confined Space Verification. The entry team leader will verify that the space is safe for entry and that the measures required by a written permit are accomplished. This written permit will contain as a minimum; the date, the location of the space, and the signature of the person providing the verification. The verification will be made before entry and will be made available to each employee entering the space.

4.1.6 Confined Space Reevaluation. When there are changes in the use or configuration of a confined space that might increase the hazards to entrants, company management or their designee will reevaluate that space and, if necessary, reclassify it as a permit-required confined space.

4.1.7 Permit Required to Confined Space Reclassification. A space classified as a permit-required confined space will be reclassified as a confined space under the following conditions:

4.1.7.1 If the permit space poses no actual or potential atmospheric hazards and if all hazards within the space are eliminated without entry into the space, the permit space may be reclassified as a confined space for as long as the non-atmospheric hazards remain eliminated.

4.1.7.2 If it is necessary to enter the permit space to eliminate hazards, such entry will be performed under the assumption that a hazard exists. If testing and inspection during that entry demonstrate that the hazards within the permit

space have been eliminated, the permit space may be reclassified as confined space for as long as the hazards remain eliminated.

- Note: Control of atmospheric hazards through forced air ventilation alone does not constitute elimination of the hazards. Periodic monitoring will be conducted to ensure forced air ventilation maintains a safe worker environment for reclassification to a confined space.

4.1.7.3 It will be documented that all hazards in a permit space have been eliminated, through a permit that contains as a minimum; the date, the location of the space, and the signature of the person making the determination. The permit will be made available to each employee entering the space.

4.1.7.4 If hazards arise within a permit space that has been declassified to a confined space, each employee in the space will immediately exit the space and the supervisor will be notified. Company management or their designee will then reevaluate the space and determine whether it must be reclassified as a permit space, in accordance with other applicable provisions of this safety program.

4.2 Permit-Required Confined Space Safety Program:

4.2.1 General. Under the permit-required confined space safety program the company will:

4.2.1.1 Implement the measures necessary to prevent unauthorized entry.

4.2.1.2 Identify and evaluate the hazards of permit spaces before employees enter them.

4.2.1.3 Develop and implement the means, procedures, and practices necessary for safe permit space entry operations, including, but not limited to, the following:

4.2.1.3.1 Specifying acceptable entry conditions.

4.2.1.3.2 Isolating the permit space.

4.2.1.3.3 Purging, inerting, flushing, or ventilating the permit space as necessary to eliminate or control atmospheric hazards.

4.2.1.3.4 Provide pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards.

4.2.1.3.5 Verify that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry.

4.2.1.3.6 Develop and utilize checklists based on this safety program and 29 CFR 1910.146.

4.2.1.4 Provide the following equipment at no cost to employees, maintain that equipment properly, and ensure that employees are train in the proper use of the equipment:

4.2.1.4.1 Testing and monitoring equipment needed to determine if hazardous conditions exist or to verify that they do not exist.

4.2.1.4.2 Ventilating equipment needed to obtain acceptable air quality entry conditions.

4.2.1.4.3 Communications equipment necessary for communication between personnel involved in the entry operation.

4.2.1.4.4 Personal protective equipment insofar as feasible. (Where engineering and work practice controls do not adequately protect employees).

4.2.1.4.5 Lighting equipment needed to enable employees to see well enough to work safely and to exit the space quickly in an emergency.

4.2.1.4.6 Barriers and shields to protect workers from pedestrian and vehicular traffic.

4.2.1.4.7 Ladders, needed for safe ingress and egress by authorized entrants.

4.2.1.4.8 Rescue, Retrieval, and Emergency equipment needed to extract or treat injured personnel, except to the extent that the equipment and/or service is provided by rescue services that are immediately available.

4.2.1.4.9 Any other equipment necessary for safe entry into and rescue from permitted spaces at our facility.

4.2.1.4.10 Principal equipment needed to conduct confined space operations. The below listed intrinsically safe equipment as a minimum will be maintained (where required) for confined space operations:

4.2.1.4.10.1 Multi-gas monitors

4.2.1.4.10.2 Ventilation Equipment

4.2.1.4.10.3 Rescue tripod/davit arm and winch system

4.2.1.4.10.4 Body harness

4.2.1.4.10.5 Extraction cable and lanyards

4.2.1.4.10.6 Air Compressors (as required)

4.2.1.4.10.7 Supplied Air respirators (as required)

4.2.1.4.10.8 Air purifying respirators (as required)

4.2.1.4.10.9 SCBA equipment (as required)

4.2.1.4.10.10 Emergency escape breathing app. (as required)

4.2.1.4.10.11 Radio communication system (as required)

4.2.1.4.10.12 Signage (as required)

4.2.1.4.10.13 Lock-out/Tag-out Equipment (as required)

4.2.1.4.10.14 Intrinsically safe lighting equipment

4.2.1.4.10.15 Personal protective clothing

4.2.1.4.10.16 Hearing protection equipment

4.2.1.4.10.17 Head protection equipment

4.2.1.4.10.18 Eye Protection equipment

4.2.1.4.10.19 First Aid kits

4.2.1.4.10.20 Time keeping equipment

4.2.1.4.10.21 Hand tools

4.2.1.4.10.22 Escape ladders for depths of four feet or shoulder height

4.2.2 Evaluation of Permitted Space Conditions. The company will evaluate permit space conditions as follows when entry operations are conducted:

4.2.2.1 Test conditions in the permit space to determine if acceptable entry conditions exist before entry is authorized to begin, except that, if isolation of the space is infeasible because the space is large or is part of a continuous system (such as a sewer), pre-entry testing will be performed to the extent feasible before entry is authorized and, if entry is authorized, entry conditions will be continuously monitored in the areas where authorized entrants are working.

4.2.2.2 Test or monitor the permit space as necessary to determine if acceptable entry conditions are being maintained during the course of entry operations.

4.2.2.3 When testing for atmospheric hazards, use the following protocol; first for oxygen, then for combustible gases and vapors, and then for toxic gases and vapors.

4.2.2.3.1 Atmospheric testing conducted per section 5 of this program or Appendix B to 29 CFR 1910.146 will be used to satisfy this requirement.

4.2.2.4 Attendants may be assigned to monitor more than one permit space provided their duties can be effectively performed for each permit space that is monitored. Likewise, attendants may be stationed at any location outside the permit space as long as their duties can be effectively performed for each permit space that is monitored.

4.2.2.4.1 If multiple spaces are monitored by a single attendant, the permit will be annotated to provide the means and procedures by which the attendant is to respond to an emergency affecting one or more of the permit spaces being monitored.

4.2.2.4.2 When a confined space entry is to take place, as part of the preplanning process, the persons who are to have active roles in the entry operation will be designated in advance. Additionally the duties of each such employee will be identified, and provided with the required training.

4.2.3 Procedures must be developed for the following:

4.2.3.1 Summoning rescue and emergency services

4.2.3.2 Rescuing entrants from permit spaces

4.2.3.3 Providing necessary emergency services for rescue

4.2.3.4 Preventing unauthorized personnel from attempting a rescue

4.2.4 Permits. Development and implementation for the preparation, issuance, use, and cancellation of entry permits will be as follows:

4.2.4.1 When employees of contractor personnel or non-company employees are working simultaneously as authorized entrants in a permit space, the verifying official of the permit (or pre-designated representative) will ensure that all parties concerned are aware of the accepted entry procedures for the specific operation. This will ensure entry operations are properly coordinated.

4.2.4.2 The verifying official of the permit (or pre-designated representative) will ensure that all parties concerned are aware of the accepted procedures necessary for concluding the entry after entry operations have been completed (such as closing off a permit space and canceling the permit).

4.2.4.3 The company will immediately review and as necessary halt and revise entry operations when there is reason to believe that the measures taken under the permit space safety program may not protect employees. The focus will be directed at the correction of deficiencies found to exist before subsequent entries are authorized. Examples of circumstances requiring the review of the permit-required confined space safety program are as a minimum:

4.2.4.3.1 Any unauthorized entry of a permit space.

4.2.4.3.2 The detection of a permit space hazard not covered by the permit.

4.2.4.3.3 The detection of a condition prohibited by the permit.

4.2.4.3.4 The occurrence of an injury or near-miss during entry.

4.2.4.3.5 A change in the use or configuration of a permit space.

4.2.4.3.6 Employee complaints about the effectiveness of the safety program.

4.2.4.4 Review of the permit-required confined space safety program, using the canceled permits retained will be accomplished within 1 year after each entry and the safety program revised as necessary, to ensure that employees participating in entry operations are protected from permit space hazards.

4.2.4.4.1 Single annual reviews covering all entries performed during a 12-month period will be accomplished. If no entry is performed during a 12-month period, no review is necessary.

4.3 Permit System:

4.3.1 Before entry is authorized, documents will be completed that include the following measures:

4.3.1.1 Specifying acceptable entry conditions.

4.3.1.2 Isolating the permit space.

4.3.1.3 Purging, inerting, flushing, or ventilating the permit space as necessary to eliminate or control atmospheric hazards.

4.3.1.4 Provide pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards.

4.3.1.5 Verify that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry.

4.3.1.6 Develop and utilize checklists based on this safety program and 29 CFR 1910.146.

4.3.2 Before entry begins, the entry team leader identified on the permit will sign the entry permit to authorize entry.

4.3.3 The completed permit will be made available at the time of entry to all authorized entrants, by posting it at the entry portal or by any other equally effective means so that the entrants can confirm that pre-entry preparations have been completed.

4.3.4 The duration of the permit may not exceed the time required to complete the assigned task or job identified on the permit.

4.3.5 The entry team leader will terminate entry and cancel the entry permit when:

4.3.5.1 The entry operations covered by the entry permit have been completed.

4.3.5.2 A condition that is not allowed under the entry permit arises in or near the permit space.

4.3.6 Each canceled entry permit will be retained for at least 1 year after its termination or cancellation to facilitate the review of the permit-required confined space safety program. Any problems encountered during an entry operation will be noted on the pertinent permit so that appropriate revisions to the permit space safety program can be made.

4.4 Entry Permit. The company will develop or use a standardized entry permit form that documents compliance with this section and authorizes entry to a permit space. As a minimum the permit in use will identify the following:

4.4.1 The permit space to be entered.

4.4.2 The purpose of the entry.

4.4.3 The date and the authorized duration of the entry permit.

4.4.4 The authorized entrants within the permit space, by name or by such other means (for example, through the use of rosters or tracking systems) as will enable the attendant to determine quickly and accurately, for the duration of the permit, which authorized entrants are inside the permit space. If a tracking system is used for certain entries this requirement may be met by inserting a reference on the entry permit as to the means used, such as a roster or tracking system, to keep track of the authorized entrants within the permit space.

4.4.5 The personnel, by name, currently serving as attendants.

4.4.6 The individual, by name, currently serving as entry team leader, with a space for the signature or initials of the entry team leader who originally authorized entry.

4.4.7 The hazards of the permit space to be entered.

4.4.8 The measures used to isolate the permit space and to eliminate or control permit space hazards before entry. Such as; the lockout or tagging of equipment and procedures for purging, inerting, ventilating, and flushing permit spaces.

4.4.9 The acceptable entry conditions.

4.4.10 The results of initial and periodic atmospheric tests performed, accompanied by the names or initials of the testers and by an indication of when the tests were performed.

4.4.11 The rescue and emergency services that can be summoned and the means (such as the equipment to use and the numbers to call) for summoning those services.

4.4.12 The communication procedures used by authorized entrants and attendants to maintain contact during the entry.

4.4.13 Equipment, such as personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment, to be provided for compliance with the permit requirement.

4.4.14 Any other information whose inclusion is necessary, given the circumstances of the particular confined space, in order to ensure employee safety.

4.4.15 Any additional permits, such as for hot work, that have been issued to authorize work in the permit space.

4.4.16 Training so that all employees acquire the understanding, knowledge, and skills necessary for the safe performance of the duties assigned.

5. Safety Information.

5.1 Procedures for Atmospheric Testing. Atmospheric testing for confined space entry is required for two distinct purposes: Evaluation of the hazards of the permit space and verification that acceptable entry conditions for entry into that space exists.

5.1.1 Evaluation testing. The company will ensure that the atmosphere of a confined space is analyzed using equipment of sufficient sensitivity and specificity to identify and evaluate any hazardous atmospheres that may exist or arise. This is required to ensure that appropriate permit entry procedures specific to the operation can be developed and acceptable entry conditions stipulated for that specific space. Evaluation and interpretation of these data, and development of the entry procedure, will be done by, or reviewed by, a technically qualified professional (e.g., OSHA consultation service, or certified industrial hygienist, registered safety engineer, certified safety professional, certified marine engineer, etc.) based on evaluation of all serious hazards. Employees, or their representatives, must be given an opportunity to request the space be re-evaluated. The internal atmosphere will be tested, with a calibrated direct-reading instrument, for the following conditions in the order given:

5.1.1.1 Oxygen content. (19.5% - 23.5% is required, any percentage less or more requires action to be taken) *OSHA Mandated*

5.1.1.2 Flammable gases and vapors in excess of 10% of the lower flammable limit. *OSHA Mandated*

5.1.1.3 Potential toxic air contaminants in excess of 10% of the lower flammable limit. *OSHA Mandated*

5.1.1.4 Airborne combustible dusts at concentrations that exceed the lower flammable limit (for example: dust obscures vision at a distance of 5 feet or less) *Site or Substance Specific*

5.1.2 Verification testing. The atmosphere of a permit space which may contain a hazardous atmosphere will be tested for residues of all contaminants identified by evaluation testing using permit specified equipment to determine that residual concentrations at the time of testing and entry are within the range of acceptable entry conditions. Results of testing (i.e., actual concentration, etc.) will be recorded on the permit in the space provided adjacent to the stipulated acceptable entry condition. The atmosphere will be verified, with a calibrated direct-reading instrument, for the following conditions in the order given:

5.1.2.1 Oxygen content. (19.5% - 23.5%) *OSHA Mandated*

5.1.2.2 Flammable gases and vapors. *OSHA Mandated*

5.1.2.3 Potential toxic air contaminants. *OSHA Mandated*

5.1.2.4 Airborne combustible dusts *Site Specific*

5.2 Duration of testing. Measurement of values for each atmospheric parameter will be made for at least the minimum response time of the test instrument specified by the manufacturer.

5.3 Testing stratified atmospheres. When monitoring for entries involving a descent into atmospheres that may be stratified, the atmospheric envelope will be tested a distance of approximately 4 feet (1.22 m) in the direction of travel and to each side. If a sampling probe is used, the entrant's rate of progress will be slowed to accommodate the sampling speed and detector response. The stratified atmosphere will be tested, with a calibrated direct-reading instrument, for the following conditions in the order given:

5.3.1 Oxygen content. (19.5% - 23.5%) *OSHA Mandated*

5.3.2 Flammable gases and vapors. *OSHA Mandated*

5.3.3 Potential toxic air contaminants. *OSHA Mandated*

5.3.4 Airborne combustible dusts. *Site Specific*

6. Training and Information.

6.1 The company will develop a standardized training format to meet the requirement for a safe confined space entry.

6.2 Training will be provided to each affected employee:

6.2.1 Before the employee is first assigned duties that require a confined space entry.

6.2.2 Before there is a change in assigned duties.

6.2.3 Whenever there is a change in permit space operations that presents a hazard about which an employee has not previously been trained.

6.2.4 Whenever company management or its employees have reason to believe that there are deviations from the permit space entry procedures required by this instruction or inadequacies in the employee's knowledge or use of these procedures.

6.3 The training will establish employee proficiency in the duties required by this instruction and will introduce new or revised procedures, as necessary, for compliance with this instruction or when future revisions occur.

6.4 The company will verify that the training required by this section has been accomplished. The documentation will contain each employee's name, the signatures or initials of the trainers, and the dates of training. The documentation will be available for inspection by employees and their authorized representatives.

7. Definitions.

- *Confined Space* - There are two types of confined spaces, non-permit required and permit required.
  - A non-permit required confined space must meet *all* the following criteria:
    - It is large enough and so configured that an employee can bodily enter and perform assigned work.
    - Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.)
    - Is not designed for continuous employee occupancy.
  - A permit required confined space includes the features of non-permit required spaces and *one or more* of the following:
    - Contains or has a potential to contain a hazardous atmosphere.
    - Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.
    - Contains any other recognized serious safety or health hazard.

- *Confined Space Entry* - the act of physically entering the space for work activity. Entry begins when any part of the entrant's body breaks the plane of the opening to a confined space with the intent of entry into the confined space or when the possibility of falling into the confined space exists.

- *Confined Space Entry Team* - All persons entering a confined space, the outside attendants (outside observer and/or outside assistant), and the entry team leader.

- *Confined Space Entry Permit* - A permit document designed to outline necessary safety procedures and equipment required for safe entry into designated confined spaces. The type of permit required is dependent upon the hazards present in the confined space:
  - Confined Space - A space which meets any of the criteria for the definition of a confined space, EXCEPT that it does NOT contain, nor has the potential to contain, atmospheric hazards such as flammable or combustible liquids or vapors, hazardous chemicals, toxic gases, oxygen enriched or deficient atmospheres or which does NOT require atmospheric testing, respiratory protection, chemical protective clothing, or specialized permits such as Open Flame or Asbestos Work.
  - Permit Required Confined Space - A confined space which contains, or has the potential to contain, atmospheric hazards such as flammable or combustible liquids or vapors, hazardous chemicals, toxic gases, oxygen enriched or deficient atmospheres or a space which requires atmospheric testing, respiratory protection, chemical protective clothing, or specialized permits such as Open Flame or Asbestos Work.

PROGRAM OVERVIEW

CONSTRUCTION SAFETY PROGRAM

REGULATORY STANDARD: *OSHA – 29 CFR 1910*
OSHA – 29 CFR 1926

INTRODUCTION: Outlines the safety requirements for a construction company. It provides guidance for tool selection, housekeeping, PPE, fall protection, and for the identification and control of other general construction industry hazards.

TRAINING:

- Employees will be trained on safety policies and procedures as well as the hazards posed by their work assignment for each construction site or job.

ACTIVITIES:

- Every construction job is unique and each must be assessed to identify its potential health and safety risks and communicate the identified hazards to employees
- Review operations for additional activities which could impact both contractors and employees
- Write and communicate polices and procedures
- Conduct compliance audits when contractors are on site

FORMS:

- Safety Checklist
- Training Attendance Roster
- As needed:
  - First Aid Kit Supply Requirements
  - On-site Code of Safe Practices

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1. Purpose. Effective implementation for job safety and health of our employees requires a written safety program fully endorsed and advocated by the highest level of management within the company. This safety program is designed to establish clear company goals and objectives and will be communicated to all required personnel. It encompasses the total workplace regardless of the number of workers employed or the number of work shifts. The company will review and evaluate this safety program:

1.1 On an annual basis.

1.2 When changes occur to 29 CFR that prompt a revision.

1.3 When changes occur to any related regulatory document that prompts a revision of this document.

1.4 When facility operational changes occur that require a revision of this document.

2. Scope. This program applies to all construction job sites and company employees.

3. Responsibilities.

3.1 Management:

3.1.1 Provide sufficient human and financial resources to address federal, state, and local safety and health compliance.

3.1.2 Assign compliance and general safety and health responsibilities to the Safety Officer (or other specifically designated person).

3.1.3 Establish employee safety and health management goals.

3.1.4 Review company safety and health management performance at least annually.

3.1.5 Hold managers accountable for safety and health performances through annual performance appraisals or at the completion of each job.

3.1.6 All subcontractors will be pre-approved by reviewing their safety programs, safety training documents, and safety statistics. EMR will be used in this reviewing process

3.2 Project Managers:

3.2.1 Assess each job to identify overall safety and health hazards and reassess as new components of the job begin.

3.2.2 Develop safety rules and job procedures necessary to eliminate or control hazards.

3.2.3 Conduct employee and subcontractor safety orientation and on-the-job training prior to the start of the job.

3.2.4 Conduct scheduled employee safety meetings.

3.2.5 Conduct on-going informal hazard identification checks, inspections and scheduled formal audits.

3.2.6 Estimate the waste that will be generated (per job) prior to work so that containers and waste removal methods can be arranged.

3.2.7 Report all incidents as required.

3.2.8 Investigate and document all accidents per accident investigation procedures.

3.2.9 Support and enforce all company, department, and job specific safety rules, policies and procedures and utilize disciplinary procedures as described in the company's Employee Handbook.

3.2.10 Maintain required safety documentation (training, incident reports, equipment records, inspection/audit information, etc.).

3.3 Job Site Supervisor:

3.3.1 Implement safe conditions, work practices enforcement of safety rules, laws and procedures in the daily supervision of all employees.

3.3.2 Ensure that each employee is provided with and wears the prescribed personal protective equipment that is necessary for the task at hand.

3.3.3 Ensure that all employees are informed of the safety rules for the job site or work location.

3.3.4 Enforce all safety rules and regulations.

3.3.5 Instruct employees on the recognized hazards of the job and how to avoid and report unsafe conditions.

3.3.6 Ensure that all regulatory standards for repair and maintenance of equipment are followed.

3.3.7 Ensure that all defective or damaged equipment is tagged and removed form the work site immediately until repaired or replaced.

3.3.8 Assist in the scheduled safety inspections as directed by the safety officer or other designated person.

3.3.9 Assist in the new hire orientation of all new employees before permitting them to enter the job site.

3.3.10 Assist the safety officer in the investigation of all accidents.

3.3.11 Serve on the company Employee Safety Committee.

3.3.12 Maintain required safety documentation (training, incident reports, equipment records, inspection/audit information, etc.).

3.3.13 Must conduct a post-job performance evaluation for all subcontractors.

3.4 Safety Officer (as needed or required):

3.4.1 Develop programs as necessary to comply with federal, state, and local employee safety and health regulations.

3.4.2 Coordinate provision of employee and management safety and health training.

3.4.3 Maintain all required documentation (training, incident reports, equipment records, inspection/audit information, etc.).

3.4.4 Participate in the Employee Safety and Health Committee.

3.4.5 Prepare safety and health management status reports including Workers' Compensation loss summary, compliance summary, and trend analysis of audit results, accident and incident causes, safety alerts, and other reported safety concerns.

3.5 Employees:

3.5.1 Follow all safety and job rules and procedures.

3.5.2 Use only tools, equipment, and materials for which training and authorization have been given.

3.5.3 Report all incidents and accidents as required.

3.5.4 Report all observed unsafe conditions and behaviors.

3.5.5 Participate in all employee safety and health training programs.

4. Procedure.

4.1 General construction safety work rules:

4.1.1 Employees are to follow all task and job site policies, and procedures.

4.1.2 Employees are to refrain from running, horseplay, practical jokes, and other activities, which could lead to the injury of the employee or others.

4.1.3 Employees are to report to work in appropriate attire and condition to ensure constant awareness of surroundings and activities.

4.1.4 Employees under the influence of alcohol or drugs will be removed from the work site immediately.

4.1.5 Employees will only use, repair, or adjust tools and machinery if trained and authorized by supervisory personnel.

4.1.6 Employees will maintain good housekeeping in all work areas and follow housekeeping schedules as required by job procedures and department policies.

4.1.7 Employees must report all unsafe conditions or behaviors to their supervisor immediately.

4.1.8 Employees must report all injuries to their supervisor immediately.

4.1.9 Employees are expected to assist in keeping the work site as free of debris as possible.

4.1.9.1 Waste materials will be stored and handled correctly to minimize the likelihood of a spill that may impact to the environment. During outdoor work, receptacles must be kept concealed to prevent spreading of waste materials and to control the possibility for run-off.

4.1.9.2 Employees must be trained on the proper disposal of waste. This includes disposal of non-hazardous wastes, trash, or scrap materials.

4.1.9.3 There will be areas available for recycling.

4.1.10 Employees are not allowed on the work site with firearms, explosives or unlawful weapons. Employees with such possessions on their person or property will be removed from the job site immediately.

4.1.11 Loose or ragged clothing shall not be worn while working around machinery.

4.1.12 Rings and/or other jewelry should be removed while working around machinery.

4.1.13 Know the location of emergency exits, first aid kits, fire extinguishers, fire alarms.

4.1.14 Do not use compressed air for dusting or cleaning clothing.

4.1.15 Attend and participate in the weekly “tool box” safety meetings.

4.1.16 Wear only the approved personal protective equipment.

4.1.17 Fall protection is required when exposed to falls greater than 6 feet.

4.1.18 Never ride mobile scaffolding.

4.1.19 All scaffolding must be properly constructed, with toe-boards, mid-rails, and handrails over 10 feet.

4.1.20 All scaffolding must be inspected daily by the designated “competent person”.

4.1.21 All ladders shall be inspected before use.

4.1.22 Ladders are only to be used within appropriate compliance guidelines.

4.1.23 Do not operate any machine unless trained and authorized to do so.

4.1.24 All gas cylinders shall be chained in an upright position.

4.1.25 Never remove a safety guard from machinery or equipment.

4.2 Specific jobsite construction industry safety work rules are located in the section labeled "General Safety" in this manual.

5. Safety Information.

5.1 Jobsite Safety Audits

5.1.1 Jobsite hazard assessment:

5.1.1.1 The Safety Officer or Project Manager conducts a General Hazard Assessment during the planning phase of a new project and updates the assessment as the job progresses. The completed assessment form is maintained in the main office, or where similar records are maintained.

5.1.2 Jobsite safety audits:

5.1.2.1 The Safety Officer or Job Site Supervisor will conduct formal jobsite safety audits on an annual basis for long term projects or on an as needed basis for shorter term projects to evaluate the overall safety of the jobsite.

5.1.2.2 Findings will be reviewed with the employees or the Subcontractor contact.

5.1.2.3 The Safety Officer or Project Manager will use recently completed audit reports during subsequent audits to ensure appropriate corrective actions are implemented as necessary.

5.1.3 Daily walk through safety audits:

5.1.3.1 The Safety Officer or Job Site Supervisor will walk through assigned areas on an as needed basis to identify any unsafe condition or behavior.

5.1.3.2 Hazards are to be corrected immediately.

5.1.3.3 If a hazard cannot be corrected immediately, a Hazard Alert Form will be completed and submitted to all affected subcontractors. Those subcontractors will inform employees of the hazards and appropriate precautionary measures. In such cases, the Job Site Supervisor must recheck the area in a reasonable time frame to ensure the hazard is appropriately corrected.

5.1.3.4 Work affected by any hazard that could cause serious injury must be halted until the hazard is corrected.

5.2 Accident and Incident Investigation

5.2.1 Reporting incidents is critical to the effectiveness of any injury and illness prevention program. The purposes of incident reporting are as follows:

5.2.1.1 Provide documentation for claims

5.2.1.2 Provide information to focus employee safety and health management efforts

5.2.1.3 Provide historical data to measure progress

5.2.1.4 Allow for continuous improvement

5.3 Reporting Procedures

5.3.1 Employees must report all incidents and accidents to the Job Site Supervisor (or the Safety Officer or Project Manager) that will complete the following forms. Portions of the report form may be completed by the employee or a Supervisor designee.

5.3.2 The employee's Supervisor must complete all portions relating to the accident/incident investigation and must also ensure the full completion of all portions.

5.3.3 The Safety Officer or Project Manager must review and sign the completed form.

5.3.4 Copies of the report must be forwarded to the following people, as needed or required:

5.3.4.1 Safety Officer

5.3.4.2 Claims Coordinator

5.3.4.3 Internal Human Resources Representative

5.4 Accident Investigation or Employee Incident Report flow:

5.4.1 The employee reports the incident to his/her Supervisor as soon as he/she is aware of the event.

5.4.2 The Safety Officer or Job Site Supervisor conducts an investigation and completes the Incident Report as soon as possible and forwards the report to the Project Manager or management.

5.4.3 The Manager reviews the report to ensure the completion of a thorough investigation and sends copies to the appropriate personnel.

5.4.4 Once the reports are completed and forwarded to the appropriate personnel, the following personnel will be undertake the listed activities to reduce the risk of recurrence:

5.4.4.1 Safety Officer:

5.4.4.1.1 Regularly reviews Incident Reports to identify trends.

5.4.4.1.2 Compiles an Incident Trend Summary Report which is presented to the Senior Manger or to the Employee Safety and Health Committee who initiates organization-wide corrective actions to address the identified trends.

5.4.4.1.3 Works with the Project Manager and/or Job Site Supervisor to ensure the correction of identified hazards.

5.4.4.2 Claims Officer:

5.4.4.2.1 Uses the Incident Reports to complete the necessary Worker's Compensation forms and to initiate claims management activities.

5.4.4.3 Project Manager:

5.4.4.3.1 Follows up with the Supervisor and employees to ensure the correction of identified incident/accident causes.

5.4.4.3.2 Shares relevant information with the Supervisor in other areas of their departments to ensure similar hazardous situations are addressed.

5.4.4.3.3 Ensures the provision of sufficient resources to make the necessary corrections and changes. Such resources may include equipment, materials, money, time, and support for policy changes.

5.4.4.4 Senior Manager:

5.4.4.4.1 Reviews Incident Reports as needed to determine the types of incidents occurring within the organization and the identified hazards in order to make appropriate decisions regarding safety and health management efforts.

5.4.4.4.2 Reviews the Incident Report Trend Summary Report provided by the Safety Officer to identify overall facility needs and to provide the leadership necessary to ensure workplace safety and health.

5.4.4.5 Employee Safety and Health Committee (as needed or required):

5.4.4.5.1 The Committee will be composed of both management and non-management personnel.

5.4.4.5.2 The Safety Officer is responsible for maintaining a list of current Committee members.

5.5 Recordkeeping. At a minimum the company will maintain the following records:

Record	Responsible Person	Location	Duration
Employee Safety Orientation	Safety Officer or other designated person	Main Office Employee File or with similar records	Until superseded
Employee Safety Training Records	Safety Officer or other designated person	Main Office Employee File or with similar records	Until superseded
Inspection Records and Audit Reports (w/corrective actions noted)	Safety Officer or other designated person	Main Office or with similar records	Until superseded or all action items are closed (whichever is longer)
Accident Reports (w/ corrective actions noted)	Safety Officer or other designated person	Main Office or with similar records	5 years
OSHA 300 Log and 301 Forms	Safety Officer or other designated person	Main Office or with similar records	5 years
Employee and Subcontractor Disciplinary Records regarding Safety/OSHA Compliance	Human Resources or other designated person	Human Resources Office or with similar records	Until Obsolete

6. Training and Information.

6.1 New employees:

6.1.1 All new employees will receive an orientation provided by the Safety Officer or Job Site Supervisor prior to their exposure to work place hazards.

6.1.2 The new employee orientation will cover the following items:

6.1.2.1 Overview of the Safety Program

6.1.2.2 Review of employee and management responsibilities

6.1.2.3 Hazard reporting procedures

6.1.2.4 Incident and accident reporting procedures

6.1.2.5 Employee Safety Committee function and members

6.1.2.6 General work rules

6.1.2.7 Department work rules

6.1.2.8 Method of access to first aid treatment

6.1.2.9 Acceptable clothing

6.1.2.10 Personal Protective Equipment required on the job

6.1.2.11 Location of all safety equipment

6.1.2.12 Fall protection

6.1.2.13 Scaffolds

6.1.2.14 Materials and handling

6.1.2.15 Cranes and hoists

6.1.2.16 Tag lines

6.1.2.17 Barricades

6.1.2.18 Machine guarding, lock out/tag out

6.1.2.19 Confined space entry

6.1.2.20 Vehicle safety

6.1.2.21 Housekeeping

6.1.2.22 Job tasks hazards and methods of control

6.1.2.23 Federal and State OSHA required training

6.1.3 The initial orientation documentation will be maintained by the Safety Officer or Job Site Supervisor and stored in the main office or the employee file (or where similar training records are maintained).

6.2 Transfer employees:

6.2.1 Employees transferring within the company will be trained in the items and exposures which previous training did not cover. The Safety Officer or Job Site Supervisor will provide this training prior to the employee's exposure to new hazards. Updated training will be documented on the employee's training record and stored in the main office or the employee file (or where similar training records are maintained).

6.3 Specific job/task training:

6.3.1 Employees must be trained to perform specific tasks in the construction job site such as forklifts, scaffold erection and confined space entry.

6.3.2 The Job Site Supervisor will identify which tasks require specific training and ensure this training is completed prior to permitting the employee to perform that task.

6.3.3 Training will be provided by the Safety Officer or Job Site Supervisor and documented on the employee's training record and stored in the main office or the employee file (or where similar training records are maintained).

6.4 Ongoing training:

6.4.1 Every construction job is unique. The Safety Officer or Job Site Supervisor must assess each job to identify its potential health and safety risks. Appropriate control methods will be communicated via:

6.4.1.1 New job orientation

6.4.1.2 Daily morning tailgate meetings for all employees and subcontractors.

6.4.1.3 Weekly site updates/training

6.4.1.4 Scheduled skills training programs

7. Definitions.

- *Incident* - An incident is an unplanned event resulting in a minor injury (e.g. a small bruise) or minor property damage (e.g. a broken box with lightly damaged, mostly usable contents) or has the potential to result in injury or property damage (a near miss). Incidents do not usually result in a claim.

- *Accident* - An accident is an unplanned event resulting in an injury requiring treatment (in-house first aid or outside medical attention) or more substantial property damage. Accidents usually result in a claim.

PROGRAM OVERVIEW

CONTRACTOR SAFETY VERIFICATION PROGRAM

REGULATORY STANDARD: OSHA - 29 CFR General Duty Clause

INTRODUCTION: It is the responsibility of the host employer (i.e. the company) to ensure the safety of all workers conducting business on the site. When contractors or temporary employees perform work that involves activities that may put personnel at risk, the company must ensure these contractors have appropriate training, equipment, and work conditions to accomplish the task(s) in a safe manner. An evaluation may be required to ensure that the training and equipment is adequate to control exposure hazards. This program provides a framework for these evaluations.

TRAINING:

- None required

ACTIVITIES:

- Evaluate hazards of tasks and activities at your workplace where contractors and temporary employees may have risk or exposure. Ensure these hazards are controlled and the persons exposed have appropriate training and equipment.
- Evaluate hazards of tasks and activities which your employees may encounter at another job site or workplace. Ensure these hazards are controlled and your employees have appropriate training and equipment to control these hazards.

FORMS:

- Contractor or Contract Employee Safety Training Requirements
- Contractor Safety Information
- Contractor Safety Inspection Report

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Contractor Safety Verification Program

1. Purpose. This program is designed to establish a screening process so that the company may hire and use contractors (or temporary employees) who accomplish the desired job tasks without compromising the safety and health of employees at this facility. The contractor must assure that contract employees are trained on the hazards related to the job, of performing the job safely, and other applicable provisions of the OSHA Regulatory Standards. This safety program describes a systematic approach that will be used to evaluate contractor personnel used at this facility, and provides recommendations and guidelines for selecting contractors. Company management will review and evaluate this safety program:

1.1 On an annual basis, or more frequently as needed

1.2 When changes occur to 29 CFR, that prompt revision of this document

1.3 When facility operational changes occur that require a revision of this document

1.4 When there is an accident or near-miss incident that relates to this area of safety

1.5 When changes occur to any related document that prompts a revision of this document

1.6 Anytime the safety program procedures fail

2. Scope. This program applies to all company sites and facilities where contractors or sub-contractors are utilized for company business or operations.

3. Responsibilities.

3.1 Management/Supervisors:

3.1.1 Ensure contractors are informed of the company emergency action and fire prevention program(s) and the actions contractor employees are required to take during an emergency situation.

3.1.2 Assure that contractors have the required training and equipment to comply with applicable federal, state and local safety regulations. Documented training and equipment maintenance records may be required to be produced by contractors in some instances.

3.1.3 Perform periodic inspections of contractor work and records to assure compliance with applicable regulations.

3.1.4 Assign or designate responsibility to a company employee to act as the primary liaison between the company and the contractor for safety-related issues.

3.1.5 Periodically hold meetings with contractors or contract employees to discuss on-going safety issues.

3.2 Employees:

3.2.1 Report any hazardous conditions or situations to company management or your supervisor, as needed or required

3.3 Safety Officer:

3.3.1 Assist in the development and implementation of this program as needed or required.

3.3.2 Act as the liaison between the company and contractors, if designated to do so.

4. Procedure.

4.1 Emergency Action and Fire Prevention Program. All contract employers will be informed, prior to the initiation of the contractors' work at the site, of the applicable provisions of the facility emergency action safety program and all other information as required by the relevant OSHA Standard.

4.2 Contractor Pre-Qualification Policy. Contractors may be required to produce evidence that they are aware of regulatory compliance requirements for specific tasks or activities at company sites or locations. To evaluate contractor performance during or prior to the awarding of contract work, the company may utilize the Contractor Safety Information form, or an equivalent document, to assure adequate levels of past safety performance. As a means to assure that contract employees follow the safety rules of the facility, including safe work practices required by relevant regulations and policies the following criteria and information relating to the contractor will be reviewed and complied with before any contract for work on site is approved:

4.2.1 Information relating to contract employers' safety performance and programs

4.2.2 Methods of informing the contractor (and our personnel) of known potential hazards related to the contractor's work and applicable provisions of the facility emergency action safety program

4.2.3 Safe work practices to control the entrance, presence and exit of contract employers and contract employees in covered process areas, or other areas where known hazards exist

4.2.4 Evaluation of contractor performance in complying with specific safety standards

4.2.5 Contract employee injury and illness logs related to safety standards

4.2.6 A list of unique hazards presented by contractors' work or potential hazards generated by the contractor in the workplace will be communicated to company management and other company employees who would require this information to maintain a safe workplace.

4.3 Routine Contractor Compliance Inspections. Routine contractor compliance inspections will be conducted periodically when contractors are on site. The inspection will be conducted to discover conditions and work practices that do not conform to best management practices regarding contractor safety compliance. The Contractor Safety Inspection Report form, or an equivalent document, may be used to facilitate the inspection process.

4.3.1 Contractor Safety Inspection Team. The company contractor inspection team will be comprised of selected members of management/supervisors and hourly personnel.

4.3.2 Inspection Intervals. The Safety Officer or other designated person will coordinate inspection dates and times with all assigned inspection team members. Inspections will be conducted on an as needed basis while work is in progress, or at least annually for long-term work.

4.3.3 Inspection report. The Safety Officer or other designated person will develop a contractor safety report based on the inspection items noted during the inspection. The following items will be accomplished:

4.3.3.1 The pertinent sections of the report will be distributed immediately to personnel responsible for correcting deficiencies noted during the inspection.

4.3.3.2 The pertinent sections of the report will be distributed to all supervisors and key management personnel affected by the contractor's operation. Supervisors will brief the employees on the results. Any employee requesting to be placed on the distribution list will be accommodated.

4.3.3.3 The Safety Officer or other designated person will develop a statistical analysis of deficiencies noted to determine jobs/areas that have a high incidence of contractor non-compliance. These areas will be emphasized during future inspections and meetings. This analysis will become a determining factor in future awards of work to the contractor.

4.3.3.4 Any deficiencies noted will be immediately corrected by the contractor or a "stop work" order will be issued.

5. Safety Information.

5.1 Contractor Safety Meetings. A well ordered flow of information is essential to a good Contractor Safety Verification Program. Company management through contractor meetings at all levels intends to ensure that all contractors awarded work will maintain a high degree of safety compliance at all times.

5.1.1 Contractor meeting agendas. The Safety Officer will develop agendas serving various topics of importance to the Contractor Safety Verification Program. The agendas will be flexible. They will be intended to ensure the highest degree of compliance to existing regulations.

5.1.2 Contractor meeting schedules. Contractor safety meetings will be conducted on a regular basis and when operational changes to equipment, facilities, or the job occur that impacts the Contractor Safety Verification Program.

5.1.3 Departmental staff meetings. Contractor safety topics will be included in the agenda of selected staff meetings. The Safety Officer will keep department heads informed of contractor safety performance developments in their area. Department heads may ask the Safety Officer to provide contractor safety briefings as required.

5.1.4 Supervisor meetings. Contractor safety issues will be included in the agenda of selected meetings during times when contractors are used in their departments. Department heads will ensure that selected Contractor Safety Verification Program information is transmitted to supervisors for inclusion in meetings. Supervisors may ask the Safety Officer or another designated person to provide contractor safety briefings as required.

5.2 Specific Safety Standards Requiring Contractor Safety Compliance. The following standards will be reviewed if the contractor (or temporary employee) engages in activities that could fall under the jurisdiction of the specific standard:

Confined Space	29 CFR 1910.146
Fall Protection	29 CFR 1910.66, 119, 128, 129, 130, 131
Forklift	29 CFR 1910.178
Hazard Communication	29 CFR 1910.1200
Hazardous Waste Operations	29 CFR 1910.120
Lockout Tagout	29 CFR 1910.147
Process Safety	29 CFR 1910.119
Respiratory Protection	29 CFR 1910.134
Welding Safety	29 CFR 1910.252

6. Training and Information.

6.1 All contractors will ensure that their employees are properly trained about the hazards of the workplace (including, but not limited to known fire, explosion and or toxic hazards, uncontrolled energy, and confined spaces). To facilitate this process, the company may utilize the Contractor/Contract-Employee Safety Training Requirements form, or an equivalent document, to provide documented evidence of training.

6.1.1 Contractors (including temporary employment agencies) used by the company are required to provide training to their employees in the work practices necessary for their specific job. Additionally, the company Safety Officer or other designated company personnel, in coordination with the contractor, will conduct process hazard analyses to identify, evaluate, and control processes involving highly hazardous chemicals.

6.1.2 Whenever there are outside contractor’s present, coordination with company management, supervisors or other designated company personnel is mandated. For example, the company will inform the contractor (and vice versa) when equipment cannot be touched, re-energized or restarted.

6.1.3 Based on interviews with the contractors and/or any previous employers, company management will ensure, through periodic evaluations, that the training provided to contractor employees by the contractor is equivalent to the training required for direct hire employees. The burden of training for contractor employees remains with the contractor.

6.1.4 Contractors used by the company must:

6.1.4.1 Assure their employees are trained in safe work practices needed to perform the job.

6.1.4.2 Assure their employees are instructed in the known potential fire, explosion, or toxic release hazards related to the job and the applicable provisions of the facility emergency action safety program.

6.1.4.3 Document the required training and the means to verify their employees have understood the training.

6.1.4.4 Assure their employees follow the facility safety rules and work practices.

6.1.4.5 Advise the company of unique hazards presented by the contractor's work.

7. Definitions.

- *None at this time*

ARCITECHTURAL CONCRETE PLUS, LLC.

PROGRAM OVERVIEW

CRANE, HOIST AND SLING SAFETY PROGRAM

REGULATORY STANDARD: OSHA - 29 CFR 1910.179 and 184
ANSI - B30.2 and 30.9
Crane Manufacturers Association of America 61

INTRODUCTION: This program is intended to assist employers in identifying and minimizing the risks associated and ensuring proper procurement, maintenance, testing, inspection and safe operation of internally used overhead cranes and hoists, and sling equipment. Mobile cranes (like those used outside at construction sites) are excluded.

TRAINING:

- All employees trained initially on the hazards and how to minimize risk. Training should include hazard recognitions, suspended loads, tag lines, safe work areas. Note that Paychex can provide general awareness training, not certified crane operator training.
- Retraining is required as changes in the workplace occur, or as needed

ACTIVITIES:

- Purchase only equipment that is approved by the American National Standards Institute (ANSI B-30.2) and ensure it is labeled appropriately with registration numbers and load limits
- Test equipment as needed or required, or contract with the installation firm or manufacturer to perform required tests
- Identify Hoist & Crane Designee for approval of hoist and/or crane activities, scheduling of inspections, and recordkeeping

FORMS:

- Crane, Hoist, and Sling Inspection Checklist
- Crane, Hoist, and Sling Inspection Record
- Crane, Hoist, and Sling Maintenance Testing & Inspection Requirements
- Crane, Hoist, and Sling Requirements for Construction and Installation
- Training Attendance Roster

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1. Purpose. Each facility or site which uses overhead cranes, hoists and slings require processes in place to ensure proper procurement, maintenance, testing, inspection and safe operation of internally used overhead cranes and hoists, and sling equipment. Mobile cranes (like those used outside at construction sites) are excluded.

2. Scope. This program applies to all company owned, leased or operated overhead cranes, hoists, and slings.

3. Responsibilities.

3.1 Management and Supervisor:

3.1.1 Purchase only equipment that is approved by the American National Standards Institute (ANSI B-30.2).

3.1.2 Test equipment as needed or required, or contract with the installation firm or manufacturer to perform required tests.

3.1.3 Ensure operators inspect equipment daily or before each use.

3.1.4 Assess the operations to assure that cranes and hoists are operating properly.

3.1.5 Assess operator behavior to assure that equipment is used properly. Retrain or replace operators whose behavior exhibits deficiencies.

3.1.6 Train operators, inspectors, and assure the Crane and Hoist Designated Person has the appropriate knowledge and skills to perform their required duties.

3.1.7 Assure that repairs, modifications and maintenance of crane and hoist equipment are performed in a timely manner, and on a regular basis. Modifications must be approved by a professional engineer or the manufacturer.

3.2 Crane Operators:

3.2.1 Operators will conduct visual crane and hoist inspections frequently (daily or before each use is recommended, although monthly inspection is the minimum). A crane and hoist inspection form is provided for this purpose.

3.2.2 Cranes that have been idle for a period of one month or more will be inspected by the designated “Hoist & Crane Designee” before the crane is put back into service.

3.2.3 Operators' skills, knowledge, and operating behaviors are routinely assessed by Supervisors. Deficiencies will be addressed through re-training or replacement of the operator.

3.2.4 Appropriate preventive maintenance inspection cycles are established, based on manufacturer's recommendations and/or the Hoist & Crane Designee recommendations. Modifications made must be approved by a professional engineer or the manufacturer.

3.2.4.1 Follow all company work practices and manufacturer's recommendations to ensure safe operation of the equipment and ancillary materials.

3.3 Crane and Hoist Designee:

3.3.1 This person must have qualifications that meet the approval of the Hoist & Crane regulations. In addition, this person must understand the maintenance qualifications, frequency of inspection, documentation and recordkeeping requirements. It is recommended that this person be (or have access to) a professional engineer to provide appropriate consultation on load capacity and other approvals required.

3.3.2 Be responsible for inspections, documentation and records for cranes, hoists and slings used at the company.

3.3.3 Provide inspections for cranes that have been idle for one month or more.

3.3.4 Assure registration stickers with appropriate registration numbers are affixed to the crane, hoist and/or sling.

3.3.5 Assure cranes are affixed with their rated load capacity.

3.3.6 Provide approvals for (or consult with a professional engineer or the manufacturer to approve) any activity where the rated load of a crane may be exceeded. In no case may a hoist’s rated load capacity be exceeded.

3.4 Manufacturer or Installer:

3.4.1 Provide for initial testing of cranes, hoists and slings. Testing includes hoisting and lowering, trolley travel, bridge travel, limit switches and locking and safety devices, and rated load testing.

3.4.2 Provide consultation services for loading capacity, modifications, repairs and other items as needed or required.

3.4.3 Provide all repairs and service for slings.

3.5 Maintenance Personnel:

3.5.1 Perform required preventive maintenance services on crane and hoist equipment, per manufacturer’s recommendations. Slings must be repaired and serviced *only* by the manufacturer.

3.5.1.1 Adjustments of operating mechanisms, limit switches, control systems, brakes and power sources may be performed by company personnel, under the direction of either a professional engineer or other designated person who has the qualifications to perform such repairs on crane and hoist equipment.

3.5.1.2 Repairs must be made to cranes and hoists only under the approval and oversight of either the manufacturer or a professional engineer.

4. Procedure.

4.1 General:

4.1.1 Cranes and hoists are procured through and registered with the site designated unit or through the outside company contracted to manage hoists and cranes. The Hoist & Crane Designee will apply a registration sticker with the hoist or crane's designated registration number. This sticker must remain legible from the floor.

4.1.2 Load testing, hoisting and lowering, trolley travel, bridge travel and limit locking and safety devices must be performance tested (in accordance with ANSI B-30.2b) upon initial installation or after any modifications or alterations to the equipment. Testing does not need to be performed for change-outs of chain, wire rope or cables.

4.1.3 Operators and their supervisors are properly trained for the operations they are expected to perform and on the equipment to which they are assigned. (Training is required to be documented.). Operation of any overhead crane or hoist without proper training and authorization is forbidden.

4.2 Safe Work Practices for Crane and Hoist Operators:

4.2.1 At a minimum, operators will:

4.2.1.1 Pay constant attention to hoist/crane while load is suspended.

4.2.1.2 Never exceed the rated load.

4.2.1.3 Never leave a suspended load unattended.

4.2.1.4 Position/center load for balance.

4.2.1.5 NOT perform side-pull lifts.

4.2.1.6 NOT lift with kinked or damaged chain, cable, or rope.

4.2.1.7 NOT lift loads over people.

4.2.1.8 IMMEDIATELY stop and report any malfunctioning device to Supervisors. IN THE EVENT OF IMMEDIATE DANGER, lower the load, lock out the crane power source, and immediately contact the site emergency number. If unable to safely lower the load, control the immediate area while others contact emergency responders.

4.2.1.9 For cab-operated cranes, maintain cab access clear and clean and perform documented monthly inspections of cab fire extinguisher.

4.2.1.10 Follow direction from persons trained to provide correct hand signals when assisted lifts are conducted.

4.2.1.11 Never allow persons to ride hook or load.

4.2.2 Be responsible and accountable for the safety of the load, regardless of who attached it.

4.3 Safe Work Practices for Sling Operators:

4.3.1 Slings that are damaged or defective will not be used.

4.3.2 Slings will not be shortened with knots or bolts or other makeshift devices.

4.3.3 Sling legs will not be kinked.

4.3.4 Slings will not be loaded in excess of their rated capacities.

4.3.5 Slings used in a basket hitch will have the loads balanced to prevent slippage.

4.3.6 Slings will be securely attached to their loads.

4.3.7 Slings will be padded or protected from the sharp edges of their loads.

4.3.8 Suspended loads will be kept clear of all obstructions.

4.3.9 All employees will be kept clear of loads about to be lifted and of suspended loads.

4.3.10 Hands or fingers will not be placed between the sling and its load while the sling is being tightened around the load.

4.3.11 Shock loading is prohibited.

4.3.12 A sling will not be pulled from under a load when the load is resting on the sling.

4.3.13 Before being lifted completely from its resting position, loads will be checked for proper balance.

4.3.14 Unapproved makeshift slings such as fan belts will never be used.

4.4 Handling Loads:

4.4.1 Size of load.

4.4.1.1 The crane may not be loaded beyond its rated load except for testing purposes.

4.4.2 Attaching the load.

4.4.2.1 Ropes must be free from kinks or twists and not be wrapped around the load.

4.4.2.2 Loads are attached to the block hook by slings or other approved devices, taking care that the slings clear all obstacles.

4.4.2.3 Where hazards to employees occur tag lines shall be used to control loads being handled by hoisting equipment.

4.4.2.4 Hooks on overhaul ball assemblies, lower load blocks, or other attachment assemblies shall be of a type that can be closed and locked, eliminating the hook throat opening. Alternatively, an alloy anchor type shackle with a bolt, nut and retaining pin may be used.

4.4.3 Moving the load.

4.4.3.1 Loads must be secure and balanced in the sling or lifting device before it is lifted (even more than a few inches).

4.4.3.2 Before starting check for the following:

4.4.3.2.1 Hoist rope is not kinked.

4.4.3.2.2 Multiple part lines are not to be twisted around each other.

4.4.3.2.3 Hooks are brought over the load to prevent swinging.

4.4.3.3 During hoisting care will be taken that:

4.4.3.3.1 There is no sudden acceleration or deceleration.

4.4.3.3.2 The load does not contact any obstructions.

4.4.3.4 Cranes may not be used for side pulls.

4.4.3.5 Employees may not be on the hook (riding it or gliding with it) during movement.

4.4.3.6 Loads may not be carried over people.

4.4.3.7 Operators must test the brakes when the rated load capacity of the crane or hoist is approached. Testing is by raising the load a few inches and applying the brakes.

4.4.3.8 At least two full wraps of rope must remain on the drum at all times.

4.4.3.9 When two or more cranes are used to lift a load one qualified responsible person must be designated to be in charge of the operation. They will analyze the operation and instruct all personnel involved in the proper positioning, rigging of the load, and the movements to be made.

4.4.3.10 Operators must remain at the controls at all times when loads are suspended.

4.4.3.11 A warning signal must activate when the bridge starts and when the load or hook approaches personnel.

4.4.3.12 When rigging equipment is not in use it should be removed from the immediate work area as to not present a hazard.

4.4.4 Hoist limit switches.

4.4.4.1 Upper limit switches must be no-load tested at the beginning of each operator's shift. Extreme care must be used; the block is "inched" into the limit or run in at slow speed. If the switch does not operate properly, the crane may not be used until repaired.

4.4.4.2 The hoist limit switch, which controls the upper limit of travel of the load block, may never be used as an operating control.

4.5 Markings:

4.5.4 All cranes, hoists and slings will be labeled with their registration number by the Hoist & Crane Designee. These registration numbers must be legible from the floor.

4.5.5 Monorails must be labeled with their rated weight load capacity. Multiple hoists applied to a single monorail may not exceed the total rated capacity of the monorail without specific approval of the Hoist & Crane Designee. Markings must be legible from the floor.

4.5.6 Hoists and slings must be marked with their rated weight load capacity. Under no circumstances may a rated capacity be exceeded on a hoist. Markings must be legible from the floor.

4.5.7 Cranes are required to be marked with their rated weight load capacity on each side of the crane. Markings must be legible from the floor. If more than one number appears on the marking (e.g. 20/5) the larger number is the total rated capacity and will not be exceeded.

4.6 Repairs/Modifications and Testing:

4.6.4 Cranes and Hoists

4.6.4.1 All repairs and modifications to new and existing crane and hoist systems are made by a professional engineer or the manufacturer.

4.6.4.2 Adjustments to crane and hoist equipment may be performed by qualified personnel under the direct instruction of either a professional engineer or the manufacturer.

4.6.4.3 Cranes must be tested upon initial installation and after alterations.

4.6.5 Slings

4.6.5.1 Sling repairs and modifications must be made by the manufacturer.

5. Safety Information.

5.1 Cranes and Hoists:

5.1.1 General (See Crane and Hoist Construction and Installation Requirements form for more detailed information.)

5.1.1.1 Wind indicators and rail clamps for outdoor storage bridges will be in place. A visible or audible alarm must be provided to warn the operator of winds exceeding a set velocity. (Velocity is set based on the capabilities of the crane.)

5.1.1.2 Hoisting equipment (sheaves, hoist chains, ropes and hooks) will be smooth and free from defects or damage and inspected monthly. Documentation of these inspections will be kept.

5.1.1.3 Clearance from any obstruction must be maintained at a minimum of 3 inches overhead and 2 inches laterally.

5.1.1.4 Passageways and walkways (including those used to maintain crane equipment) must be free from obstruction, and be located so they do not jeopardize the safety of any employee on the walkway.

5.1.1.5 Parallel cranes must have adequate space between bridges so that hoisted materials and the crane equipment is not at risk.

5.1.1.6 If there is at least 48 inches of headroom available, foot-walks should be provided on cab-operated cranes along the length of the bridge.

5.1.1.7 Controls must be visible (well lighted) and located within convenient reach of the operator when facing the load and/or direction of travel of the cab. Load hook must be in full view at all times.

5.1.1.8 Fire extinguishers may be of any type except Carbon Tetrachloride. Cab operators must be trained and familiar with their use.

5.1.1.9 Brakes (control and holding types) must be provided that adequately slow and stop the crane, and which hold the load.

5.1.1.10 Electrical equipment and components will comply with OSHA's Electrical Safety requirements.

5.1.1.11 Hoisting equipment (sheaves, ropes and hooks) will be smooth and free from defects or damage. They must be inspected frequently.

5.1.1.12 Warning devices and alarms must be installed for all cranes (except floor operated cranes) that have power traveling mechanisms.

5.1.1.13 Ladders must be free from obstruction and other encumbrances during use. Articles that are too large for pockets or belt attachments must be lifted and lowered by a hand line.

5.1.1.14 Cabs must be kept neat so that personal items do not interfere with the operation or access to controls. Tools, oil cans, waste, extra fuses, and other necessary articles should be stored in a tool box.

5.2 Slings:

5.2.1 General (See Crane Hoist and Sling Maintenance Testing and Inspection form for more detailed information.)

5.2.1.1 Operators must be trained by the manufacturer or other certified agency.

5.2.1.2 Slings and their components must be inspected daily, periodically and on a regular schedule.

5.2.1.3 Damaged equipment may not be used until repaired by the manufacturer.

5.2.1.4 Slings and their components must have identification permanently affixed that designates the size, grade rated capacity and reach.

5.2.1.5 Slings must be manufacturer tested before being placed into service.

5.2.1.6 Slings are rated for temperature ranges. If materials or temperatures exceed this range, the sling or component must be re-tested by the manufacturer.

5.2.1.7 Types of slings include:

5.2.1.7.1 Alloy steel chain

5.2.1.7.2 Wire rope

5.2.1.7.3 Metal mesh

5.2.1.7.4 Natural or Synthetic fiber rope

5.2.1.7.5 Synthetic web

6. Training and Information.

6.1 All employees working near crane, hoist and sling operations must be made aware of the hazards associated with the use of the equipment.

6.1.1 Specialized or one-time lifts must have information and training provided prior to the lift.

6.2 Initial training must occur for crane, hoist and sling operators prior to initial job assignment and use of equipment. Training includes:

6.2.1 Pre-operational inspection requirements (including verification of markings on the equipment and components).

6.2.2 Specific operational requirements.

6.2.3 Principles of operations.

6.2.4 Hazard recognition associated with the work.

6.2.5 Load determination and balancing.

6.2.6 Process to remove equipment or components from service.

6.3 Training must be documented. Documentation must be retained as long as the operator is required to use the equipment.

6.3.1 Training for cranes and hoists is performed by the manufacturer or other certified agency.

6.3.2 Training for sling *use* may be provided by an experienced employee who has had previous training provided by the manufacturer, although it is more common for the manufacturer or installer of the sling to provide the required operator training.

6.3.3 Training for sling inspection is provided to operators by the manufacturer.

6.4 Refresher training is identical to initial training and is required when there is a change in the job assignment or equipment used, when procedures change and when operator behavior warrants retraining.

6.5 Operators must be physically and mentally capable of performing their duties and understanding the safe use of cranes, hoists and slings.

6.6 Fire extinguishers may be of any type except Carbon Tetrachloride. Cab operators must be trained and familiar with their use.

7. Definitions.

- *Hoist & Crane Designee* - If a designee is utilized for approval of hoist and/or crane activities, they must have qualifications that meet the approval of the Hoist & Crane regulations. In addition, this person must understand the maintenance qualifications, frequency of inspection, documentation and recordkeeping requirements. It is recommended that this person be (or have access to) a professional engineer to provide appropriate consultation on load capacity and other approvals required.

- *Qualified person* - A person who, by possession of a recognized degree or a certificate of 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 and work.

- *Designated* - Selected by management as being competent to perform specific duties.

- *Crane* - A mechanism used for lifting or lowering a load and moving it horizontally.

- *Hoist* - A suspended mechanism that exerts a force for lifting or lowering a load. May be part of a crane.

- *Monorail* - A single run of overhead track on which hoists travel.

- *Sling* – A hammock, net or similar device used with hoists or cranes to carry a suspended load.

- *Angle of loading* - The inclination of a leg or branch of a sling measured from the horizontal or vertical plane as shown in Fig. N-184-5 of 29 CFR 1910.184; provided that an angle of loading of five degrees or less from the vertical may be considered a vertical angle of loading.

- *Basket hitch* - A sling configuration whereby the sling is passed under the load and has both ends, end attachments, eyes or handles on the hook or a single master link.

- *Braided wire rope* - A wire rope formed by plaiting component wire ropes.

- *Bridle wire rope sling* - A sling composed of multiple wire rope legs with the top ends gathered in a fitting that goes over the lifting hook.

- *Cable laid endless sling mechanical joint*- A wire rope sling made endless by joining the ends of a single length of cable laid rope with one or more metallic fittings.

- *Cable laid grommet-hand tucked* - An endless wire rope sling made from one length of rope wrapped six times around a core formed by hand tucking the ends of the rope inside the six wraps.

- *Cable laid rope* - A wire rope composed of six wire ropes wrapped around a fiber or wire rope core.

- *Cable laid rope sling mechanical joint* - A wire rope sling made from a cable laid rope with eyes fabricated by pressing or swaging one or more metal sleeves over the rope junction.

- *Choker hitch* - A sling configuration with one end of the sling passing under the load and through an end attachment, handle or eye on the other end of the sling.

- *Coating* - An elastomer or other suitable material applied to a sling or to a sling component to impart desirable properties.

- *Cross rod* - A wire used to join spirals of metal mesh to form a complete fabric. (See Fig. N-184-2 of 29 CFR 1910.184.)

- *Designated* - Selected or assigned by the employer or the employer's representative as being qualified to perform specific duties.

- *Equivalent entity* - A person or organization (including an employer) which, by possession of equipment, technical knowledge, and skills, can perform with equal competence the same repairs and tests as the person or organization with which it is equated.

- *Fabric (metal mesh)* - The flexible portion of a metal mesh sling consisting of a series of transverse coils and cross rods.

- *Female handle (choker)* - A handle with a handle eye and a slot of such dimension as to permit passage of a male handle thereby allowing the use of a metal mesh sling in a choker hitch. (See Fig. N-184-1 of 29 CFR 1910.184.)

- *Handle* - A terminal fitting to which metal mesh fabric is attached. (See Fig. N-184-1 of 29 CFR 1910.184.)

- *Handle eye* - An opening in a handle of a metal mesh sling shaped to accept a hook, shackle or other lifting device. (See Fig. N-184-1 of 29 CFR 1910.184.)

- *Hitch* - A sling configuration whereby the sling is fastened to an object or load, either directly to it or around it. Link is a single ring of a chain.

- *Male handle (triangle)* - A handle with a handle eye.

- *Master coupling link* - An alloy steel welded coupling link used as an intermediate link to join alloy steel chain to master links. (See Fig. N-184-3 of 29 CFR 1910.184.)

- *Master link or gathering ring* - A forged or welded steel link used to support all members (legs) of an alloy steel chain sling or wire rope sling. (See Fig. N-184-3 of 29 CFR 1910.184.)

- *Mechanical coupling link* - A non-welded, mechanically closed steel link used to attach master links, hooks, etc., to alloy steel chain.

- Proof load - The load applied in performance of a proof test.

- *Proof test* - A nondestructive tension test performed by the sling manufacturer or an equivalent entity to verify construction and workmanship of a sling.

- *Rated capacity or working load limit* - The maximum working load permitted by the provisions of this section.

- *Reach* - The effective length of an alloy steel chain sling measured from the top bearing surface of the upper terminal component to the bottom bearing surface of the lower terminal component.

- *Selvage edge* - The finished edge of synthetic webbing designed to prevent unraveling.

- *Sling* - An assembly which connects the load to the material handling equipment.

- *Sling manufacturer* - A person or organization that assembles sling components into their final form for sale to users.

- *Spiral* - A single transverse coil that is the basic element from which metal mesh is fabricated. (See Fig. N-184-2 of 29 CFR 1910.184.)

- *Strand laid endless sling-mechanical joint* - A wire rope sling made endless from one length of rope with the ends joined by one or more metallic fittings.

- *Strand laid grommet-hand tucked* - An endless wire rope sling made from one length of strand wrapped six times around a core formed by hand tucking the ends of the strand inside the six wraps.

- *Strand laid rope* - A wire rope made with strands (usually six or eight) wrapped around a fiber core, wire strand core, or independent wire rope core (IWRC).

- *Vertical hitch* - A method of supporting a load by a single, vertical part or leg of the sling. (See Fig. N-184-4 of 29 CFR 1910.184.)

PROGRAM OVERVIEW

DEMOLITION SAFETY PROGRAM

REGULATORY STANDARD: OSHA 29 CFR 1926 Subpart T

INTRODUCTION: Addresses demolition activities performed without explosives. Before starting any demolition project, careful preparations must be made to ensure the safety of workers on the job and other individuals within the vicinity of the demolition site. These preparatory operations involve the overall planning of the demolition job, including the methods to be used to bring the structure down, the equipment necessary to do the job, and the measures to be taken to perform the work safely.

TRAINING:

- Supervisors and employees will be trained in the recognition of hazards associated with demolition work and in their responsibilities for emergencies.
- Any person involved with debris chute use must be trained in the safe use requirements.

ACTIVITIES:

- Identify "competent" personnel to prepare demolition plans
- Write and communicate policies and procedures that will include a process to ensure that at each demolition site, hazards, safety equipment, and emergency response procedures are evaluated
- Provide any needed safety equipment
- An engineering survey must be completed to assess the condition of the framing, floors, and walls to prevent a possible premature collapse of the structure

FORMS:

- Pre-Demolition Safety Checklist
- Training Attendance Roster

Table of Contents

Demolition Safety Program

1. Purpose. This program covers all employees when engaged in the dismantling, razing, or wrecking of any fixed building or structure or any part thereof. This includes all partial dismantling and razing activities where structural members of the structure are not removed. This program also covers activities involving rehabilitation, repair, or remodeling including those where no removal of load supporting structural members takes place.

2. Scope. This program applies to all employees and contractors engaged in demolition activities as defined by this program.

3. Responsibilities.

3.1 Management will:

3.1.1 Plan for the wrecking of the structure, the equipment to do the work, labor requirements, and protection of the public.

3.1.2 Ensure an engineer or similarly "qualified person" establishes a plan for any demolition job by completing an engineering survey before demolition operations begin.

3.1.3 Make available the telephone numbers of the local police, ambulance and fire departments at each job site.

3.1.4 Establish a fire plan before any demolition job.

3.1.4.1 Outline assignments of key personnel.

3.1.4.2 Provide an evacuation program for workers on the site.

3.1.5 Provide training to employees prior to start of demolition work when necessary.

3.1.6 Assigned duties only to personnel capable of performing duties assigned.

3.2 Employees will:

3.2.1 Attend all training.

3.2.2 Follow established safety rules.

3.2.3 Perform only the work capable of performing.

3.2.4 Immediately report hazards and hazardous conditions to management.

3.3 Safety Officer will:

3.3.1 Assist in the development and implementation of this program.

4. Procedure.

4.1 Preparatory Operations:

4.1.1 Before the start of every demolition job, the company will take steps to safeguard the health and safety of workers at the job site. These preparatory operations involve the overall planning of the demolition job, including:

4.1.1.1 The methods to be used to bring the structure down,

4.1.1.2 The equipment necessary to do the job, and

4.1.1.3 The measures to be taken to perform the work safely.

4.1.2 All planning work shall be performed by an engineer or similarly "qualified person" experienced in all phases of the demolition work to be performed.

4.1.3 Engineering Survey. Before starting all demolition operations, an engineering survey of the structure shall be conducted by an engineer or similarly "qualified person" to:

4.1.3.1 Determine the condition of the framing, floors, and walls, and possibility of unplanned collapse of any portion of the structure. Any adjacent structure where employees may be exposed shall also be similarly checked.

4.1.3.2 Flooring and walls shall be shored or braced when employees are required to work within a structure to be demolished which has been damaged by fire, flood, explosion, or other cause.

4.1.3.3 Identify Utility Location

4.1.3.3.1 All electric, gas, water, steam, sewer, and other service lines shall be shut off, capped, or otherwise controlled, outside the building line before demolition work is started.

4.1.3.3.1.1 In each case, any utility company, which is involved, shall be notified in advance.

4.1.3.3.1.2 If it is necessary to maintain any power, water or other utilities during demolition, such lines shall be temporarily relocated, as necessary, and protected.

4.1.3.4 Evaluate Medical Services and First Aid capabilities

4.1.3.4.1 The nearest hospital, infirmary, clinic, or physician shall be located.

4.1.3.4.1.1 The job supervisor shall be provided with instructions for the most direct route to these facilities.

4.1.3.4.1.2 Proper equipment for prompt transportation of an injured worker, as well as a communication system to contact any necessary ambulance service, must be available at the job site.

4.1.3.4.1.3 The telephone numbers of the hospitals, physicians, or ambulances shall be conspicuously posted.

4.1.3.5 Determine Safety Equipment Needs

4.1.3.5.1 The required number and type of respirators, lifelines, warning signs, safety nets, special face and eye protection, hearing protection, and other worker protection devices shall be determined.

4.1.3.5.2 A comprehensive program is necessary for any confined space entry.

4.1.3.6 A written copy of the survey must be maintained.

4.1.4 Determine if any type of hazardous chemicals, gases, explosives, flammable materials, or similarly dangerous substances have been used in any pipes, tanks, or other equipment on the property. When the presence of any such substances is apparent or suspected, testing and purging shall be performed and the hazard eliminated before demolition is started.

4.1.5 Where a hazard exists from fragmentation of glass, such hazards shall be removed.

4.1.6 Where a hazard exists to employees falling through wall openings, the opening shall be protected to a height of approximately 42 inches.

4.1.6.1 When debris is dropped through holes in the floor without the use of chutes, the area onto which the material is dropped shall be completely enclosed with barricades not less than 42 inches high and not less than 6 feet back from the projected edge of the opening above.

4.1.6.1.1 Signs, warning of the hazard of falling materials, shall be posted at each level. The signs shall not be removed in this lower area until debris handling ceases above.

4.1.6.2 All floor openings, not used as material drops, shall be covered over with material substantial enough to support the weight of any load which may be imposed. Such material shall be properly secured to prevent its accidental movement.

4.1.6.3 Except for the cutting of holes in floors for chutes, holes through which to drop materials, preparation of storage space, and similar necessary preparatory work, the demolition of exterior walls and floor construction shall begin at the top of the structure and proceed downward.

4.1.6.3.1 Each story of exterior wall and floor construction shall be removed and dropped into the storage space before commencing the removal of exterior walls and floors in the story next below.

4.1.7 Employee entrances to multistory structures being demolished shall be completely protected by sidewalk sheds or canopies, or both, providing protection from the face of the building for a minimum of 8 feet. All such canopies shall be at least 2 feet wider than the building entrances or openings (1 foot wider on each side thereof), and shall be capable of sustaining a load of 150 pounds per square foot.

4.1.8 Fire Program. The Fire Program shall outline the assignments of key personnel in the event of a fire and provide an evacuation program for workers on the site.

4.1.8.1 All potential sources of ignition shall be evaluated and the necessary corrective measures taken.

4.1.8.2 Electrical wiring and equipment for providing light, heat, or power shall be installed by an electrician or other electrically competent person and inspected regularly.

4.1.8.3 Equipment powered by an internal combustion engine shall be located so that the exhausts discharge well away from combustible materials and away from workers.

4.1.8.4 When the exhausts are piped outside the building, a clearance of at least six inches shall be maintained between such piping and combustible material.

4.1.8.5 All internal combustion equipment shall be shut down prior to refueling. Fuel for this equipment shall be stored in a safe location.

4.1.8.6 Sufficient firefighting equipment shall be located near any flammable or combustible liquid storage area.

4.1.8.7 Only approved containers and portable tanks shall be used for the storage and handling of flammable and combustible liquids.

4.1.8.8 Heating devices shall be situated so that they are not likely to overturn and shall be installed in accordance with their listing, including clearance to combustible material or equipment. Temporary heating equipment, when used, shall be maintained by competent personnel.

4.1.8.9 Smoking is not permitted at or near hazardous operations or materials. Where smoking is permitted, safe receptacles shall be provided for smoking materials.

4.1.8.10 Roadways between and around combustible storage piles shall be at least 15 feet wide and maintained free from accumulation of rubbish, equipment, or other materials. When storing debris or combustible material inside a structure, such storage shall not obstruct or adversely affect the means of exit.

4.1.8.11 A suitable location at the job site shall be designated and provided with programs, emergency information, and equipment, as needed.

4.1.8.12 Access for heavy fire-fighting equipment shall be provided on the immediate job site at the start of the job and maintained until the job is completed.

4.1.8.13 Free access from the street to fire hydrants and to outside connections for standpipes, sprinklers, or other fire extinguishing equipment, whether permanent or temporary, shall be provided and maintained at all times, as follows:

4.1.8.13.1 Pedestrian walkways shall not be so constructed as to impede access to hydrants.

4.1.8.13.2 No material or construction shall interfere with access to hydrants, Siamese connections, or fire-extinguishing equipment.

4.1.8.14 A temporary or permanent water supply of volume, duration, and pressure sufficient to operate the fire-fighting equipment properly shall be made available. Standpipes with outlets shall be provided on large multi story buildings to provide for fire protection on upper levels. If the water pressure is insufficient, a pump shall also be provided.

4.1.8.15 An ample number of fully charged portable fire extinguishers shall be provided throughout the operation. All motor-driven mobile equipment shall be equipped with an approved fire extinguisher.

4.1.8.16 An alarm system (telephone system, siren, two-way radio, etc.), shall be established in such a way that employees on the site and the local fire department can be alerted in case of an emergency.

4.1.8.16.1 The alarm code and reporting instructions shall be conspicuously posted and the alarm system shall be serviceable at the job site during the demolition.

4.1.8.16.2 Fire cutoffs shall be retained in the buildings undergoing alterations or demolition until operations necessitate their removal.

4.2 Stairs, Passageways, and Ladders:

4.2.1 Only those stairways, passageways, and ladders, designated as means of access to the structure of a building, shall be used. Other access ways shall be entirely closed at all times.

4.2.2 All stairs, passageways, ladders and incidental shall be periodically inspected and maintained in a clean safe condition.

4.2.3 In multistory buildings, when a stairwell is being used, it shall be properly illuminated by either natural or artificial means, and completely and substantially covered over at a point not less than two floors below the floor on which work is being performed. Access to the floor where the work is in progress shall be through a properly lighted, protected, and separate passageway.

4.3 Chutes:

4.3.1 No material shall be dropped to any point lying outside the exterior walls of the structure unless the area is effectively protected.

4.3.2 All material chutes, or sections thereof, at an angle of more than 45 deg. from the horizontal, shall be entirely enclosed, except for openings equipped with closures at or about floor level for the insertion of materials.

4.3.2.1 The openings shall not exceed 48 inches in height measured along the wall of the chute.

4.3.2.2 At all stories below the top floor, such openings shall be kept closed when not in use.

4.3.3 A substantial gate shall be installed in each chute at or near the discharge end. A competent employee shall be assigned to control the operation of the gate, and the backing and loading of trucks.

4.3.4 When operations are not in progress, the area surrounding the discharge end of a chute shall be securely closed off.

4.3.5 Any chute opening, into which workers dump debris, shall be protected by a substantial guardrail approximately 42 inches above the floor or other surface on which the men stand to dump the material. Any space between the chute and the edge of openings in the floors through which it passes shall be solidly covered over.

4.3.6 Where the material is dumped from mechanical equipment or wheelbarrows, a securely attached toe board or bumper, not less than 4 inches thick and 6 inches high, shall be provided at each chute opening.

4.3.7 Chutes shall be designed and constructed of such strength as to eliminate failure due to impact of materials or debris loaded therein.

5. Safety Information.

5.1 Removal of Materials through Floor Openings:

5.1.1 Any openings cut in a floor for the disposal of materials shall be no larger than 25 percent of the aggregate of the total floor area, unless the lateral supports of the removed flooring remain in place. Floors weakened or otherwise made unsafe by demolition operations shall be shored to carry safely the intended imposed load from demolition operations.

5.2 Removal of Walls, Masonry Sections, and Chimneys:

5.2.1 Masonry walls, or other sections of masonry, shall not be permitted to fall upon the floors of the building in such masses as to exceed the safe carrying capacities of the floors.

5.2.2 No wall section, which is more than one story in height, shall be permitted to stand alone without lateral bracing, unless such wall was originally designed and constructed to stand without such lateral support, and is in a condition safe enough to be self-supporting. All walls shall be left in a stable condition at the end of each shift.

5.2.3 Employees shall not be permitted to work on the top of a wall when weather conditions constitute a hazard.

5.2.4 Structural or load-supporting members on any floor shall not be cut or removed until all stories above such a floor have been demolished and removed. The cutting of floor beams for the disposal of materials or for the installation of equipment is permitted, if the requirements of 1926.853 and 1926.855 are met.

5.2.5 Floor openings within 10 feet of any wall being demolished shall be planked solid, except when employees are kept out of the area below.

5.2.6 In buildings of "skeleton-steel" construction, the steel framing may be left in place during the demolition of masonry. All steel beams, girders, and similar structural supports shall be cleared of all loose material as the masonry demolition progresses downward.

5.2.7 Walkways or ladders shall be provided to enable employees to safely reach or leave any scaffold or wall.

5.2.8 Walls, which serve as retaining walls to support earth or adjoining structures, shall not be demolished until such earth has been properly braced or adjoining structures have been properly underpinned.

5.2.9 Walls, which are to serve as retaining walls against which debris will be piled, shall not be so used unless capable of safely supporting the imposed load.

5.3 Manual Removal of Floors:

5.3.1 Openings cut in a floor shall extend the full span of the arch between supports.

5.3.2 Before demolishing any floor arch, debris and other material shall be removed from such arch and other adjacent floor area.

5.3.2.1 Planks not less than 2 inches by 10 inches in cross section, full size undressed, shall be provided for, and shall be used by employees to stand on while breaking down floor arches between beams.

5.3.2.2 Such planks shall be so located as to provide a safe support for the workers shall the arch between the beams collapse.

5.3.2.3 The open space between planks shall not exceed 16 inches.

5.3.3 Safe walkways, not less than 18 inches wide, formed of planks not less than 2 inches thick of wood, or of equivalent strength if metal, shall be provided and used by workmen when necessary to enable them to reach any point without walking upon exposed beams.

5.3.4 Stringers of ample strength shall be installed to support the flooring planks. The ends of such stringers shall be supported by floor beams or girders, and not by floor arches alone.

5.3.5 Planks shall be laid together over solid bearings with the ends overlapping at least 1 foot.

5.3.6 When floor arches are being removed, employees shall not be allowed in the area directly underneath, and such an area shall be barricaded to prevent access to it.

5.3.7 Demolition of floor arches shall not be started until they, and the surrounding floor area for a distance of 20 feet, have been cleared of debris and any other unnecessary materials.

5.4 Removal of Walls, Floors, and Material with Equipment:

5.4.1 Mechanical equipment shall not be used on floors or working surfaces unless such floors or surfaces are of sufficient strength to support the imposed load.

5.4.2 Floor openings shall have curbs or stop-logs to prevent equipment from running over the edge.

5.5 Storage:

5.5.1 The storage of waste material and debris on any floor shall not exceed the allowable floor loads.

5.5.2 In buildings having wooden floor construction, the flooring boards may be removed from not more than one floor above grade to provide storage space for debris, provided falling material is not permitted to endanger the stability of the structure.

5.5.3 When wood floor beams serve to brace interior walls or freestanding exterior walls, such beams shall be left in place until other equivalent support can be installed to replace them.

5.5.4 Floor arches, to an elevation of not more than 25 feet above grade, may be removed to provide storage area for debris: Provided that such removal does not endanger the stability of the structure.

5.5.5 Storage space into which material is dumped shall be blocked off, except for openings necessary for the removal of material. Such openings shall be kept closed at all times when material is not being removed.

5.6 Removal of Steel Construction:

5.6.1 When floor arches have been removed, planking in accordance with 1926.855(b) shall be provided for the workers engaged in razing the steel framing.

5.6.2 Cranes, derricks, and other hoisting equipment used shall meet the requirements specified in 29 CFR 1926 Subpart N.

5.6.3 Steel construction shall be dismantled column length by column length, and tier by tier (columns may be in two-story lengths).

5.6.4 Any structural member being dismembered shall not be overstressed.

5.7 Mechanical Demolition:

5.7.1 No workers shall be permitted in any area, which can be adversely affected by demolition operations, when balling or clamming is being performed. Only those workers necessary for the performance of the operations shall be permitted in this area at any other time.

5.7.2 The weight of the demolition ball shall not exceed 50 percent of the crane's rated load, based on the length of the boom and the maximum angle of operation at which the demolition ball will be used, or it shall not exceed 25 percent of the nominal breaking strength of the line by which it is suspended, whichever results in a lesser value.

5.7.3 The crane boom and loadline shall be as short as possible.

5.7.4 The ball shall be attached to the loadline with a swivel-type connection to prevent twisting of the loadline, and shall be attached by positive means in such manner that the weight cannot become accidentally disconnected.

5.7.5 When pulling over walls or portions thereof, all steel members affected shall have been previously cut free.

5.7.6 All roof cornices or other such ornamental stonework shall be removed prior to pulling walls over.

5.7.7 During demolition, continuing inspections by an engineer or similarly "qualified person" shall be made as the work progresses to detect hazards resulting from weakened or deteriorated floors, or 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.

5.8 Special Structures Demolition:

5.8.1 Safe Work Practices when Demolishing a Chimney, Stack, Silo or Cooling Tower.

5.8.1.1 Inspection and Planning. When preparing to demolish any chimney, stack, silo, or cooling tower, an experienced person shall perform a careful, detailed inspection of the structure.

5.8.1.1.1 When possible, architectural/engineering drawings shall be consulted.

5.8.1.1.2 Particular attention shall be paid to the condition of the chimney or stack for any structural defects such as weak or acid-laden mortar joints, and any cracks or openings.

5.8.1.1.3 The interior brickwork in some sections of industrial chimney shafts can be extremely weak. If the stack has been banded with steel straps, these bands shall be removed only as the work progresses from the top down.

5.8.1.1.4 Sectioning of the chimney by water, etc. shall be considered.

5.8.1.2 Safe Work Practice. When hand demolition is required, it shall be carried out from a working platform.

5.8.1.2.1 Experienced personnel must install a self-supporting tubular scaffold, suspended platform, or knee-braced scaffolding around the chimney. Attention shall be paid to the design, support, and tie-in (braces) of the scaffold.

5.8.1.2.2 A competent person shall be present at all times during the erection of the scaffold.

5.8.1.2.3 Adequate working clearance shall be maintained between the chimney and the work platform.

5.8.1.2.4 Access to the top of the scaffold shall be provided by means of portable walkways.

5.8.1.2.5 The platforms shall be decked solid and the area from the work platform to the wall shall be bridged with a minimum of two-inch thick lumber.

5.8.1.2.6 A back rail 42 inches above the platform, with a midrail covered with canvas or mesh shall be installed around the perimeter of the platform to prevent injury to workers below.

5.8.1.2.6.1 Debris netting may be installed below the platform.

5.8.1.2.6.2 Excess canvas or plywood attachments can form a wind-sail that could collapse the scaffold.

5.8.1.2.7 When working on the work platform, all personnel shall wear hard hats, long-sleeve shirts, eye and face protection, such as goggles and face shields, respirators, and safety belts, as required.

5.8.1.2.8 Care shall be taken to assign the proper number of workers to the task. Too many people on a small work platform can lead to accidents.

5.8.1.2.9 When using a creeping bracket scaffold to "climb" the structure in place of erecting a self-supporting tubular steel scaffold. The following considerations shall be made:

5.8.1.2.9.1 Careful inspection of the masonry and a decision as to the safety of this alternative must be made by an engineer or similarly “qualified person”.

5.8.1.2.9.2 It is essential that the masonry of the chimney be in good enough condition to support the bracket scaffold.

5.8.1.2.9.3 The area around the chimney shall be roped off or barricaded and secured with appropriate warning signs posted. No unauthorized entry shall be permitted to this area. (It is good practice to keep a worker, i.e., a supervisor, operating engineer, another worker, or a "safety person," on the ground with a form of communication to the workers above).

5.8.1.2.9.4 Special attention shall be paid to weather conditions when working on a chimney.

5.8.1.2.9.4.1 No work shall be done during inclement weather such as during lightning or high wind situations.

5.8.1.2.9.4.2 The work site shall be wetted down, as needed, to control dust.

5.8.1.3 Debris Clearance. If debris is dropped inside the shaft, it can be removed through an opening in the chimney at grade level.

5.8.1.3.1 The opening at grade must be kept relatively small in order not to weaken the structure.

5.8.1.3.2 When removing debris by hand, an overhead canopy of adequate strength shall be provided. If machines are used for removal of debris, proper overhead protection for the operator shall be used.

5.8.1.3.3 Excessive debris shall not be allowed to accumulate inside or outside the shaft of the chimney as the excess weight of the debris can impose pressure on the wall of the structure and might cause the shaft to collapse.

5.8.1.3.4 The supervisor shall determine when debris is to be removed, halt all demolition during debris removal, and make sure the area is clear of cleanup workers before continuing demolition.

5.8.1.4 Demolition by Deliberate Collapse. Deliberate collapse requires extensive planning and experienced personnel, and shall be used only when conditions are favorable.

5.8.1.4.1 There must be a clear space for the fall of the structure of at least 45 degrees on each side of the intended fall line and 1½ times the total height of the chimney.

5.8.1.4.2 There shall be no sewers or underground services on the line of the fall.

5.8.1.4.3 Lookouts must be posted on the site and warning signals must be arranged.

5.8.1.4.4 The public and other workers at the job site must be kept well back from the fall area.

5.8.2 Demolition of Pre-Stressed Concrete Structures.

5.8.2.1 During the Engineering Survey, an engineer or similarly "qualified person" shall determine if the structure to be demolished contains any prestressed members (refer to table 14.2).

5.8.2.2 The company will inform all workers on the demolition job site of the presence of prestressed concrete members within the structure, and instruct them in the safe work practice which must be followed to safely perform the demolition. Workers shall be informed of the hazards of deviating from the prescribed procedures and the importance of following their supervisor's instruction.

Table 14.2. Categories of Pre-Stressed Construction

There are four main categories of pre-stressed members. The category or categories shall be determined before attempting demolition. Any pre-stressed structure may contain elements of more than one category.	
Category 1	Members are pre-stressed before the application of the superimposed loads, and all cables or tendons are fully bonded in the concrete or grouted within ducts.
Category 2	Like Category 1, but the tendons are left ungrouted. This type of construction can sometimes be recognized from the access points that may have been provided for inspection of the cables and anchors. More recently, unbonded tendons have been used in the construction of beams, slabs, and other members; these tendons are protected by grease and surrounded by plastic sheathing, instead of the usual metal duct.
Category 3	Members are pre-stressed progressively as building construction proceeds and the dead load increases, using bonded tendons as in Category 1.
Category 4	Like Category 3, but using unbonded tendons as in Category 2.

5.8.3 Precast units stressed separately from the main frames of the structure, with end anchors and grouted and ungrouted ducts shall be lowered to the ground, if possible, before being broken up.

5.8.3.1 A professional engineer shall be consulted before carrying out this work.

5.8.3.2 After lowering the units can be turned on their side with the ends up on blocks after any composite concrete is removed. This may suffice to break the unit and release the prestress; if not, a sand bag screen, timbers, or a blast mat as a screen shall be erected around the ends and demolition commenced, taking care to clear the area of any personnel.

5.8.4 Monolithic Structures. A professional engineer experienced in prestressed work shall be consulted before any attempt is made to expose the tendons or anchorages of structures in which two or more members have been stressed together. Temporary supports may be required so that the tendons and the anchorage can be cautiously exposed.

5.8.5 Progressively Pre-stressed Structures. A professional engineer experienced in prestressed work shall be consulted before any attempt to demolish progressively prestressed structures.

5.8.5.1 Demolition of progressively prestressed structures shall be made in strict accordance with the engineer's method of demolition. (The stored energy in this type of structure is large. In some cases, the inherent properties of the stressed section may delay failure for some time, but the presence of these large prestressing forces may cause sudden and complete collapse with little warning).

6. Training and Information.

6.1 Employees performing demolition work will be capable of performing their assigned duties and appropriately trained in the use of any equipment used to perform those duties.

7. Definitions.

- *Demolition* - The dismantling, razing, or wrecking of any fixed building or structure or any part thereof, including dismantling and razing activities where structural members of the structure are not removed, and all activities involving rehabilitation, repair, or remodeling including those where no removal of load supporting structural members takes place.

- *Qualified Person* – A professional engineer (civil/structural) who by knowledge and experience is capable of the assessing and carrying out the duties assigned.

ARCITECHTURAL CONCRETE PLUS, LLC.

PROGRAM OVERVIEW

ELECTRICAL (COMPREHENSIVE) SAFETY PROGRAM

REGULATORY STANDARD: *OSHA - 29 CFR 1910.331 - 335*
OSHA - 29 CFR 1926.302, 1926.416-417

INTRODUCTION: This program is designed to assist the company to ensure that work practices performed on or near electrical equipment and energy sources are evaluated to determine if proper safety precautions are implemented. This program applies to all employees and contractors of the company who are exposed to live electrical energy at levels of >50V. It outlines employee training, work practices, equipment use and details the safeguards for personal protection.

TRAINING:

- All supervisors and employees will be trained in the hazard they are exposed to and any protective measures or controls to be used
- Employees exposed to hazards >50V must be trained and understand the magnitude of the hazard and the protective measures and controls used
- Employees exposed to higher voltages (>110V) must be qualified and have appropriate licenses or documented training. Paychex does not provide this level of training.
- Welders must be trained in electrical safety, regardless of the voltage encountered
- Specialized equipment (high voltage, CDT, etc.) may require additional training or restrictions put into place to limit exposures

ACTIVITIES:

- Review hazards and determine level of exposures
- Provide testing supplies and safety equipment
- Run electrical systems to reduce the use of extension cords to truly temporary use
- Provide warning and alerting devices to protect employees from contact with energy hazards
- Write and communicate policies and procedures

FORMS:

- Appliance Safety (Cord and Plug)
- Electrical Program Assessment
- Electrical Written Program
- Equipment Grounding Checklist
- Intrinsically Safe Areas and Devices
- NRTL and AHJ Approvals
- Training Attendance Roster
- Wiring Design and Protection
- Wiring Design Standards
- Wiring Methods and Components
- Wiring Requirements for Special Equipment and Systems

Table of Contents

Electrical (Comprehensive) Safety Program

1. Purpose. This program outlines the processes to protect employees in their workplaces from hazards associated with electrical energy. These processes may include, but are not limited to the following:

1.1 Design of electrical systems, electrical utilization equipment, and installations

1.2 Safety related work practices

1.3 Safety related maintenance requirements

1.4 Safety requirements for special equipment and processes

1.5 Additionally, any contractors that will perform electrical work at the company will be required to have an Electrical Safety Program in place.

2. Scope. This program applies to all employees and contractors at the company who are exposed to live electrical energy at levels of >50V.

3. Responsibilities.

3.1 Management:

3.1.1 Ensure a written program is in place appropriate to the hazards. This program considers voltage, energy level, circuit conditions, and the identification of any electrical safety controls

3.1.2 Ensure any modifications to existing equipment meet Electrical Safety Standards

3.1.3 Ensure installations of new equipment are assessed or inspected to assure they meet the electrical safety standard requirements.

3.1.4 Review the written program at least annually to assure it remains accurate and applicable.

3.1.5 Assure employees who work on live electrical equipment or components, or who are exposed to electrical hazards are "qualified" under the requirements of the standard and appropriately trained, based on the risks presented.

3.1.6 Ensure all contractors who work with electrical parts, components or hazards have a written Electrical Safety Program in place, prior to th

3.1.7 eir beginning work.

3.1.8 Provide Electrical Personal Protective Equipment to the employees, as needed.

3.2 Engineering and Design or Purchasing:

3.2.1 Ensure any modifications to existing equipment meet Electrical Safety Standards

3.2.2 Ensure installations of new equipment are assessed or inspected to assure they meet the electrical safety standard requirements.

3.2.3 Ensure all contractors who work with electrical parts, components or hazards have a written Electrical Safety Program in place, prior to their beginning work.

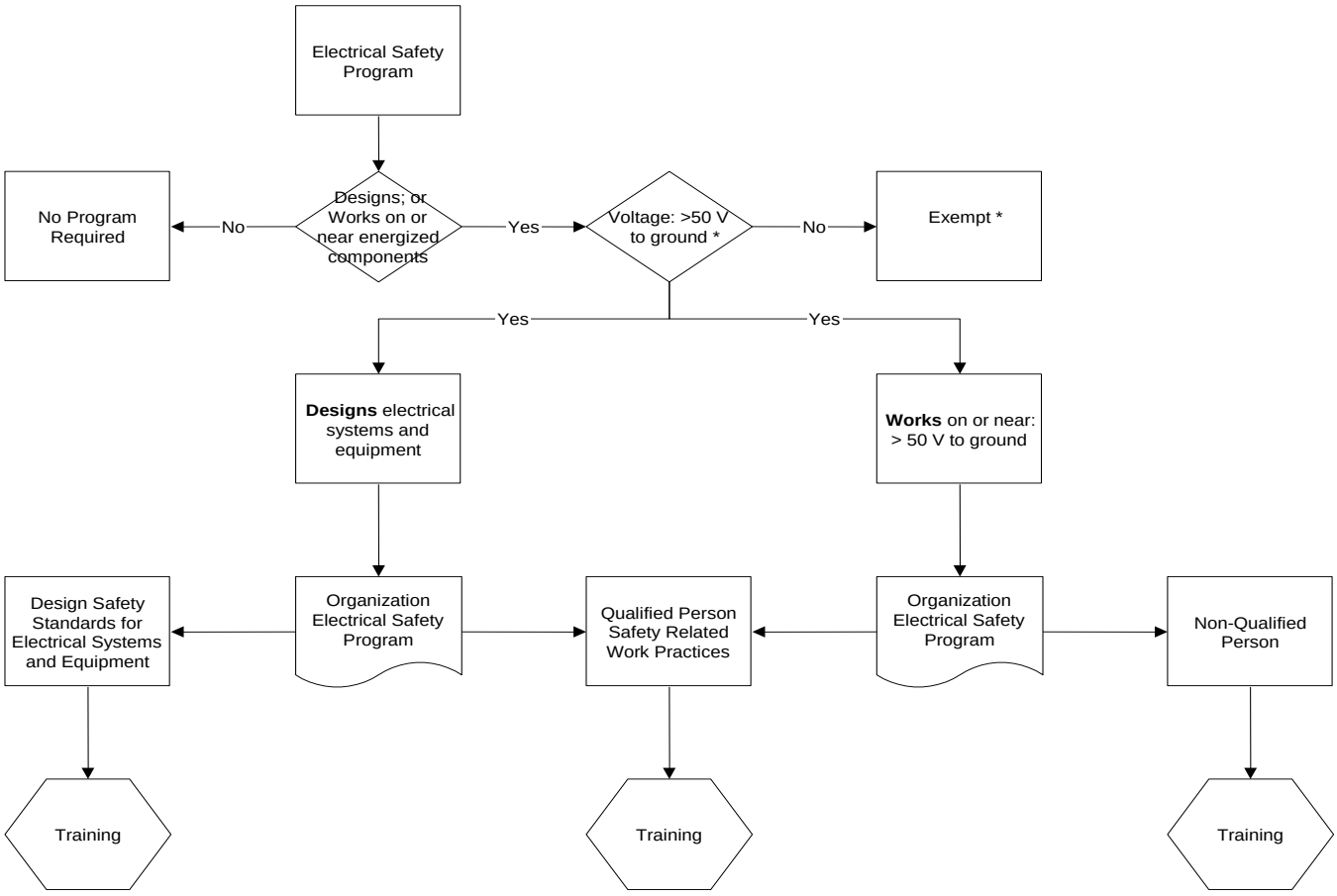
3.3 Contractors**:**

3.3.1 Provide the company with a copy of their written Electrical Safety Program and/or employee training records, upon request.

3.4 Safety Officer:

3.4.1 Assist in the development and implementation of the written program, as needed.

4. Procedure.



4.1 There may be conditions where voltages less than 50 volts may require an Electrical Safety Program. These would include, but are not limited to, conditions where electrical burns, explosion due to electric arcs, or low voltage, high current systems require safe work practices.

5. Safety Information.

5.1 General:

5.1.1 Qualified Employees - Only "Qualified" individuals are allowed to work on or near energized equipment. A process must be in place to ensure that employees performing electrical tasks are qualified and trained as appropriate.

5.1.2 Policies or Procedures – Written electrical policies or procedures are established to ensure that electrical products, wiring, and devices are designed, installed, maintained, and utilized safely. Safe work practices and procedures are written and followed for regularly conducted tasks related to electrical exposures.

5.1.3 Level of Exposure - Hazard/Risk analyses are performed prior to any task. The work area is assessed to determine the level of exposure, requirements of the task and the corresponding risk to employees from any exposed energized parts or equipment.

5.1.4 Training - Employees receive training based on their regularly assigned tasks related to energized equipment. Employees are provided with and are trained to use any personal protective equipment (PPE) and instrumentation to perform their work tasks.

5.1.5 Safe Work Practices - Each person is expected to work within the limits of their expertise and training and follow established practices, which are developed according to the hazards and tasks performed. Examples are:

5.1.5.1 DO NOT leave exposed electrical hazards unattended

5.1.5.2 Replace covers or protect energized components from inadvertent contact

5.1.5.3 Utilize proper insulation and/or protective equipment and proper tools corresponding to the level of exposure.

5.1.6 Non-routine Tasks - Perform non-routine or emergency work only under the direction of qualified personnel, or after a thorough hazard/risk analysis (such as Job Hazard Analysis) of existing conditions. Write procedures, as required. Utilize Lock-Out/Tag-Out (LOTO) procedures, as required.

5.1.7 When working on or near exposed de-energized parts they are to be treated as live.

5.1.8 While any employee is exposed to contact with parts of fixed electric equipment or circuits which have been de-energized, the circuits energizing the parts shall be locked out or tagged or both.

5.2 Safety Related Work Practices:

5.2.1 Scope

5.2.1.1 Safety related work practices must be implemented for both qualified and non-qualified persons working with or near energized parts,

materials, equipment or sources. This includes premises wiring, wiring from a connection to a supply, other types of wiring and installation of optical fiber cable when cables are run in the same conduit, raceway (or equivalent system) with any electrical wiring.

5.2.1.2 Power generation, transmission and distribution work performed by qualified persons are exempted from this section. Additionally, work in vehicles (ships, watercraft, railways, aircraft and RVs) when such work is for signaling or communications equipment is also exempt.

5.2.2 Training must be classroom or on-the-job and the degree of training must be commensurate with the risk to the employee. Training includes:

5.2.2.1 The content of the portions of the electrical safety standard that applies to the work

5.2.2.2 Safety related work practice required for the respective job or task

5.2.2.3 Additional requirements for unqualified persons that are necessary for their safety, including methods to recognize energized from non-energized parts, how to determine nominal voltage of exposed live parts and the clearance distances outlined

5.2.2.4 below in Table 1:

Table 1

Voltage Range	Minimum Distance
300V and less	Contact should be avoided
300-750V	1 foot
750-2kV	1 foot 6 inches
2kV-15kV	2 feet
15kV-37kV	3 feet
37kV-87.5kV	3 feet 6 inches
87.5kV-121kV	4 feet
121kV-140kV	4 feet 6 inches
>140kV	Must be de-energized

5.2.3 Selection and Use of Work Practices. Work practices are designed to prevent shock and other injuries from either direct or indirect contact with live electrical parts and energy.

5.2.3.1 Live parts (>50V) must be de-energized before employees work on them, unless it is demonstrated that additional or increased hazards are introduced, or where de-energizing is infeasible due to design or operational limitations. In such cases additional protective measures must be used to effectively protect employees.

5.2.3.2 Locking and Tagging or equivalent measures must be used to provide protection when live parts or equipment are de-energized. Lock-out must occur in accordance with the *written procedure* for de-energizing the

equipment or process. (Reference the company specific Lock-Out/Tag-Out program for more information.)

5.2.3.3 When equipment or processes can NOT be electrically de-energized, only electricians or other "qualified" persons are allowed to work on or near the equipment. Such people must be familiar with the types and level of hazards presented, the protective equipment necessary, and the specific procedure and process used to work on that energized equipment.

5.2.3.4 In all cases overhead power lines must be de-energized if there is a possibility of contact with them by any part of the body, tool or equipment that could create a conduit of energy through the person or equipment.

5.2.3.4.1 If "unqualified" persons must work underneath or near energized lines, they must be located far enough away from the line so that any tool or equipment used can not contact the line. At a minimum, the distances must be 10 feet for 50kV or less and an additional 4 inches for every additional 10kV of power over 50kV.

5.2.3.4.2 "Qualified" persons may not approach or take un-insulated conductive objects any closer to overhead lines than the following:

Table 2

Voltage Range	Minimum Distance
300V and less	Contact should be avoided
300-750V	1 foot
750-2kV	1 foot 6 inches
2kV-15kV	2 feet
15kV-37kV	3 feet
37kV-87.5kV	3 feet 6 inches
87.5kV-121kV	4 feet
121kV-140kV	4 feet 6 inches

5.2.3.4.3 If the employees are within approach distances, they must still be insulated by protective equipment or materials.

5.2.3.4.4 Elevated equipment (or equipment capable of being elevated) must maintain a clearance of at least 10 feet from overhead lines. Vehicles in transit with their structures lowered to their lowest level may reduce the clearance to 4 feet (plus 4 inches for every additional 10kV over 50kV). Insulated barriers, if used, must protect from the voltage that may be encountered. Aerial lifts used by "qualified" persons for work on overhead lines may have clearances reduced to the distances in Table 2 (above).

5.2.3.4.4.1 Employees on the ground may not have contact with such equipment or any of its attachments unless they are insulated or the

approach distances of the equipment are limited to those outlined in the table above.

5.2.3.4.4.2 Where equipment could contact the energized lines and is intentionally grounded, employees may not stand at (or within a few feet of) the grounding location. Such areas should be barricaded.

5.2.3.5 Illumination and light must be provided to enable the employees to work safely. Blind reaching into a part, panel, equipment or circuitry system is prohibited.

5.2.3.6 Confined-space electrical work must utilize shields, barriers or insulating materials to avoid inadvertent contact with live energy sources and parts. Doors, panels, etc. must be secured.

5.2.3.7 Any conductive material must be handled in a manner that prevents contact with energized parts and materials. Procedures and work practices may need to be implemented when long-dimension objects (e.g. tree trimming poles) are used or handled in such areas.

5.2.3.8 Portable ladders must be non-conductive if used near energized materials.

5.2.3.9 Jewelry and similar clothing items (e.g. scarves) must be covered or removed, if contact with energized parts is possible.

5.2.3.10 Housekeeping duties should not be performed near live parts without additional precautions put into place. De-energizing should take place to prevent inadvertent contact with energized parts by "un-qualified" people.

5.2.3.11 Interlocks may not be defeated unless it is done by a "qualified" person.

5.2.4 Use of Equipment:

5.2.4.1 Portable equipment (Cord and Plug type) must be handled so that it is not damaged. Flexible cords may not be used to raise, lower, pull, move or hang equipment where the insulating jacket could be damaged.

5.2.4.1.1 Visual inspection must occur before use. Inspection includes looking for loose parts, deformed pins, and damage to the jacket or insulation. If equipment remains in place, it does not require inspection unless it is relocated.

5.2.4.1.2 Damaged equipment must be repaired or replaced prior to use. Repairs may require testing to assure electrical continuity and safety.

5.2.4.1.3 Plugs must be the appropriate type for the receptacle. Devices to circumvent this are prohibited (i.e. a three-prong adapter that allows the equipment to be plugged into a two-prong receptacle).

5.2.4.1.4 Flexible cords for equipment requiring grounding must contain a grounding connector. The plugs may not be altered or changed to allow insertion into a non-grounded receptacle.

5.2.4.1.5 Highly conductive environments (wet or damp locations or hazardous atmospheres) must use only equipment approved for that environment. Employees must not plug equipment in to receptacles in such locations if their hands are wet and equipment is energized. Insulating materials may be required when electrical energy can be conducted through the hands or fingers.

5.2.4.1.6 Locking connectors must be secured after connection.

5.2.4.2 Power and Lighting Circuits must use the switches, breakers or disconnects to open, reverse or close circuits when live energy is present. Cable connectors not specifically designed for this purpose may not be used, unless it is an emergency. After de-energizing, circuits may not be manually re-energized until it has been determined that it can be accomplished safely (overloads rather than fault conditions are exempt from this requirement). Over-current protection may *not* be modified.

5.2.4.3 Test equipment may be used only by a "qualified" person. Visual inspection of the test equipment must take place before each use. If defects or damage is found, it must be removed from service until repaired or replaced. Test equipment (and their accessories) must be designed and rated for the level of energy they will be testing for.

5.2.4.4 Where flammable or ignitable vapors, gases or dusts are present at any time electrical equipment capable of igniting these materials may not be used.

5.2.5 Safeguards for Personal Protection:

5.2.5.1 PPE (Personal Protective Equipment) appropriate to the level of electrical hazard that may be encountered must be provided and used. PPE must be maintained in a safe and reliable condition. It must be inspected or tested periodically. If the insulating capability of protective equipment could be damaged during use the insulating material must be protected (i.e. outer leather gloves over insulated inner gloves).

5.2.5.1.1 Non-conductive head protection must be provided if head injury is possible from contact with electrical circuits or conductors.

5.2.5.1.2 Eye or face protection is required when arcs or flashes may occur or if electrical explosion could create flying objects.

5.2.5.2 Insulted tools and equipment are used when contact with live energy is possible. If the insulating capability of tools and equipment could be damaged during use the insulating material must be protected.

5.2.5.2.1 Fuse removal tools must be rated for the circuit voltage

5.2.5.2.2 Ropes and hand-lines must be non-conductive

5.2.5.2.3 Protective shields will be put in place or used to prevent contact with live parts or energized materials. "Non-qualified" persons must be suitably protected during service or repair from contact with live electrical energy or energy hazards.

5.2.5.3 Warning and alerting devices, such as signs, tags symbols, barricades or attendants will be used to protect employees from contact with energy hazards. Barricades must be used in conjunction with signs when access to a work area must be restricted. Where such barricades do not provide sufficient protection, attendants will be posted.

6. Training and Information.

6.1 All employees with exposures will receive general electrical safety awareness training

6.2 "Qualified" individuals will have appropriate licenses or documented training

6.3 Employees exposed to 50 volts or more to ground (**and their first-line supervisors**) require additional training that is commensurate with the risk encountered

6.4 Welders must be trained, regardless of the voltage they may encounter

7. Definitions.

- *Conductor* - A wire or other conduit that conducts electricity
- *De-energized* - Free from any electrical connection to an energy source
- *Designs Electrical Systems and Equipment* - Engineers or other technical professionals responsible for implementing design safety standards for electrical equipment.

- *Electrical Personal Protective Equipment and Devices* - Protective equipment that is specifically designed to protect individuals from shock, arc blast, arc flash, etc.

- *Electrical Safety Program* - The program that directs activity appropriate for the voltage, energy level, and circuit conditions, and include safety-related work practices.

- *Energized* - Electrically connected to an energy source.

- *Over-Current Protection* - A device that protects equipment or conductors from current in excess of the rating for the equipment or conductors.

- *Qualified Person* - A person trained and knowledgeable to recognize and avoid electrical hazards of equipment or a specific work method.

- *Safety Related Work Practices* - Methods that are consistent with the nature and extent of electrical hazards that are meant to safeguard employees from injury while working on or near exposed electric conductors or circuit parts that are (or can become) energized.

- *Un-Qualified Person* - An individual that is not permitted to work on electrical equipment because they do not have the necessary skills and/or training to perform the work safely.

ARCITECHTURAL CONCRETE PLUS, LLC.

PROGRAM OVERVIEW

EMERGENCY ACTION, EVACUATION AND FIRE PREVENTION SAFETY PROGRAM

REGULATORY STANDARD: OSHA - 29CFR1910.36, .38, .157, .165
NFPA-10

INTRODUCTION: This program is intended to assist in establishing requirements to ensure that fire and other potential emergency situations are evaluated and safety procedures implemented.

TRAINING:

- All employees and supervisors will be trained in emergency actions and their responsibilities including how emergencies are communicated. Training is required initially, and as changes to the workplace, program or employee responsibilities occur
- Conduct drills, if required
- Emergency Response Team members must be trained based on the types of emergencies they will be expected to encounter. Fire fighting techniques, first aid treatment or both may be required, depending upon the duties and responsibilities of the team
- Fire extinguisher users must be trained annually in the general principles of fire extinguisher use and the hazards involved in incipient (beginning) stage fire fighting

ACTIVITIES:

- Identify and evaluate fire hazards
- Identify and evaluate exit routes
- Identify fire wardens and response teams and define responsibilities, if applicable
- Provide emergency equipment as needed
- Write and communicate policies and procedures including Emergency Action and Fire Prevention Programs
- Review program at least annually

FORMS:

- Emergency Action Plan
- Exit and Egress (Life Safety) Requirements
- Fire Drill or Evacuation Assessment
- Fire Prevention Plan
- Monthly Fire Extinguisher Review
- Training Attendance Roster
- Types of Fire Protection Systems

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1. Purpose. This program outlines the requirements for the Emergency Action and Fire Prevention Program (EAFP), and for Emergency Evacuation Program in the workplace. It is a federal requirement that all companies have EAFP's (programs must in writing for companies with more than 10 employees).

2. Scope. This program applies to all workplaces, facilities, and sites at the company.

3. Responsibilities.

3.1 Management:

3.1.1 Determine flight or fight response for the company (i.e. will all employees evacuate during fire or spill emergencies, or will some employees be required as part of their job duties to fight a fire, contain a spill or provide medical treatment).

3.1.2 Write Emergency Action and Fire Prevention Programs (EAFP's), including specific procedures or responsibilities for employees and wardens.

3.1.3 Communicate programs to employees and staff.

3.1.4 Review these programs at least annually to assure they remain adequate to the business operations.

3.1.5 Ensure evacuation alarm systems and notifications are in place, and are distinctive and consistent throughout the site. It is recommended that evacuation programs be periodically tested through physical drills (partial evacuation drills and/or full evacuation drills) or via table-top drills or discussions.

3.1.6 Ensure all employees are appropriately trained to the responsibilities they are expected to take during an emergency situation, including how to report a fire or other emergency and what to do during an evacuation.

3.1.7 Ensure evacuation wardens are designated and trained. It is recommended that there be a ratio of at least one warden for every 20 employees.

3.1.8 Ensure that fire extinguishers (if located on-site) are inspected, maintained, tested and of the proper size and type for the area hazards.

3.1.8.1 If employees are expected to use them, annual training is required.

3.1.8.2 If employees are not expected to use them, extinguishers should be marked "For Fire Department Use Only".

3.1.9 If utilized, provide on-site emergency response teams with appropriate equipment and training to perform their expected duties.

3.1.9.1 Maintain training documentation for response team members, and documentation for equipment inspection and maintenance.

3.1.10 Notify Insurance Carrier of significant changes in staffing and building occupancy.

3.1.11 Inspect Fire Doors annually, and keep all fire doors closed. If they must be held open due to production or operation-specific requirements, they must be fitted with automated releases in accordance with state building codes. Maintain documentation for the life of the fire door.

3.2 Employees:

3.2.1 Attend initial training, and refresher training as required.

3.2.2 Evacuate, or perform expected tasks prior to evacuation, during an emergency.

3.3 Wardens (evacuation assistance):

3.3.1 Attend appropriate training.

3.3.2 Follow established procedures to assist in the safe and orderly evacuation of employees.

3.3.3 Report either the all-clear or problems to the incident commander or other designated person at the command post.

3.4 On-site Response Teams (as appropriate or designated):

3.4.1 Provide emergency response to fires, spills or medical emergencies, as designated.

3.4.2 Attend appropriate training to maintain appropriate certifications.

3.4.3 Ensure emergency response equipment is functioning and adequate to the response(s) required.

3.5 Safety Officer (as needed or required):

3.5.1 Assist in the development and implementation of this program.

4. Procedure.

4.1 Emergency Action Programs:

4.1.1 May be combined with Fire Prevention Programs into one document that serves both purposes.

4.1.2 Must be in writing, kept at the workplace and available for employees to review.

4.1.2.1 Companies with 10 or fewer employees may communicate the program orally, rather than in writing.

4.1.3 Programs must include:

4.1.3.1 Procedures for reporting a fire or other emergency.

4.1.3.2 Procedures for emergency evacuation, including types of evacuations and assigned evacuation routes. (Posted, color coded evacuation route maps are highly recommended for each area of the building or structure.)

4.1.3.3 Procedures to be followed by employees who remain to operate or shut down critical operations before they evacuate (power systems, water supplies, ammonia tanks, chemical processes that must be shut down in sequence, etc.).

4.1.3.4 Procedures, assigned areas and responsibilities of evacuation wardens, if utilized.

4.1.3.5 Procedures to account for all employees after evacuation.

4.1.3.6 Procedures to be followed by employees who perform rescue or medical duties (on-site response teams).

4.1.3.7 The name or job title of the person(s) who may be contacted by employees who need more information about the program, or an explanation of their duties and responsibilities under the program.

4.1.4 An alarm system must be maintained. The system must have a distinctive signal for each type of alarm (i.e. evacuation alarms must sound the same throughout the site).

4.1.5 Wardens (or evacuation assistance) must be designated and properly trained to assist in a safe and orderly evacuation of other employees.

4.1.6 Programs should address the types of emergencies that are reasonably likely to occur (fire, chemical spills, severe weather, etc.).

4.2 Fire Prevention Programs:

4.2.1 May be combined with Emergency Action Programs into one document that serves both purposes.

4.2.2 Must be in writing, kept at the workplace and available for employees to review.

4.2.2.1 Companies with 10 or fewer employees may communicate the program orally, rather than in writing.

4.2.3 Programs must include:

4.2.3.1 A listing of all the major fire hazards in the building or facility

4.2.3.2 Proper handling and storage procedures for hazardous materials

4.2.3.3 Potential ignition sources and their control measures

4.2.3.4 The type of fire protection equipment necessary to control each major hazard

4.2.3.5 Procedures to control accumulation of flammable and combustible waste materials

4.2.3.6 Procedures for maintenance (regular, scheduled) of any heat-producing equipment and their safeguards to prevent accidental fires

4.2.3.7 The name or job title of employees who are responsible for maintaining equipment to prevent or control sources of ignition or fires

4.2.3.8 The name or job title of employees who are designated as responsible for controlling any fuel source hazards (flammable liquid tanks, fuel tanks, propane tanks, etc.)

4.3 Evacuation and Notification:

4.3.1 Alarms and Signals to notify employees of an emergency evacuation are distinctive in sound and consistent throughout the site.

4.3.1.1 Alarms may be automatic or verbally provided in person or through a public address system, but they must be able to be understood by all employees.

4.3.1.2 The same sound or wording must be used throughout the site.

4.3.1.3 Employees must be trained or informed of the sounds or wording used.

4.3.2 Evacuation Routes will be established for each area of the building or site.

4.3.2.1 Employees will be trained and informed of their work-area route.

4.3.2.2 It is highly recommended that maps be posted at each area of the building to assist employees and others in determining their evacuation routes. Maps should be color coded, with the evacuation route in red.

4.3.2.3 Off-site job locations will have evacuation routes determined and communicated to employees who work at these off-site locations.

4.3.3 Relocation Points will be established for employees to congregate during an evacuation. Designated relocation points assist in assuring that all employees are accounted for.

4.3.3.1 Employees will be trained in their respective relocation point during initial (or refresher) training.

4.3.3.2 Supervisors or other specifically designated people at each relocation point will be responsible for assuring that all employees have been accounted for.

4.3.3.2.1 An accounting for the relocation point will be made to the incident commander or other designated person at the command post.

4.3.3.3 Off-site job locations will have relocation points determined and communicated to employees who work at these off-site locations before the job commences or the employee reports to the site.

4.3.3.4 Where appropriate, severe weather relocation points (shelters or arrangements with neighboring facilities) will be communicated to employees during the training.

4.3.4 Return to Work Signals will be provided once it is safe for employees to re-enter the workplace. Each supervisor or other designated person at each relocation point will be aware of the signal used, and be watchful for it.

4.3.5 Evacuation Wardens

4.3.5.1 "Sweep" the assigned area to assure that all employees are appropriately evacuated.

4.3.5.2 Carry out any other assigned duties, prior to evacuating.

4.3.5.3 Report either "all clear" or any problems to the incident commander or other person designated under the company's EAFP prior to reporting to their assigned relocation point.

5. Safety Information.

5.1 Means of Egress (exits and exit paths):

5.1.1 All employees must be able to safely exit the building in a direct path and within a reasonable time frame.

5.1.2 There are specific requirements for exits, paths to exits, exit signs, aisle widths and for stairways. These "life safety" codes must be considered during renovation, construction or when re-arranging a work area. For more information reference the attached documentation on Life Safety.

5.1.3 All exits, aisles and exit paths, and stairways must be kept clear and unobstructed. No storage is allowed that will restrict the access or use of the exit path below the required widths. No storage is allowed that will block or obstruct stairs or exit doors.

5.1.4 All exits and the paths to them must be clearly visible or have visible signs that indicate the location of the exit.

5.1.5 Locks or fastening devices to keep exit doors closed and locked from the inside (preventing the use of the door as an exit) are prohibited in almost every workplace structure (mental and correctional institutions are two exceptions). Doors that could be mistaken for an exit, but are not exits must be marked "Not an Exit" or "Closet" or with similar markings so that they will not be mistaken for an exit in an emergency.

5.1.6 Emergency lighting, signs and exits must meet requirements for the number of exits, the location and size of signs and the amount of illumination required.

5.2 Fire Alarms and Detection:

5.2.1 Fire alarms are required in buildings where the location of the fire will not provide adequate warning to employees and other occupants (i.e. multi-floor buildings or segregated work spaces).

5.2.2 Alarms must be loud enough to be heard above the ambient noise level of the work area and activate in time to provide adequate warning for the work area occupants to safely evacuate.

5.2.3 Alarms and signals must be tested or maintained to assure they remain in working order.

5.2.4 Buildings undergoing construction and renovation (where employees are still working and occupying the work areas) must have appropriate (or alternate) alarms and fire prevention systems that are at least equal to those required for the occupancy and type of hazards in the area. This includes hazards inherent to the work area and tasks performed, as well as any additional hazards caused by the construction or renovation.

5.3 Fixed Fire Suppression Equipment:

5.3.1 All fixed suppression equipment must be maintained and tested by trained persons. The local fire department may provide or be able to be contracted to perform this maintenance and testing. Specific employees may be designated and trained for this service, depending upon the maintenance and testing requirements for the system.

5.3.2 There are various types of fixed suppression equipment. Each type must be specifically designed for the types of fires likely to be encountered. These types are:

5.3.2.1 Automatic sprinklers that discharge water into an area when heat or smoke causes the valve (sprinkler head) to open. Sprinkler heads must be kept

free from any obstruction (at least 18" clearance vertically and horizontally).

5.3.2.2 Standpipe systems include fixed water supplies (risers) with a hose and nozzle. These systems are usually recessed in walls or found in stairwells. Standpipe systems are for use by trained fire-fighting personnel only.

5.3.2.3 Dry chemical systems are discharged in rooms or over a specific process (like an electrical system). Pre-discharge alarms are required where vision could be obscured that would affect employee evacuation.

5.3.2.4 Gaseous agents are normally used in enclosed rooms and spaces. Depending on the agent used to suppress the fire, pre-discharge alarms are required. Where employee evacuation can not occur within a specific time frame, specific agents are prohibited from being used as suppression agents.

5.3.2.5 Water spray and foam systems are usually utilized for a specific process hazard (like a kitchen grease pit or solvent tank). They discharge a chemical-foam that will "blanket" the fire or area with foam to "smother" the fire.

5.4 Portable Fire Extinguishers:

5.4.1 The Two Extinguisher Rule: Fire extinguishers are for controlling small, incipient fires. NEVER should more than two (2) extinguishers be used to control a fire. If the fire is not controlled with two extinguishers, it is no longer considered an incipient fire and should ONLY be extinguished by trained Firefighters or by fixed fire suppression systems.

5.4.2 Classes. There are four classes or types of Fire Extinguishers. Each class has distance requirements that are required for employees to access them. These types and distances are:

5.4.2.1 Class A – used on ordinary combustibles (wood, paper, cloth, etc.). Extinguishers must be 75 ft. or less from the hazard.

5.4.2.2 Class B – used for flammable or combustible liquids (gasoline, paint, solvents, propane). Distance must be 50 ft. or less from the hazard.

5.4.2.3 Class C – used for electrical equipment and must be 50 ft. or less from the hazard.

5.4.2.4 Class D – used for metals (magnesium, potassium and sodium). Extinguishers must be 75 ft. or less from the hazard.

5.4.3 General. Extinguishers must be located so they are clearly visible, readily accessible to the employees or persons designated and trained to use them, and located so they are protected from damage by moving equipment.

5.4.3.1 Extinguishers must be maintained in a fully charged and operable condition, and kept in their designated locations.

5.4.3.2 Extinguishers must be appropriate to the type (or class) of fire hazard likely to be found in the work area.

5.4.3.3 Standard signs and floor markings may be utilized to increase visibility.

5.4.3.4 Extinguishers should be located along normal paths of travel but protected from the direct line of traffic to avoid injury to personnel or mechanical damage.

5.4.3.5 Extinguishers are not required in workplaces where all employees will be required to evacuate the facility (total evacuation) upon the initial alarm sounding, unless extinguishers are required by a specific regulatory standard (i.e. welding, confined space, and some flammable liquid usages).

5.4.4 Inspection and Testing. Extinguishers must be visually inspected monthly. Extinguishers must be maintained annually. Extinguishers must be physically (hydrostatically) tested every 5 years or 12 years depending on the type of extinguisher. When removed from service for maintenance or testing, or due to corrosion or damage, they must be replaced with an equivalent protective system.

5.4.4.1 Documentation of the inspection, maintenance and testing may be kept with the extinguisher or in a separate system, provided the records are accessible to employees or agencies that may be required to review these records. Documentation must be kept for the life of the extinguisher.

5.4.5 Employee Training

5.4.5.1 Where extinguishers are located, but employees will not be required to use them, employees should be informed that they are for trained fire fighter use only. It is recommended that these extinguishers also be marked “For Fire Department Use Only”.

5.4.5.2 Where employees will be required to use extinguishers, employees must be trained annually in the general principles of fire extinguisher use and the hazards involved in incipient (beginning) stage fire fighting.

5.5 Fire Brigades and On-Site Response Medical Teams (as appropriate):

5.5.1 Fire Brigades and Medical Response teams must be trained to the level or type of emergency they will likely encounter. In most cases, verified training is required, and documentation must be maintained with periodic or annual refresher training.

5.5.2 Team members must be physically capable of performing their duties (including the use of respiratory protection, where required). Employees with known physical

conditions (heart disease, emphysema or epilepsy) or known mental or physical disabilities that would impair their ability to perform the expected duties may be required to be approved by a licensed physician prior to being allowed to participate on the team.

5.5.3 Teams must be provided with adequate equipment and protective clothing to perform their duties.

5.5.4 Equipment and clothing must be maintained in good working order. Equipment removed from service must be promptly repaired or replaced, or else team members must be informed that the equipment is no longer available.

5.5.5 Teams must be organized, with either elected or appointed leaders, and have specific written procedures that outline their responsibilities (and limitations) with regard to emergency response at the workplace.

5.6 Hot Work, Open Flame Work or Spark Producing Equipment:

5.6.1 Permission and Permits. Any hot work or work with open flames should be performed only with the permission of company management. (Approvals may be required by the landlord or building owner, if different than company ownership.) Such work should be done only under specific restrictions and limitations to prevent fires or other hazards. This information and any restrictions or limitations should be documented. A signed permit system is recommended that outlines the details of the work and the restrictions or limitations.

5.6.2 Permanent Hot Work/Open Flame Permission - Permanent permission should be obtained for areas where hot work/open flame is regularly used, such as metal and welding shops or special laboratories and work areas.

5.6.2.1 Areas should be physically inspected by individuals who are knowledgeable about the hazards of the area and appropriate fire protection systems for these hazards. Annual re-inspection for the duration of the permit/permission is recommended, at a minimum.

5.6.3 Temporary Hot Work/Open Flame Permission - Allows only specified personnel to perform a single operation. Areas where one-time use of flames is required (such as maintenance and construction operations, in areas such as buildings, sheds, yard areas, and streets and parking lots) should have areas physically inspected for fire hazards by a knowledgeable person.

5.6.4 Special Situations and Equipment:

5.6.4.1 Thermogrip Solder Tongs, Electric Soldering Irons, Flameless Heat Guns are prohibited in areas where flammable vapors or gases, or combustible dusts are present.

5.6.4.2 Electric or Other Spark/Heat-Producing Tools in High-Fire Hazard Areas require special permission.

5.6.4.3 Pressure Vessels - All burning or welding operation, emergency or otherwise, are prohibited on any pressure vessel unless specific approval has been obtained from a qualified engineering specialist or the lead welder.

5.6.4.4 Contractors - shall obtain Hot Work/Open Flame Permits through the manager or supervisor in charge of the job or process.

6. Training and Information.

6.1 Evacuation Programs must be reviewed with each employee:

6.1.1 When the program is developed or when it is changed

6.1.2 Upon initial assignment to a work area

6.1.3 When the workplace changes (construction or remodeling) that require a different evacuation route

6.1.4 When an employee's responsibilities under the program change.

6.2 Fixed Suppression Systems. Employees where fixed suppression equipment agents activate (non-water systems) must be specifically trained in the alarm signal, and any protective equipment and controls needed to ensure their safety. They must have (and be trained to) specific evacuation programs from the area of discharge.

6.3 Emergency Response Team members must be trained based on the types of emergencies they will be expected to encounter. Fire fighting techniques, first aid treatment or both may be required, depending upon the duties and responsibilities of the team.

6.4 Fire extinguisher users must be trained annually in the general principles of fire extinguisher use and the hazards involved in incipient (beginning) stage fire fighting.

7. Definitions.

- *Brigades* – A workplace team of employees who are specifically designated to respond and fight incipient fires.
- *Fixed Suppression Equipment* – Fire extinguishing systems that are affixed in place. For example: sprinkler systems.
- *Command Post* – A designated location that is set up for communications and direction of emergency responders.
- *Incident Commander* – The person designated to direct the activities of an emergency response. This person normally remains at the command post.

ARCITECHTURAL CONCRETE PLUS, LLC.

PROGRAM OVERVIEW

EYE WASH STATION AND SAFETY SHOWER SAFETY PROGRAM

REGULATORY STANDARD: OSHA - 29 CFR 1910.151

INTRODUCTION: Ensures the existence of suitable facilities for quick drenching or flushing of the eyes and body where potential exposure to injurious or corrosive materials exists. It highlights procedures and training requirements and defines installation and design specifications.

TRAINING:

- All employees and supervisors who are exposed to, work with or near corrosive or injurious materials must be instructed on the use of eye wash stations and safety showers to ensure the features and operations of the unit are fully understood in the event of an emergency.

ACTIVITIES:

- Assess area hazards to determine where eye wash stations and safety showers are required
- Install eye wash stations and safety showers, as required
- Ensure appropriate signs are placed to indicate the location of eye wash stations and safety showers, and operating instructions are placed at the units
- Conduct inspections of installed safety equipment

FORMS:

- Activation and Inspection Eye Wash Station Form
- Activation and Inspection Safety Shower Form
- Program Assessment Eye Wash Station and Safety Shower
- Training and Attendance Roster Eye Wash and/or Safety Shower

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Eye Wash Station and Safety Shower Safety Program

1. Purpose. The company requires that emergency shower and/or eye wash station facilities shall be provided whenever operations may result in personnel coming into contact with injurious corrosive materials. This program provides requirements for the use and maintenance of emergency showers and eye wash stations.

2. Scope. Applies to all eye wash station and safety shower units and installations at the company or on company job site locations.

3. Responsibilities.

3.1 Managers and Supervisors:

3.1.1 Assess area hazards to determine where eye wash stations and safety showers are required to be installed.

3.1.2 Install eye wash stations and safety showers.

3.1.3 Ensure appropriate signs are placed to indicate the location of eye wash stations and safety showers, and operating instructions are placed at the units.

3.1.4 Ensure employees who work with injurious or corrosive materials are trained in the use of eye wash stations and safety showers.

3.1.5 Provide the resources for and manpower required for maintenance and testing of eye wash stations and safety showers.

3.2 Employees:

3.2.1 Attend training upon initial assignment and as workplace changes occur, as appropriate.

3.2.2 Assist, as needed or required, in the installation, maintenance or testing of eye wash stations and safety showers.

3.2.3 Notify supervision of any problems or deficiencies noted during eye wash station or safety shower inspection, maintenance or testing.

3.3 Safety Officer (as needed or required):

3.3.1 Assist in the hazard assessment of the facility and the needs or requirements for eye wash stations and safety showers.

3.3.2 Assist in the installation, maintenance or testing of eye wash stations and safety showers.

3.3.3 Assist in employee training in the use of eye wash stations and safety showers.

4. Procedure.

4.1 Hazard Assessment:

4.1.1 Conduct Hazard Assessments to identify injurious or corrosive materials in the work area and to determine the need for eye wash stations and/or emergency showers. Material Safety Data sheets may assist in this identification process.

4.1.2 Conduct Hazard Assessments whenever work process changes or building renovation/occupancy affect the operation or requirements of emergency eye wash stations and showers.

4.1.3 Document this assessment, as needed, on the Certificate of Hazard Assessment.

4.2 Installation and Maintenance:

4.2.1 Ensure that emergency eye wash station and/or emergency showers are initially installed to meet the manufacturer's specifications and are tested and maintained in good operating condition whenever hazard assessments indicated the need for this equipment. Manufacturing installation instructions normally accompany the unit.

4.2.2 Existing single nozzle designed eyewash installations requiring maintenance or repair shall be replaced with an approved dual nozzle design. Any new eyewash installation shall be of an approved dual nozzle design.

4.2.3 Out-of-service units shall be tagged and all personnel in the area informed; before removing tag and returning the unit into service, a performance test shall be conducted to ensure proper operation.

4.2.4 Potable water is preferred, but non-potable water is acceptable provided it is clean and that appropriate signs are posted.

4.2.5 Where possible, water should be kept at tepid temperature (65^{o}F - 95^{o}F).

4.2.6 Distance from the hazard must be not more than a 10 second walking distance (approximately 100 feet).

4.2.7 Drainage should be provided for shower units to prevent additional hazardous situations from occurring.

4.3 Recordkeeping:

4.3.1 Document the activation of emergency eye wash station and/or emergency shower equipment. A log book attached or near the equipment, or a sticker affixed to the unit will suffice.

4.3.2 Document the employee training.

4.4 Activation and Testing:

4.4.1 Testing should be performed upon initial installation and this documentation should remain with the unit (via log book or sticker).

4.4.2 Showers with monitored or supervised systems (or other performance verification equivalent) on the line to assure water pressure or flow (such as pressure monitors or flow gauges) require activation and testing on initial installation and activation at least annually thereafter. (NOTE: If eye wash station or shower is connected to a controlled alarm system, notification prior to activation/testing shall be made to the site or designated unit responsible for receiving the alarm to prevent summoning emergency response units).

4.4.3 Showers with no monitoring system require activation at least annually (however, monthly is recommended depending upon the potential hazards encountered in the area), and annual testing.

4.4.4 Eye wash stations, Eye/Face units for plumbed units, must be activated weekly; Self-contained units will be activated per manufacturer's instructions.

4.4.4.1 As part of the activation procedure, check for sharp projections and contamination on the nozzle area; activation should flow water 3 to 6 inches from the nozzle.

NOTE: The use of Drench hoses and Personal eyewash equipment (eyewash bottles) supports plumbed and self-contained equipment, but these SHALL NOT be used as a replacement for them. If they are used, employees shall be properly instructed on their use and limitations.

4.5 Housekeeping:

4.5.1 Emergency eye wash station and/or emergency shower equipment must retain a clear path to the equipment. Supervision should be notified of obstructed paths.

4.5.2 Equipment must be kept in a clean and sanitary condition. Eye wash station caps or covers may be used, provided they meet regulatory requirements and are removed by the water pressure of the unit upon activation.

4.6 Notification:

4.6.1 Emergency response personnel and supervision should be immediately notified of any emergency eye wash station and/or emergency shower equipment activation, other than testing.

5. Safety Information. This information is applicable to standard equipment. *Where applicable to the workplace, there are additional requirements to be met for barrier free equipment with reference to the Americans with Disability Act and access to equipment for handicapped individuals.*

5.1 Valve Actuators.

5.1.1 For all equipment:

5.1.1.1 Shall be large enough to be easily located by the user, with a highly visible sign, and in a well lighted area (Darkrooms and Dark areas are an exception to this requirement).

5.1.1.2 Shall activate in 1 second or less.

5.1.1.3 Once activated shall remain on until intentionally shut off without requiring the use of the operators hands.

5.1.1.4 Shall be protected from freezing.

5.1.1.5 Shall be protected, as much as possible, from airborne or other contaminants without impeding the use of the equipment or requiring a separate motion to remove.

5.1.1.6 Shall have instructions posted to assist users.

5.1.1.7 Shall be free of projections or sharp objects which may be injurious to the user.

5.1.1.8 Shall be constructed of materials that will not corrode in the presence of flushing fluid.

5.1.2 Showers:

5.1.2.1 The activation handle shall not be located more than 69" from the surface on which the user stands. An extension device should be constructed to accommodate activation of the shower for persons with disabilities or persons in wheelchairs.

5.2 Spray.

5.2.1 For all equipment:

5.2.1.1 Whenever practical, equipment should deliver tepid or tempered water. Temperature of the flushing fluid should not exceed 100 degrees Fahrenheit (38 degrees Celsius).

5.2.1.2 In circumstances where chemical reaction is accelerated by flushing fluid temperature, a medical advisor should be consulted for the optimum temperature for each application.

5.2.1.3 While cold flushing fluid temperatures provide immediate cooling after chemical contact, prolonged exposure to cold fluids may affect the ability to maintain adequate body temperature and can result in the premature cessation of the equipment usage.

5.2.2 Showers:

5.2.2.1 Deliver a spray pattern of 20 inches in diameter at 60 inches from the surface on which the user stands.

5.2.2.2 Located at least 16 inches from any obstruction.

5.2.2.3 Fluid must be substantially dispersed throughout the pattern.

5.2.2.4 Delivers 20 gallons per minute for a minimum of 15 minutes.

5.2.3 Eye wash stations:

5.2.3.1 Delivers a spray pattern of 4" across (3-6” away from each nozzle).

5.2.3.2 Fluid must be substantially dispersed throughout the pattern.

5.2.3.3 Delivers 0.4 gallons per minute for a minimum of 15 minutes.

5.2.4 Eye/Face units:

5.2.4.1 Delivers a spray pattern of 4" in length.

5.2.4.2 Fluid must be substantially dispersed throughout the pattern.

5.2.4.3 Delivers 3 gallons per minute for a minimum of 15 minutes.

5.3 Delivery System.

5.3.1 For all equipment:

5.3.1.1 Constructed of materials that will not corrode in the presence of flushing fluid.

5.3.1.2 Designed so as not to be injurious to the user.

5.3.1.3 Shall have no sharp projections or objects.

5.3.1.4 Shall be protected from contamination.

5.3.1.5 Shall be protected from freezing.

5.3.1.6 The water supply must be continuous and uninterruptible for the required duration.

5.3.2 Showers:

5.3.2.1 At least 1 inch pipe to deliver flow, supply lines may be 1.25 inch line.

5.3.2.2 Shower Assembly shall be 82-96 inches in height from the surface on which the user stands.

5.3.2.3 Enclosures, if used, will have a minimum of 34 inches in diameter.

5.3.2.4 Shall have supply lines which deliver 30 lbs. per-square-inch of pressure at maximum flow.

5.3.3 Eye wash stations:

5.3.3.1 Designed to provide enough room to allow the eyelids to be held open with hands.

5.3.3.2 Provide fluid to both eyes simultaneously.

5.3.3.3 New installations or modifications shall have 2 sets of parallel lines painted or adhered to back surface of eyewash. These lines will be set 1.25 inches and 3.25 inches apart from the center of the eyewash and are designed to assist the user in guiding the eyes into the stream. The unit should deliver the flushing fluid between these lines.

5.3.3.4 Shall have supply lines which deliver a minimum pressure of 30 psi and a maximum pressure of 90 psi at maximum flow.

5.3.3.5 Shall be 33-45 inches from the surface on which the user stands and shall be at least 6 inches from the wall or other obstruction.

5.3.4 Eye/face units:

5.3.4.1 Designed to provide enough room to allow the eyelids to be held open with hands.

5.3.4.2 Shall be 33-45 inches from the surface on which the user stands and shall be at least 6 inches from the wall or other obstruction.

5.3.4.3 Shall have supply lines which deliver a minimum pressure of 30psi and a maximum of 90psi at maximum flow.

5.4 Location.

5.4.1 For all equipment:

5.4.1.1 Not more than a 10 second unobstructed walking distance from the hazard (approximately 100 feet in a straight line).

5.4.2 Showers:

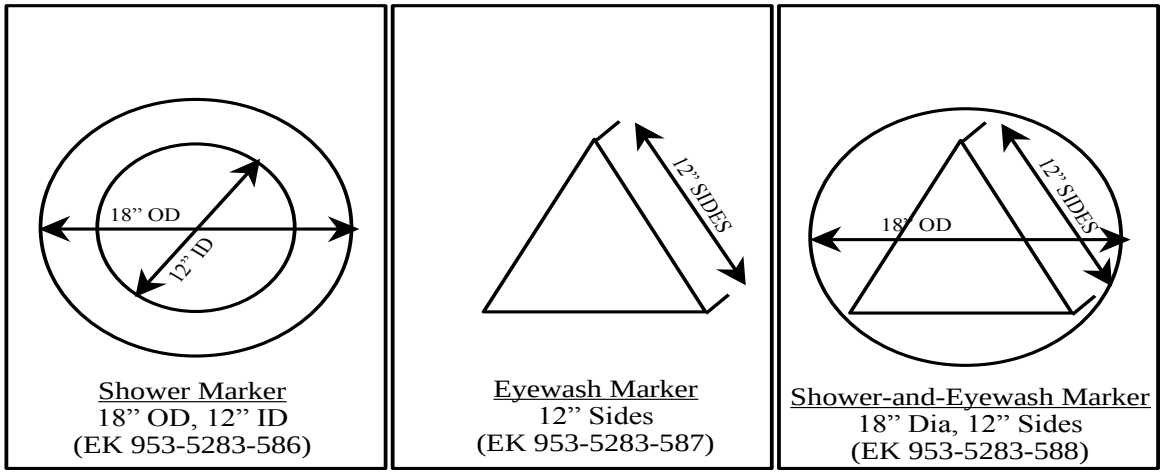
5.4.2.1 16 inches from any obstruction or wall (minimum).

5.4.3 Eye wash stations:

5.4.3.1 If a highly hazardous or corrosive material is used, the eye wash station should be in the direct vicinity of the hazard to facilitate immediate use.

5.5 Floor Markings.

5.5.1 Are RECOMMENDED - Should be clearly marked with yellow, as shown:



Shower Marker
18" OD, 12" ID
(EK 953-5283-586)

Eyewash Marker
12" Sides
(EK 953-5283-587)

Shower-and-Eyewash Marker
18" Dia, 12" Sides
(EK 953-5283-588)

5.6 Additional Information.

5.6.1 Users of emergency eye wash stations should hold eye(s) open and roll eyeballs to apply flushing fluid to all parts of the eye and under the eyelids.

5.6.2 Combination units should comply with all of the above requirements and each piece (shower, eye wash station, and eye/face) should operate simultaneously.

5.6.3 Personal Eyewash Bottles and Drench hoses are designed to supplement the use of Emergency Eye wash stations and Showers and are not designed to replace them.

6. Training Information and Requirements.

6.1 All employees who are exposed to, work with or work in proximity to injurious or corrosive materials shall be trained in the use of emergency eye wash stations and showers as follows:

6.1.1 Location of the equipment.

6.1.2 Hazardous conditions which require the equipment use.

6.1.3 Operation of equipment.

6.1.4 Providing emergency assistance to others.

6.1.5 Employees should be aware not to store materials or product in front of, near or in the pathway to equipment or to cover floor markings.

7. Definitions.

- *Activation* - Activation consists of turning the unit on to assure water flow (to flush the line).
- *gpm* - Gallons Per Minute.
- *Monitored or Supervised System* - a water or flow line with alarm systems or flow gauges which will notify some authority when flow is decreased or interrupted.
- *Testing* - Testing consists of turning the unit on, checking flow rate, flow pattern, spread, assuring components of the equipment are operating properly, and verifying that all signs, labels or markings are legible, visible and appropriate.

PROGRAM OVERVIEW

FALL PROTECTION (PERSONAL FALL ARREST SYSTEM) SAFETY PROGRAM

REGULATORY STANDARD: OSHA - 29 CFR 1910.66, 146
- 29 CFR 1926 Subpart M
- 29 CFR 1915.159
- 29 CFR 1918.85

INTRODUCTION: Fall protection systems are required when working from heights greater than 6 feet in construction and greater than 4 feet in general industry and a guardrail system is not in place, above hazardous equipment and working in an aerial lift bucket. This program establishes procedures for fall hazard control, inspections, equipment maintenance, workplace evaluations and employee training.

TRAINING:

- Employees trained initially in the type of fall protection system used. Training includes classroom instruction in the hazards of fall protection and the type of protective systems used, and (if used) a demonstration of the use of a Personal Fall Arrest System.
- Annual re-training is required in some states.

ACTIVITIES:

- Evaluate hazards falls are evaluated in the workplace. Ensure these hazards are controlled through guardrail systems or that employees have appropriate training and equipment.

FORMS:

- Fall Hazard Evaluation
- Equipment Inspection Checklist
- Program Assessment
- Requirements Example Chart
- Training Certificate
- Wallet Card
- Written Procedure
- Training Attendance Roster

Table of Contents

Fall Protection Safety Program

1. Purpose. The hazards of potential falls at heights of 4 feet and above (or 6 feet and above at construction sites) will be addressed in this document. This safety program describes a systematic approach that must be used to protect and prevent people from falling. This safety program also lists some of the most common fall hazards, and provides recommendations and guidelines for selecting fall arrest systems. The company will review and evaluate this safety program:

1.1 On an annual basis, and more frequently as needed.

1.2 When changes occur to 29 CFR, that prompt revision of this document

1.3 When facility operational changes occur that require a revision of this document

1.4 When there is an accident or close-call that relates to this area of safety

1.5 Review the safety program any time fall protection procedures fail

2. Scope. This program encompasses the total workplace regardless of the number of workers employed or the number of work shifts. It also applies to fall hazards on off-site jobs or activities to which company employees are exposed.

3. Responsibilities.

3.1 Management/Supervisors:

3.1.1 Assess the workplace, or each job site, for fall hazards.

3.1.2 Provide fall protection equipment, as needed or required. This equipment must me Osha requirements.

3.1.3 Enforce the use of appropriate fall protection systems and equipment.

3.1.4 Ensure employees are properly trained in the use of fall protection systems and equipment.

3.1.5 Ensure equipment is inspected prior to each use, when subjected to falls or impact loads, and on a frequent and regular basis.

3.1.6 Write fall protection procedures and ensure they are followed.

3.1.7 Ensure fall protection systems are installed and set up by a professional engineer or other qualified person.

3.2 Employees:

3.2.1 Attend appropriate training.

3.2.2 Utilize fall protection systems and equipment, as needed or required.

3.2.3 Inspect equipment before each use. Equipment that has been subjected to a fall or impact-load must be removed from service until inspected by the manufacturer or designated professional engineer.

3.2.4 Report hazards and hazardous conditions to your Supervisor immediately.

3.3 Safety Officer, Fall Protection Program Coordinator, or Other Designee (as needed or required):

3.3.1 Assist in the development and implementation of this program.

3.4 Contractors:

3.4.1 In addition to complying with the fall protection requirements that apply to all employees, each contractor who is retained to perform operations that involve fall protection will:

3.4.1.1 Obtain any available information regarding fall hazards and protective measures.

3.4.1.2 Coordinate fall protection operations, when both company personnel and contractor personnel will be working in or near recognized fall hazard locations.

3.4.1.3 Inform the contractor of the company's Fall Protection Safety Program. The contractor must agree to follow the company's policy with regard to any of any hazards confronted or created in conducting operations involving fall protection within company owned facilities. This debriefing will take place immediately prior to the operation.

4. Procedure.

4.1 Facility/Department Evaluation. The workplace will be assessed before each assigned job for potential fall hazards.

4.1.1 Proper fall arrest equipment will be used for jobs requiring fall protection when elimination of the hazard(s) is not possible.

4.1.2 The company will evaluate the facilities by department or job site to determine fall hazards. The Fall Hazard Evaluation Form may be used to document fall hazards.

4.1.3 A complete list of fall hazard locations and protective measures procedures will be maintained, as needed. Each site or location will be evaluated and the appropriate fall protection measures will be taken based on the hazards identified.

4.2 Fall Hazard Control Procedures (Fall Prevention).

4.2.1 Control Procedures Development. Once a facility evaluation has been accomplished, procedures will be developed, documented and utilized for the control of potential fall hazards. Fall Prevention Safety Programs will be designed by competent individuals or other competent personnel. Company engineers (where utilized) or other competent personnel will be provided with any required specialized training to recognize fall hazards, to understand and address fall prevention techniques, and to become familiar with fall arrest equipment and procedures. It is critical that they consider fall protection design for the safety of operations where employees must work at elevated heights. Safety during access and egress from elevated work sites will also be considered. The following guidelines will be used when planning work at elevated heights:

4.2.1.1 Involve the Safety Department early in the project planning/job planning so that they can recommend appropriate fall-protection measures and equipment.

4.2.1.2 Involve qualified Engineers when load rating of anchorage points must be determined or is in doubt. Required training will be provided as necessary.

4.2.1.3 Involve Engineering and Maintenance when anchorage points must be installed.

4.2.1.4 The Safety Officer and Engineering Departments will use the expertise of fall protection equipment manufacturers such as Rose Manufacturing Company, Miller Equipment Company, Research and Trading Company and DBI/SALA.

4.2.1.5 The company will be specific in dealing with fall hazards when developing contracts. Contractors will be required to provide a written safety program which describes the Contractors' fall protection policies and procedures when they will be working at elevated heights.

4.2.2 Procedural Format. The following format will be followed when developing fall protection procedures. The Safety Officer will be responsible for the implementation of these procedures. The procedures will clearly and specifically outline the scope, purpose, authorization, rules, and techniques to be utilized to control fall hazards, and the means to enforce compliance including, but not limited to, the following:

4.2.2.1 A specific statement of the intended use of the procedure.

4.2.2.2 A review of accident records, including OSHA Recordkeeping logs and Workers' Compensation documentation.

4.2.2.3 Interviews with employees and groups of employees whose work environment may include fall hazards.

4.2.2.4 Physical observations of the work environment(s) that involve fall hazards or the potential of such.

4.2.2.5 Observations of individuals and their job tasks and work habits that expose them to existing or potential fall hazards.

4.2.2.6 The procedures contained in the company's Fall Protection Safety Program.

4.2.2.7 Specific procedural steps for the use and operation of body harness systems, and other fall protection systems.

4.2.2.8 Specific procedural steps for the placement, erection, inspection, maintenance, disassembly and transfer of fall protection systems or devices and the person(s) responsible for them.

4.2.2.9 Specific requirements for testing fall protection systems or equipment to determine and verify the effectiveness of the fall protection control measures (not load testing).

4.2.2.10 The correct procedures to rescue employees who have fallen.

4.2.2.11 The role of each employee in this safety program and applicable policies.

4.2.2.12 Specific requirements for testing fall protection systems or equipment.

4.2.2.13 Accident investigation shall be directed to assess the fall protection plan for probable updates to practices, procedures or training in order to avoid reoccurrence.

4.3 Fall Protection Systems. When fall hazards cannot be eliminated through any other means, fall arrest systems will be used to control falls. Proper training on the use of fall arrest equipment is essential and will be provided prior to use.

4.3.1 Full Body Harness Systems. A full body harness system consists of a full-body harness, lanyard, energy shock absorber, and self-locking snap hook. Before using a full-body harness system, the supervisor and/or the user must address such issues as:

4.3.1.1 Has the user been trained to recognize fall hazards and to use fall arrest systems properly?

4.3.1.2 Are all components of the system compatible according to the manufacturer's instructions?

4.3.1.3 Have appropriate anchorage points and attachment techniques been reviewed?

4.3.1.4 Has free fall distance been considered so that a worker will not strike a lower surface or object before the fall is arrested?

4.3.1.5 Have swing fall hazards been eliminated?

4.3.1.6 Have safe methods to retrieve fallen workers been planned?

4.3.1.7 Has the full-body harness and all of its components been inspected both before each use and every 6 months?

4.3.1.8 Is any of the equipment, including lanyards, connectors, and lifelines, subject to such problems as welding damage, chemical corrosion, or sandblasting operations?

4.3.2 Retractable Lifelines. A retractable lifeline is a fall arrest device used in conjunction with other components of a fall arrest system. Retractable lifelines should be used by one person at a time.

4.3.2.1 A properly inspected and maintained retractable lifeline, when correctly installed and used as part of the fall arrest system, automatically stops a person's descent in a short distance after the onset of an accidental fall.

4.3.2.2 Retractable lifelines may be considered when working in areas such as on roofs and scaffolds, or in tanks, towers, vessels, and manholes. Also, retractable lifelines should be considered when climbing such equipment as vertical fixed ladders. Before using a retractable lifeline, the supervisor and/or the user must address the following questions:

4.3.2.2.1 Has the user been trained to use a retractable lifeline correctly?

4.3.2.2.2 Is the retractable lifeline being used in conjunction with a complete fall arrest system?

4.3.2.2.3 Is the equipment under a regular maintenance program?

4.3.2.2.4 Has the equipment been inspected within the last six months?

4.3.3 Standard Harnesses. Harnesses for general purpose work should be Class III, constructed with a sliding back D-ring. Standard harnesses are suitable for continuous fall protection while climbing, riding, or working on elevated personnel platforms. They are suitable for positioning, fall arrest, and the rescue and evacuation of people who are working at elevated heights.

5. Safety Information.

5.1 Protective Materials and Hardware. Appropriate fall protection devices will be provided for potential fall hazards. Selection of the equipment will be based on the fall protection evaluation. Evaluations will be conducted by authorized personnel to evaluate fall protection requirements.

5.1.1 Selection Criteria.

5.1.1.1 Fall Protection devices will be singularly identified; will be the only devices(s) used for controlling falls; will not be used for other purposes; and will meet the following requirements:

5.1.1.1.1 Capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected.

5.1.1.1.2 Anchor points will not deteriorate when located in corrosive environments such as areas where acid and alkali chemicals are handled and stored.

5.1.1.1.3 Capable of withstanding the ultimate load of 5,000 lbs. for the maximum period of time that exposure is expected.

5.1.1.1.4 Standardization within company facilities. Fall protection devices will be standardized whenever possible.

5.2 Inspection and Maintenance. To ensure that fall protection systems are ready and able to perform their required tasks, a program of inspection and maintenance will be implemented and maintained. The following as a minimum, will comprise the basic requirements of the inspection and maintenance program:

5.2.1 Equipment manufacturer's instructions will be incorporated into the inspection and preventive maintenance procedures.

5.2.2 All fall protection equipment will be inspected prior to each use, and a documented inspection at intervals not to exceed 6 months, or in accordance with the manufacturers guidelines.

5.2.3 The user will inspect his/her equipment prior to each use and check the inspection date.

5.2.4 Any fall protection equipment subjected to a fall or impact-load will be removed from service immediately and inspected by a qualified person (sent back to the manufacturer).

5.2.5 Check all equipment for mold, damage, wear, mildew, or distortion.

5.2.6 Hardware should be free of cracks, sharp edges, or burns.

5.2.7 Ensure that no straps are cut, broken, torn or scraped.

5.2.8 Special situations such as radiation, electrical conductivity, and chemical effects will be considered.

5.2.9 Equipment that is damaged or in need of maintenance will be tagged as unusable, and will not be stored in the same area as serviceable equipment.

5.2.10 A detailed inspection policy will be used for equipment stored for periods exceeding one month.

5.2.11 Anchors and mountings will be inspected before each use by the user and supervisor for signs of damage.

5.3 Most Common and Most Dangerous Fall Hazards. The tasks and situations listed below present inherent fall hazards. Give special attention to providing fall prevention and/or fall control for them, remembering that this attention is necessary in the design, engineering, planning, and execution stages of work. Supervisors will give special consideration to fall protection for the following tasks:

5.3.1 Working from crane booms and tower cranes.

5.3.2 Working on top of machinery and equipment, such as overhead cranes, furnaces, conveyors and presses.

5.3.3 Other work that involves fall hazards, such as 'off-chutes' from main piping in duct work or boilers.

5.3.4 Working on roofs, with deteriorating or unsupported sections and framing.

5.3.5 Working over chemical tanks or open pits.

5.3.6 Working from fixed or portable ladders, or climbing systems.

5.3.7 Performing work on water towers, product tanks, silos, pipe racks, presses, and floor pits.

6. Training and Information.

6.1 A safety training program will be provided for all employees who will be exposed to fall hazards in the work area, and will be conducted by competent personnel. The program will include but will not be limited to:

6.1.1 A description of fall hazards in the work area

6.1.2 Procedures for using fall prevention and protection systems

6.1.3 Equipment limitations

6.1.4 The elements encompassed in total fall distance

6.1.5 Prevention, control and fall arrest systems

6.1.6 Inspection and storage procedures for the equipment

6.2 Generally, workers will be trained to recognize the hazards of falling from elevations and to avoid falls from grade level to lower levels through holes or openings in walking/working surfaces. Safety training programs will include prevention, control, and fall arrest systems. It must be ensured that appropriate fall arrest systems are installed, and that employees know how to use them before beginning any work that requires fall protection.

6.3 Initial training. Training will be conducted prior to job assignment. The company will provide training to ensure that the purpose, function, and proper use of fall protection is understood by employees and that the knowledge and skills required for the safe application and usage is acquired by employees. This program will be provided to, and read by all employees receiving training. The training will include, as a minimum the following:

6.3.1 Types of fall protection equipment appropriate for use.

6.3.2 Recognition of applicable fall hazards associated with the work to be completed and the locations of such.

6.3.3 Load determination and balancing requirements.

6.3.4 Procedures for removal of protection devices from service for repair or replacement.

6.3.5 All other employees whose work operations are or may be in an area where fall protection devices may be utilized, will be instructed to an awareness level concerning hazards associated with fall protection operations.

6.3.6 Fall protection equipment identification. Fall protection equipment having identification numbers will be checked for legibility. Fall protection equipment having illegible identification markings will be turned in to the supervisor for inspection.

6.3.7 Equipment maintenance and inspection requirements.

6.3.8 Equipment donning and doffing procedures.

6.3.9 Equipment strengths and limitations.

6.3.10 Verification. The company will verify that employee training has been accomplished and is being kept up to date. The documentation will contain each employee's name and dates of training. Training will be accomplished by competent personnel.

6.4 Refresher training. Refresher training must encompass all the requirements for initial training, and be provided whenever there is reason to believe the employee’s knowledge is insufficient.

6.4.1 Retraining will be provided for all authorized and affected employees whenever (and prior to) a change in their job assignments, a change in the type of fall protection equipment used, or when a known hazard is added to the work environment which affects the Fall Protection Safety Program.

6.4.2 Additional retraining will also be conducted whenever a periodic inspection reveals, or whenever there is reason to believe, that there are deviations from or inadequacies in the employee's knowledge or use of fall protection equipment or procedures.

6.4.3 Whenever a fall protection procedure fails.

6.4.4 The retraining will reestablish employee proficiency and introduce new or revised methods and procedures, as necessary.

6.4.5 Verification. The company will verify that employee training has been accomplished and is being kept up to date. The documentation will contain each employee's name and dates of training. Training will be accomplished by competent personnel.

7. Definitions.

- *Anchorage* - A secure point of attachment for lifelines, lanyards or deceleration devices.
- *Body belt* – A strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration device.
- *Body harness* - Straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system.
- *Competent person* – A person who is capable of identifying hazardous or dangerous conditions in any personal fall arrest system or any component thereof, as well as in their application and use with related equipment.
- *Connector* – A device which is used to couple (connect) parts of the personal fall arrest system and positioning device systems together. It may be an independent component of the system, such as a carabineer, or it may be an integral component of part of the system.
- *Deceleration device* - Any mechanism with a maximum length of 3.5 feet, such as a rope grab, rip stitch lanyard, tearing or deforming lanyards, self-retracting lifelines, etc. which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.
- *Energy shock absorber* - A device that limits shock-load forces on the body.
- *Failure* - Load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.
- *Fall arrest system* - A system specifically designed to secure, suspend, or assist in retrieving a worker in or from a hazardous work area. The basic components of a fall arrest system include anchorage, anchorage connector, lanyard, shock absorber, harness, and self-locking snap hook.
- *Free fall* - The act of falling before a personal fall arrest system begins to apply force to arrest the fall.

- *Free fall distance* - The vertical displacement of the fall arrest attachment point on the employee's body belt or body harness between onset of the fall and just before the system begins to apply force to arrest the fall (maximum of 6 feet). This distance excludes deceleration distance, and lifeline/lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

- *Hole* - A gap or void 2 inches or more in its least dimension, in a floor, roof, or other walking/working surface.

- *Lanyard* - A flexible line of rope, wire rope, or strap which generally has a connector at each end for connecting the body belt or body harness to a deceleration device, lifeline or anchorage.

- *Leading edge* - The edge of a floor roof, or formwork for a floor or other walking/working surface which changes location as additional floor, roof, decking, or formwork sections are placed, formed or constructed. A leading edge is considered to be an unprotected side and edge during periods when it is not actively and continuously under construction.

- *Lifeline* - A component consisting of a flexible line for connection to an anchorage at one end to hang vertically or for connection to anchorages at both ends to stretch horizontally and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

- *Opening* - A gap or void 30 inches or more high and 18 inches or more wide, in a wall or partition, through which employees can fall to a lower level.

- *Personal fall arrest system* - A system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, a body belt or body harness and may include a lanyard, deceleration device, lifeline, or suitable combinations of these. As of January 1, 1998, the use of a body belt for fall arrest is prohibited.

- *Positioning device system* - A body belt or body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

- *Qualified person* - One with a recognized degree or professional certificate and extensive knowledge and experience in the subject field who is capable of design, analysis, evaluation and specifications in the subject work, project, or product.

- *Retractable lifeline* - A fall arrest device that allows free travel without slack rope, but locks instantly when a fall begins.

- *Rope grab* - A deceleration device which travels on a lifeline and automatically, by friction, engages the lifeline and locks so as to arrest the fall of an employee. A rope grab usually employs the principle of inertial locking, cam/level locking, or both.

- *Safety-monitoring system* - A safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

- *Self-retracting lifeline/lanyard* - A deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

- *Snap-hook* - A connector comprised of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object. Snap-hooks are generally one of two types:
  - The locking type with a self-closing, self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection.
  - The non-locking type with a self-closing keeper which remains closed until pressed open for connection or disconnection. As of January 1, 1998, the use of a non-locking snap-hook as part of personal fall arrest systems and positioning device systems is prohibited.

- *Toe-board* - A low protective barrier that will prevent the fall of materials and equipment to lower levels and provide protection from falls for personnel.

- *Walking/Working surface* - Any surface, whether horizontal or vertical on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runways, formwork and concrete reinforcing steel but not including ladders, vehicles, or trailers, on which employees must be located in order to perform their job duties.

- *Warning line system* - A barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and which designates an area in which roofing work may take place without the use of guardrail, body belt, or safety net systems to protect employees in the area.

- *Work area* - That portion of a walking/working surface where job duties are being performed.

ARCHITECTURAL CONCRETE PLUS, LLC.

PROGRAM OVERVIEW

FIRST AID AND EMERGENCY MEDICAL RESPONSE SAFETY PROGRAM

REGULATORY STANDARD: *OSHA - 29 CFR 1910.151*
- 29 CFR 1926.23, 1926.50

INTRODUCTION: This program is designed to assist the company to insure that medical personnel are readily available for emergency response and applies to all company facilities and employees, including any on-site emergency medical response personnel.

TRAINING:

- All employees and supervisors trained on how to summon emergency assistance
- Where required, employees trained in the use of emergency eyebaths and safety showers
- Any on-site emergency response teams trained appropriately in skills and bloodborne pathogens

ACTIVITIES:

- Determine if on-site first aid or emergency response teams or designated and trained personnel are required (if ambulance or EMT/fire department is more than 3-4 minutes away)
- Designate, train and equip emergency response personnel, if appropriate
- Establish agreements with local ambulance or fire/EMT services to provide emergency medical response, if appropriate
- Evaluate potential for injuries and implement hazard controls where possible
- Write and communicate policies and procedures

FORMS:

- Required only if incident: Exposure Incident Report

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First Aid and Emergency Medical Response Safety Program
(Including Industrial Burns)

1. Purpose. This program is designed to provide guidance and information to companies with regard to first-aid and emergency medical response situations. Included in this program is information on the treatment and prevention of industrial burns.

2. Scope. This program applies to all company facilities and employees, including any on-site emergency medical response personnel.

3. Responsibilities.

3.1 Management:

3.1.1 Determine if on-site first aid or emergency response teams or designated and trained personnel are required. If trained emergency medical response (an ambulance or EMT/fire department) is more than 5 minutes from the facility or site, a certified and trained first aid response person is required to be present at the work site for each work shift.

3.1.1.1 Designate, train and equip emergency response personnel, if appropriate. Training is at no cost to the employee and is provided at a reasonable time and place whenever possible; OR

3.1.1.2 Establish agreements with local ambulance or fire/EMT services to provide emergency medical response, if appropriate.

3.1.2 Inform employees on how to summon emergency assistance.

3.1.3 Make sure all employees are aware of what material can be found in the first aid kit and the location of each. These kits will be made accessible when needed.

3.1.3.1 Gauze pads (at least 4 x 4 inches). / Large gauze pads (at least 8 x 10 inches). / Gauze roller bandage at least 2 inches wide.

3.1.3.2 Box of band-aids.

3.1.3.3 Two triangular bandages.

3.1.3.4 Sealed moistened towelettes.

3.1.3.5 Scissors.

3.1.3.6 A blanket.

3.1.3.7 Tweezers.

3.1.3.8 Adhesive tape.

3.1.3.9 Latex gloves.

3.1.3.10 Resuscitation equipment

3.1.3.11 Elastic wraps.

3.1.3.12 Splint.

3.1.4 First aid kits will be frequently inventoried to make sure they contain all of the above supplies and that all supplies are in working order.

3.1.5 In conjunction with the Safety Officer and/or Human Resources, notify the injured/ill employee's family of the incident, as needed or required.

3.2 Employees:

3.2.1 Summon emergency medical assistance and transport, when required.

3.2.2 Notify management, as soon as possible.

3.2.3 Notify the Safety Officer or Human Resources as soon as possible after the emergency response personnel have taken charge of the situation.

3.3 Safety Officer (as needed or required):

3.3.1 Assist in the development and implementation of this program.

3.3.2 In conjunction with management and/or Human Resources, notify the injured/ill employee's family of the incident.

3.4 On-Site Medical Response Team/Person (as appropriate):

3.4.1 Attend Basic First Aid or EMT training.

3.4.2 Attend Bloodborne Pathogen training.

3.4.3 Maintain training.

3.4.4 Provide basic first aid for injured or ill employees who require assistance.

3.4.5 Maintain supplies and equipment, as needed, for emergency response.

4. Procedure.

4.1 Summoning Emergency Response Personnel:

4.1.1 Employees must be informed of the proper procedure to summon emergency medical assistance from their work area or job site (e.g. telephoning "911" or another number).

4.1.1.1 It is highly recommended that if summoning assistance is other than "dial 911", that the emergency phone number be placed on each telephone to assist employees during an emergency.

4.1.2 Information should be provided to the emergency service provider on:

4.1.2.1 The nature of the injury/illness, if known.

4.1.2.2 The specific location (company address or specific work area) of the injured employee.

4.1.2.3 Any other pertinent details of the incident.

4.1.2.4 Any procedures or escorts required to enter the facility.

4.1.3 If possible, remain with the injured or ill employee to provide comfort and support. Designate another employee to meet the emergency response personnel, if appropriate.

4.2 Potential for Industrial Burns:

4.2.1 Jobs where there is potential injury from either chemical burns or heat producing equipment that may cause burns to the skin or body must be evaluated and appropriate control measures put into place to protect employees from these hazards.

4.2.1.1 Control measures include engineering and design controls to prevent contact (insulating materials or enclosures), administrative controls (procedures, substitution of less hazardous materials or equipment), or personal protective equipment (gloves, clothing, other PPE).

4.2.2 Training is provided to employees on the heat or chemical hazards of the task or activity, and the first aid procedures for treatment.

4.2.3 Signs are posted in areas where there is a reasonable likelihood of burn injury from heat producing equipment.

4.2.3.1 Signs should read "Danger – Heat-Hazard Area. Thermal Protective Clothing or Equipment required, or similar language.

4.2.3.2 Signs must be in English, although additional languages may be used in addition to English.

4.3 Control Measures for Reducing Heat or Burn Injury:

4.3.1 Engineering Controls - should reduce heat levels to the lowest level reasonably achievable.

4.3.1.1 Controls include:

4.3.1.1.1 Placement of shielding or barriers between equipment and employees

4.3.1.1.2 Isolating heat sources through enclosures

4.3.1.1.3 Mechanizing or modifying processes or operations

4.3.2 Administrative Controls - should be implemented when engineering controls can not reduce heat to the desired level.

4.3.2.1 Controls include:

4.3.2.1.1 Limiting the amount of time workers spend performing the task or activity

4.3.2.1.2 The use of specialized tools to the extent possible

4.3.2.1.3 Enforcement of specific written procedures that outline the steps to safely work with the heat producing equipment.

4.3.3 Protective Equipment - should be implemented after it has been determined that engineering and administrative controls can not reduce heat exposures to the desired levels.

4.3.3.1 Protective equipment includes:

4.3.3.1.1 Heat resistant gloves and clothing

4.3.3.1.2 Respiratory protection.

5. Safety Information.

5.1 Eyebaths and Safety Showers:

5.1.1 Where eyes or body of any person can be exposed to injurious, corrosive or highly hazardous chemicals, or where these chemicals are used or stored in the workplace, facilities for the quick drenching of eyes and the body are required.

5.1.1.1 Equipment must meet the requirements of the American National Standards Institute (ANSI) for Eyebaths and Safety Showers ANSI Z358.1

5.1.2 Employees will be trained in the use of emergency eyebaths and safety showers, as needed or required.

5.2 Types of Burns:

5.2.1 Correct assessment of a burn's severity is one of the first critical steps in properly treating and managing the injury. Burns are classified both by their depth and amount of body surface area injured. First, second, and third degree burns identify the layers

of skin damaged while the terms minor, moderate and critical describe both the depth and extent of the tissue injured.

5.2.1.1 First-degree burns. These are burns involving only the outer layers of the epidermis. Characterized by redness, itching, and burning, these burns are generally considered minor and don't require the attention of a physician. Mild sunburns are typical first-degree burns.

5.2.1.2 Second-degree burns. These are burns that damage both the epidermis and the dermis (second layer of skin). These burns cause blisters and are prone to infection, often requiring medical attention. Second-degree burns are also sub-classified as superficial or deep dermal depending on the extent of injury. Burns are also described by their cause, such as thermal, chemical, electrical, radiation, and flash.

5.2.1.3 Third-degree burns. These are burns that destroy both the epidermis and the dermis. These burns are distinguished by their dry surface and pearly white or charred appearance. Third-degree burn patients often experience no pain following their injury because nerve endings are impaired. Third-degree burns always require the attention of a hospital burn center.

5.2.1.4 Thermal (heat burns). These are burns that are caused by contact with substances at temperatures above the boiling point of water. These burns often occur in conjunction with other types of burns.

5.2.1.5 Chemical burns. These are burns that are caused by contact with materials such as sodium hydroxide, phenol, sulfuric or hydrochloric acid. These corrosive substances generate heat, creating a thermal burn in addition to a chemical burn.

5.2.1.6 Electrical burns. These are burns that are common among gas and electrical workers and are also considered thermal burns because heat is created while the current passes through the body. These burns are more treacherous than they first appear because the body conducts the electrical current to the heart, muscular and vascular system causing extensive internal damage. Because they may be electrocuted themselves, bystanders are strongly cautioned against touching these types of burn victims until the electrical source has been removed.

5.2.1.7 Sun-burns. These are the most common type of radiation burns. Other sources of ultraviolet or nuclear radiation can also cause burns.

5.2.1.8 Flash-burns. These are burns that are usually minor cornea injuries, the consequences of looking directly into an extremely bright light. Welders and those working with high-powered electrical equipment often experience this syndrome. Flash burn symptoms include watery eyes, searing pain and photophobia (a marked sensitivity to light), occurring four to six hours following the injury. Although flash burns are regarded as more of an annoyance than a serious injury, prolonged exposure to a

powerful light source without protective eyewear can result in permanent blindness.

6. Training and Information.

6.1 Employees will be trained in:

6.1.1 How to summon emergency medical assistance.

6.1.2 The use of emergency eyebaths and safety showers, as needed or required.

6.1.3 The use of personal protective equipment and other controls required to reduce heat exposure levels.

6.1.4 The basic first aid treatment of the various types of burns if they work with heat exposure hazards, as needed or required.

6.2 On-site emergency response personnel will be trained (and certified) by the American Red cross in basic first aid or EMT level response, and annually in the requirements of the Bloodborne pathogens standard. Certifications must be maintained appropriately.

7. Definitions.

- *EMT* – Emergency Medical Technician.

PROGRAM OVERVIEW

FLAMMABLE AND COMBUSTIBLE LIQUIDS SAFETY PROGRAM

REGULATORY STANDARD: OSHA - 29 CFR 1910.106-108
OSHA - 29 CFR 1926.152
NFPA 30 Flammable and Combustible Liquids Code
NFPA 45 Fire Protection for Laboratories using Chemicals

INTRODUCTION: General requirements for the handling and storing of flammable and combustible liquids. This program details the requirements for venting, grounding and bonding, and labeling containers. It defines the requirements for spill and fire control and establishes training requirements.

TRAINING:

- Any employee working in a bulk storage area (>25 gallons which is not stored inside an approved cabinet) or who dispenses flammable or combustible liquids must understand the hazard potential and protective measures to be taken. Training must occur upon initial assignment and as changes occur that increase exposures.

ACTIVITIES:

- Evaluate operations for presence of flammable and combustible liquids
- Determine and implement correct storage requirements
- Determine protective measures and emergency response procedures
- Ensure containers are clearly labeled and inspected before use
- Arrange for appropriate waste disposal

FORMS:

- Program Assessment
- Training Attendance Roster

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Flammable and Combustible Liquids Safety Program

1. Purpose. The provisions in this program are intended to reduce the hazard associated with the handling, use and storage of flammable and combustible liquids to a degree consistent with reasonable safety. Compliance with this standard does not eliminate all hazards in the use flammable and combustible liquids. The company will review and evaluate this safety program:

1.1 On annual basis, or more frequently as needed.

1.2 When changes occur to 29 CFR 1910.106 that prompt revision of this document.

1.3 When facility operational changes occur that require a revision of this document.

1.4 When there is an accident or close call that relates to this topic.

2. Scope. The program applies to all locations where flammable and combustible liquids are used, handled or stored at company facilities and company job-sites.

3. Responsibilities.

3.1 Management/Supervisors:

3.1.1 Determine if a flammable storage room is legally necessary. It is allowable to maintain up to 25 gallons of Class IA flammable liquids 120 gallons of Class 1B, 1C, II or III liquids in containers 660 gallons of Class 1B, 1C, II or III liquids in a single portable tank in any one-fire area.

3.1.2 Ensure that all storage and dispensing locations have detailed written emergency instructions for each location. Each instruction will detail the emergency actions to be taken in the event of fire, spill, leak, power failure, failure of any safety system (including detection/monitoring and ventilation systems) and any other emergency condition affecting the safe operation of the area.

3.1.3 Ensure that written emergency instructions and appropriate signs are posted at the entrance to all storage and dispensing location, or in a conspicuous manner in the area.

3.1.4 Assure that arrangements are made with qualified emergency response agencies or with employees who are trained in emergency first-responder and spill clean up.

3.1.5 Train employees and staff members in the procedures to be followed, the hazards of the materials, and any emergency response duties they may be required to perform.

3.1.6 Ensure containers, tanks and other storage vessels are properly labeled.

3.1.7 Ensure storage rooms and containers meet the requirements.

3.1.8 Ensure dispensing of liquids is performed properly.

3.1.9 Provide spill control and fire control systems for the storage and dispensing areas.

3.1.10 Provide adequate secondary containment for tanks and storage drums (or other bulk containment vessels) as needed or required.

3.2 Employees:

3.2.1 Handle flammable and combustible liquids in accordance with written procedures and this program.

3.2.2 Label containers and tanks, as needed or required.

3.2.3 Perform spill or fire control procedures, as training and responsibilities require.

3.3 Safety Officer (as needed or required):

3.3.1 Assist in the development and implementation of this program.

4. Procedure.

4.1 Handling of Flammable and Combustible Liquids (General Requirements):

4.1.1 Flammable liquids will be kept in covered containers when not actually in use

4.1.2 There will be no open flames or other sources of ignition within the vapor path of any flammable or combustible chemical used on company premises.

4.1.3 Transfer of liquids will be accomplished by using a closed piping system, by gravity through a self-closing valve, or by safety cans.

4.1.4 The quantity of flammable and combustible liquids in any area should not exceed the amount required for one day or one shift or 120 gallons (NFPA 33).

4.1.5 *NO SMOKING* signs will be posted in all locations where flammable or combustible liquids are used or stored. Supervisors will strictly enforce this policy.

4.1.6 The transfer of flammable liquids will be done using appropriate bonding and grounding of containers.

4.1.7 Containers supplying spray nozzles (i.e., spray guns, etc.) will be kept closed.

4.1.8 There will be no sources of ignition (flame or spark producing) in any area where flammable liquids are used, or within 20 ft. unless separated by a partition.

4.1.9 Hot surfaces (steam pipes, etc.) will not be located in areas where combustible residues may accumulate without approved fire protection controls.

4.1.10 Electrical equipment located within areas where combustible residues may accumulate will be approved for Class I Div 1 locations. Electrical equipment adjacent to a spraying area in areas where combustible residues may accumulate and not separated by a partition will be approved for Class I Div 2 locations.

4.1.11 Portable lamps will not be used in any spraying area unless it is specifically designed for a maintenance operation. If used for maintenance, they must intrinsically safe and conform to Class I Div 1 locations.

4.1.12 Areas using Class I liquids will be ventilated at a rate of not less than one cubic foot per minute per sq. ft. of floor area.

4.1.13 Maintenance operations involving hot work or the use of spark producing tools may be done if the area has been proven safe (see hot work/welding safety procedures) and the work is supervised.

4.1.14 Housekeeping, i.e., cleaning of spills and leakage control. These requirements will be closely monitored. Supervisors will strictly control housekeeping in areas where flammable and combustible liquids are used or stored.

4.1.15 Waste or residue will be stored in approved covered metal containers.

4.1.16 Flammable liquids must be kept in covered containers when not actually in use.

4.1.17 Where flammable or combustible liquids are used or handled, except in closed containers, means will be provided to dispose promptly and safely of leakage or spills.

4.1.18 Class I liquids may be used only where there are no open flames or other sources of ignition within the possible path of vapor travel.

4.1.19 Storage Cabinets (Approved and Listed with no modifications)

4.1.19.1 Sprinklers are not required.

4.1.19.2 No more than three cabinets per fire area.

4.1.19.3 Cabinets shall be stable and pose no potential of overturning.

4.1.19.4 Ventilation – may be required under certain conditions. Open containers or venting of containers may require ventilation, due to the Lower Explosive Limit (LEL) potential or possible health risks. If venting is required, see NFPA 30 for details. If no venting is required, the vent openings should be kept tightly capped with the metal bungs provided for this purpose.

4.1.19.5 Grounding is not required unless dispensing operations are present or where conditions exist that could result in the concentration of vapors.

4.1.20 Open steel shelving - Solvents in approved safety cans only.

Container Type	Flammable Liquids			Combustible Liquids	
Class:	1A	1B	1C	II	III
Glass	1 pt	1qt	1 gal	1 gal	5 gal
Safety Can	2 gal	5 gal	5 gal	5 gal	5 gal
Metal Drum DOT Spec	60 gal	60 gal	60 gal	60 gal	60 gal
*Class IA and Class IB liquids may be stored in glass containers of not more than one-gallon capacity only if the required purity would be affected by storage in metal containers or if the liquid would cause excessive corrosion of the metal container.					

4.2 Tank Storage (Bulk Storage Above and Below Ground):

4.2.1 Bulk Storage. Bulk storage of flammable or combustible liquids requires a hazard assessment be conducted to determine specific requirements. Some general rules for each class of chemical include:

4.2.1.1 Class I liquids may be stored in closed containers or in storage tanks above ground outside of buildings or underground and maintained in accordance with OSHA, EPA, NFPA and DOT requirements. A site-specific assessment must be made.

4.2.1.2 Class II and III liquids may be stored in containers or tanks within buildings or in above- or below-ground tanks outside of buildings and maintained in accordance with OSHA, EPA, NFPA and DOT requirements. A site-specific assessment must be made.

4.2.1.3 If rooms containing Class I liquids are heated it will be done by the use of steam or hot water or other approved intrinsically safe method. A site-specific assessment must be made.

4.2.1.4 Ventilation will be provided for all pumping and dispensing operations taking place within a room. This applies to Class I liquids only. If natural ventilation is not adequate then mechanical ventilation must be used. A site-specific assessment must be made.

4.2.2 Aboveground Tanks. Local fire inspection personnel will be consulted when determining aboveground tank placement and fire control configurations.

4.2.2.1 Spacing (shell-to-shell) between aboveground tanks.

4.2.2.1.1 The distance between any two flammable or combustible liquid storage tanks must not be less than 3 feet.

4.2.2.1.2 The distance between any two adjacent tanks must not be less than one-sixth the sum of their diameters. When the diameter of one tank is less than one-half the diameter of the adjacent tank, the distance between the two tanks must not be less than one-half the diameter of the smaller tank.

4.2.2.1.3 Where crude petroleum in conjunction with production facilities are located in non-congested areas and have capacities not exceeding 126,000 gallons (3,000 barrels), the distance between such tanks must not be less than 3 feet.

4.2.2.1.4 Where unstable flammable or combustible liquids are stored, the distance between such tanks must not be less than one-half the sum of their diameters.

4.2.2.1.5 When tanks are compacted in three or more rows or in an irregular pattern, greater spacing or other means must be provided so that inside tanks are accessible for firefighting purposes.

4.2.2.1.6 The minimum separation between a liquefied petroleum gas container and a flammable or combustible liquid storage tank must be 20 feet, except in the case of flammable or combustible liquid tanks operating at pressures exceeding 2.5 p.s.i.g. or equipped with emergency venting which will permit pressures to exceed 2.5 p.s.i.g. Suitable means must be taken to prevent the accumulation of flammable or combustible liquids under adjacent liquefied petroleum gas containers such as by diversion curbs or grading. When flammable or combustible liquid storage tanks are within a diked area, the liquefied petroleum gas containers must be outside the diked area and at least 10 feet away from the centerline of the wall of the diked area. The foregoing provisions must not apply when liquefied petroleum gas containers of 125 gallons or less capacity are installed adjacent to fuel oil supply tanks of 550 gallons or less capacity.

4.2.2.2 Normal venting for aboveground tanks.

4.2.2.2.1 Atmospheric storage tanks must be adequately vented to prevent the development of vacuum or pressure sufficient to distort the roof of a cone roof tank or exceeding the design pressure in the case of other atmospheric tanks, as a result of filling or emptying, and atmospheric temperature changes.

4.2.2.2.2 Normal vents must be sized either in accordance with The American Petroleum Institute Standard 2000 (1968), Venting Atmospheric and Low-Pressure Storage Tanks; or other accepted standard.

4.2.2.2.3 Must be at least as large as the filling or withdrawal connection, whichever is larger but in no case less than 1 1/4 inch nominal inside diameter.

4.2.2.2.4 Low-pressure tanks and pressure vessels must be adequately vented to prevent development of pressure or vacuum, as a result of filling or emptying and atmospheric temperature changes, from exceeding the design pressure of the tank or vessel. Protection must also be provided to prevent overpressure from any pump discharging into the tank or vessel when the pump discharge pressure can exceed the design pressure of the tank or vessel.

4.3 Warehousing (Bulk Storage not in Tanks):

4.3.1 General. Flammable and combustible liquids storage rooms where dispensing does not occur is called Warehousing. The following considerations (as a minimum) apply:

4.3.1.1 Access Ways to Permit Approach of Fire Control Apparatus

4.3.1.2 Alerting/warning systems

4.3.1.3 Chemical compatibility

4.3.1.4 Emergency evacuation

4.3.1.5 Emergency rescue

4.3.1.6 Emergency response by firefighters

4.3.1.7 Fire suppression systems

4.3.1.8 Ingress and Egress

4.3.1.9 Intrinsically safe lighting, ventilation, heating and other equipment

4.3.1.10 Recovery actions

4.3.1.11 Signage

4.3.1.12 Sources of ignition

4.3.1.13 Spacing and quantity limitations

4.3.1.14 Spill containment and control measures

4.3.1.15 Written emergency safety programs and procedures

4.3.2 Storage Rooms or Areas.

FIRE PROTECTION	FIRE RESISTANCE	MAXIMUM FLOOR AREA	TOTAL ALLOWABLE QTY PROVIDED GALS/SQ FT/FLOOR AREA
YES	2 Hour	500 sq. ft.	10
NO	2 Hour	500 sq. ft.	4
YES	1 Hour	150 sq. ft.	5
NO	1 Hour	150 sq. ft.	2
Note: Fire protection system will be sprinkler, water spray, carbon dioxide, or other approved system.			

4.3.2.1 Where openings to other rooms or buildings exist, they will be provided with noncombustible liquid tight raised sills or ramps at least 4 in. in height or the room will be 4 in. below the surrounding floor or an open grated trench draining to a safe location will be used.

4.3.2.2 Openings to rooms will be provided with approved self-closing fire doors. (Doors may be left open during material handling operations if they are designed to close automatically in a fire).

4.3.2.3 Windows, if any, will be fire windows and will be designed to close automatically in a fire.

4.3.2.4 Wiring and equipment located inside the storage room will be approved for Class I of flammable or combustible liquid stored.

4.3.2.5 The ventilation inside the room will configured to provide at least six air changes per hour. This will be accomplished either by gravity or mechanical exhaust. Note: If no mechanical exhaust is provided, then it is almost certain that the required exchange rate is not being met. All storage rooms will be reviewed to ensure an air inlet exists and additional NFPA guidelines for proper design.

4.3.2.6 If mechanical ventilation exists, it will be controlled by a switch located outside the door. The ventilation and lighting fixtures will be operated by the same switch.

4.3.2.7 If Class I flammables are dispensed, a pilot light (indicator light at switch) will be installed adjacent to the switch to confirm live voltage to the circuit.

4.3.2.8 An aisle of at least three feet wide will be maintained for ease of ingress and egress, separation of materials, fire safety and movement of materials.

4.3.2.9 Containers over 30 gallons capacity will not be stacked.

4.3.2.10 Dispensing will be accomplished with the use of approved pumps or if by gravity, then through a self-closing valve.

4.3.2.11 A fire extinguisher will be located outside the door of the room.

4.3.2.12 No smoking or open flames are allowed in flammable and combustible liquids storage areas.

4.3.2.13 Water-reactive materials will not be stored in the same room as flammable and combustible liquids.

4.3.2.14 Adequate warning signs will be installed as required.

4.3.2.15 Class I flammable liquids will not be permitted in basement areas.

4.3.3 Storage Inside Buildings.

4.3.3.1 General. Containers in piles must be separated by pallets or equivalent means to provide stability and to prevent stress on container walls. Portable tanks stored over one tier high must be designed to nest securely and adequate materials handing equipment must be available to handle tanks safely at the upper tier level.

4.3.3.2 Egress, Access and Fire Protection. Flammable or combustible liquids must not be stored so as to limit use of exits, stairways, or areas normally used for the safe egress of people. Aisles of at least 3 feet wide must be provided where necessary for reasons of access to doors, windows or standpipe connections. No pile may be closer than 3 feet to the nearest beam, chord, girder, or other obstruction, and must be 3 feet below sprinkler heads or other overhead fire protection systems.

4.3.3.3 Containers. The storage of flammable or combustible liquids in containers or portable tanks must comply with 29 CFR §1910.

4.3.3.4 Office areas. Storage is prohibited except where required for maintenance and operation of building and operation of equipment. Such storage must be kept in closed metal containers stored in a storage cabinet or in safety cans or in an inside storage room not having a door that opens into that portion of the building used by the public.

4.3.3.5 Leaking containers. Leaking containers must be removed to a storage room or taken to a safe location outside the building and the contents transferred to an undamaged container.

4.3.4 The maximum allowable size of containers is as follows:

CONTAINER TYPE	FLAMMABLE LIQUIDS			COMBUSTIBLE LIQUIDS	
	Class IA	Class IB	Class IC	Class II	Class III
Glass or approved plastic:	1 pt	1 qt	1 gal	1 gal	1 gal
Metal (other than DOT drums):	1 gal	5 gal	5 gal	5 gal	5 gal
Safety cans:	2 gal	5 gal	5 gal	5 gal	5 gal
Metal drums (DOT specifications):	60 gal	60 gal	60 gal	60 gal	60 gal
Approved portable tanks:	660 gal	660 gal	660 gal	660 gal	660 gal

4.3.5 Storage in Outside Buildings.

4.3.5.1 Where quantity stored exceeds 1,100 gallons, a minimum distance of 10 feet between buildings and nearest container of flammable or combustible liquid must be maintained.

4.3.5.2 Spill containment. The storage area must be graded in a manner to divert possible spills away from buildings or other exposures or must be surrounded by a curb at least 6 inches high. When curbs are used, provisions must be made for draining of accumulations of ground or rainwater or spills of flammable or combustible liquids. Drains must terminate at a safe location and must be accessible to operation under fire conditions.

4.3.5.3 Security. The storage area must be protected against tampering or trespassers where necessary and must be kept free of weeds, debris and other combustible material not necessary to the storage.

4.3.5.4 If the storage building is located 50 feet or less from a building or line of adjoining property that may be built upon, the exposing wall must be a blank wall having a fire-resistance rating of at least 2 hours.

4.4 Drum Storage (6-55 gallon):

4.4.1 General considerations. Accidents may occur during handling of drums and other flammable and combustible liquids containers. Hazards include detonations, fires, explosions, vapor generation and physical injury resulting from moving heavy containers by hand and working around stacked drums, powered industrial trucks and deteriorated drums. While these hazards are always present, proper work practices, such as minimizing handling and using equipment and procedures that isolate workers from such hazardous substances, can minimize the risks to employees.

4.4.2 Inspection requirements.

4.4.2.1 The appropriate procedures for handling drums depend on the drum contents. Thus, prior to any handling, drums should be visually inspected to gain as much information as possible about their hazards. Things to look for include:

4.4.2.1.1 Symbols, words, or other marks on the drum indicating that it contains flammable or combustible liquids.

4.4.2.1.2 Signs of deterioration such as corrosion, rust and leaks.

4.4.2.1.3 Signs that the drum is under pressure such as swelling and bulging.

4.4.2.1.4 Drum type.

4.4.2.1.5 Configuration of the drumhead.

4.4.2.1.6 Chemical compatibility with other chemicals in the area.

4.4.3 Handling drums. The following procedures can be used to maximize worker safety during drum handling and movement:

4.4.3.1 Personnel should be trained in proper lifting and moving techniques to prevent back injuries.

4.4.3.2 Ensure powered industrial trucks used in the movement of the materials have a rated load capacity high enough to handle the anticipated loads, and make sure the vehicle can operate smoothly on the available road surface.

4.4.3.3 Before moving anything, determine the most appropriate sequence in which the various drums and other containers should be moved. For example, small containers may have to be removed first to permit entry and movement of drums.

4.4.3.4 Ensure that operators have a clear view when carrying drums. Where necessary, have workers available to guide the operator's motion.

4.4.4 Bulging Drums.

4.4.4.1 Pressurized drums are extremely hazardous. Wherever possible, do not move drums that may be under internal pressure, as evidenced by bulging or swelling.

4.4.4.2 If a pressurized drum has to be moved, whenever possible handle the drum with a grappler unit constructed for explosive containment. Either move the bulged drum only as far as necessary to allow seating on firm ground, or carefully over pack the drum. Exercise extreme caution when working with or adjacent to potentially pressurized drums.

4.4.5 Leaking, Open and Deteriorated Drums. If a drum containing a liquid cannot be moved without rupture, immediately contact your supervisor or manager. The emergency response team will be summoned for any spill condition.

4.4.6 Grounding and bonding. Buildup of static electricity charges on containers and people is a dangerous source of sparks that can touch off flash fires wherever flammable liquids are being transferred or used.

4.4.6.1 Grounding. A readily accessible connection to an earth ground will be installed in all company storage and dispensing areas.

4.4.6.2 Bonding. A readily accessible connection from a grounded drum to a container being filled will be installed on all drums or bulk containers used to dispense flammable or combustible liquids. This procedure is not necessary when self-bonding containers are used. If it is unclear if the container is self-bonding, use a bonding strap in the dispensing process.

4.4.7 Drip pans. Drip pans should be positioned below each drum faucet to catch spills or any possible drippings from a worn or damaged faucet.

4.4.8 Drum venting. Drums containing flammable or combustible liquids will be vented to relieve pressure buildup due to heat and also to prevent creation of a vacuum when liquid is being drained off or the drum is subjected to sudden cooling.

4.4.9 Drum faucets. Drum faucets will be of the self-closing type. Non self-closing types will not be used by the company.

4.5 Flammable Liquid Storage Cabinet Requirements:

4.5.1 Maximum capacity. Not more than 60 gallons of Class I or Class II liquids, or more than 120 gallons of Class III liquids may be stored in a storage cabinet.

4.5.2 Fire resistance. Storage cabinets used by the company must be designed and constructed to meet NFPA 251-1969 requirements.

4.5.3 Labeling. Cabinets must be labeled in conspicuous lettering, "Flammable - Keep Fire Away."

4.5.4 ONLY approved flammable liquid storage cabinets shall be used. Approvals must be from a nationally recognized testing laboratory such as FM or UL.

4.5.5 Inspections shall be performed to ensure good housekeeping practices, that stored materials are compatible, and that quantities are not exceeded.

4.5.6 Do not drill holes in the cabinet, or otherwise modify the cabinet. Sprinkler protection for the interior of the rated flammable liquids storage cabinets will not be required if the area for which the cabinet and its location conforms with NFPA 13, NFPA 30 and insurance carrier requirements.

4.5.7 Storage Capacity.

Storage	Maximum Quantity
Safety Can	5 Gallons or less
Safety Can on Open Steel Shelving (area must be splinklered)*	25 Gallons or less, Class IA Liquid
Flammable Cabinet	120 gallons total per cabinet. No more than 3 cabinets per fire area. Limited to 60 Gallons or less of Class IA Liquid
Flammable Liquid Storage Room	Amounts normally approved by Insurance Carrier

Note: For complete limits, refer to 29CFR1910.106 or NFPA30

4.5.8 Deviations - Any exceedance from the above quantity guidelines shall require a formal safety review with the potential inclusion of the company's insurance carrier. Any deviation from regulatory compliance shall be approved and documented by the Authority Having Jurisdiction.

4.5.9 Where the use and handling of flammable or combustible liquids is only incidental to the principal business, the quantity of liquid that may be located outside of a flammable storage cabinet in any one fire area of a building shall not exceed 25 gallons of Class IA liquids in approved containers or 120 gallons of Class IB, IC, II, or III liquids in approved containers.

4.6 Small Container Storage (5 gallon or less):

4.6.1 Static Bonding and Grounding

4.6.1.1 Ensure safety cans are provided and used, as appropriate.

4.6.1.2 Ensure all containers are electrically boded and grounded to prevent static spark discharges whenever flammable or combustible liquids are transferred.

4.6.1.3 Ensure electrical bond is made before any filling holes are opened or the flow started. Maintain bond until flow is completed and all filling holes are closed.

4.6.2 Transfer of Flammable/Combustible Liquids

4.6.2.1 Use gravity flow or an approved pump to transfer flammable or combustible liquids. The use of compressed air in the container is prohibited.

4.6.3 Labeling

4.6.3.1 All dedicated safety cans shall display the name of the contents, either painted on or by use of pressure sensitive labels.

4.6.3.2 An HMIS or NFPA chemical hazard labels shall be affixed to all safety cans.

4.6.3.3 Safety cans that are filled at a central dispensing station should be labeled with the can user's work area location and telephone number.

4.6.4 Storage

4.6.4.1 Open Shelf storage of safety cans containing flammable or combustible liquids is permissible. Departments must contact their safety representative for prior review of location and quantity limitations.

4.6.4.2 Flammable Liquid Storage Cabinets, if used, shall be installed in compliance with all federal, state and local regulatory guidelines. Local safety professionals can assist in this compliance review.

4.6.5 Waste Disposal

4.6.5.1 For disposal information refer to the EPA or equivalent State Department Website, or contact your local safety representative.

4.6.6 Inspection

4.6.6.1 Before each filling, inspect the can to determine if it:

4.6.6.1.1 Is approved

4.6.6.1.2 Has a closure that operates properly (spring, tension, and alignment).

4.6.6.1.3 Has a correct content-identification label, if a dedicated can.

4.6.6.1.4 Has an appropriate chemical hazard label.

4.6.6.1.5 Is labeled with the user's work are location and telephone number, where applicable.

4.6.6.1.6 Has all required parts, including flame arrestors. If flame arrestor has been removed, the can no longer has a listing and must be removed from service.

4.6.6.1.7 Is free of dents or evidence of corrosion that could interfere with safe and proper use.

4.6.6.2 Inspect waste liquid cans EACH TIME they are emptied.

4.6.7 Testing for Leaks

4.6.7.1 After filling a safety can, check for leaks at seams (Check for accumulation of moisture along all welded joints) and leaks from gaskets.

4.6.8 Defective Equipment

4.6.8.1 Tag any can that fails to pass inspection and/or testing with a "DEFECTIVE EQUIPMENT" tag and remove from service until repairs are made. If repair of the defect is prohibited or is not feasible or satisfactory, render the can unusable and ship to metal salvage.

4.6.9 Repairs

4.6.9.1 Repairs to safety cans shall not be made, including soldering or flattening of dents. New cans should be purchased.

4.6.9.2 Any modification of a safety can will result in the loss of the cans' listing.

4.6.10 Types of Safety Cans

4.6.10.1 Plastic cans are not approved for use except as waste solvent containers for highly corrosive service. Any other use requires prior approval of the local safety provider or the Fire and Emergency Services provider. Plastic cans in use must not be transported outside the building.

4.6.10.2 Bench-top cans are used for saturating sponges and wiping cloths, cleaning small parts, and for moistening swabs. The spring mounted flame arrestor and dasher is depressed by hand to provide access to the fluid. Upon release, it returns to the normal position and excess fluid drains back into the can.

4.6.10.2.1 Gloves, compatible with the liquid in the bench-top can, should be worn. Safety representatives can assist in selecting the appropriate gloves.

4.6.10.2.2 Except for the plunger can, cover all bench-top cans containing liquids when not in use, to minimize escape of vapors.

4.6.10.3 Dispensing cans are equipped with nozzles or faucets to facilitate pouring liquids into containers with small fill openings

4.6.10.4 Storage cans have only one opening for both filling and pouring, and are used mainly for temporary storage and for pouring liquids into containers with large fill openings.

4.6.10.5 Viscous-Liquid Cans are not equipped with a flame arrestor. Approvals are limited to storing and dispensing viscous fluids (e.g. adhesives) or suspensions (e.g. emulsions) which would clog a flame-arresting screen.

4.6.10.6 Waste-Liquid cans are used for the accumulation and disposal of flammable or combustible liquid waste material. The cans are equipped with a latch to keep the fill cap open while adding waste material. The latch must be released immediately thereafter to prevent escape of vapors. Cans used for the disposal of viscous fluids or suspensions may have the flame arrestor removed.

4.7 Dispensing of Liquids into Approved Containers

4.7.1 Any container into which flammable or combustible liquids are dispensed, must be of an approved type.

4.7.2 Class I and Class II liquids shall be drawn from or transferred into vessels, containers, or portable tanks within a building from:

4.7.2.1 Original shipping containers with a capacity of 5 gal. (18.92 L) or less.

4.7.2.2 Safety cans.

4.7.2.3 Closed piping systems.

4.7.2.4 Portable tank or container by means of a device drawing through an opening in the top of the tank or container.

4.7.2.5 A listed self-closing valve or self-closing faucet by gravity.

4.7.2.6 Transferring by air pressure is prohibited.

4.7.3 Design, construction and capacity of flammable liquids storage cabinets shall be listed on the equipment. Those liquids not having a designation shall be listed as "U" and treated as Class 1A/F-4. Grounding and bonding of containers is required for all dispensing activities.

4.7.4 Flammable or combustible liquids must be drawn from or transferred into vessels, containers, or portable tanks within a building 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 through an approved self-closing valve. Transferring by means of air pressure on the container or portable tanks is prohibited.

5. Safety Information.

5.1 Spill Control:

5.1.1 Spill control equipment will be maintained in each area where storage and/or dispensing is conducted. This equipment will include as a minimum:

5.1.1.1 Spill Control Broom

5.1.1.2 Chemical Neutralizers

5.1.1.3 Personnel Protective Equipment

5.1.1.4 Absorbent Pads

5.1.1.5 Shovels, Brooms, Mops, Pails

5.1.2 Employee trained in spill response and control measures are authorized to use spill control equipment as needed or required, to contain or control and clean up spills of flammable or combustible liquids.

5.1.3 Employees not trained in spill response and control measures will summon the appropriate person or agency to provide containment, control and clean up.

5.1.4 Spilled materials are generally considered as waste and may need to be disposed of as a hazardous waste and may need special controls, documentation and procedures.

5.2 Fire Control:

5.2.1 Portable and special equipment. Portable fire extinguisher and control equipment must be provided in such quantities and types as are needed for the special hazards of operation and storage. At least one portable fire extinguisher having a rating of not less than 12-B units must be located outside of, but not more than 10 feet from, the door opening into any room or area used for storage

5.2.2 Sprinklers. When sprinklers are provided, they will be installed in accordance with NFPA requirements. Water must be available in volume and at adequate pressure to supply water hose streams, foam-producing equipment, automatic sprinklers, or water spray systems as the need is indicated by the special hazards of operation, dispensing and storage.

5.2.3 Special extinguishers. Special extinguishing equipment such as that utilizing foam, inert gas, or dry chemical must be provided as the need is indicated by the special hazards of operation dispensing and storage. Materials that will react with water must not be stored in the same room with flammable or combustible liquids.

5.2.4 Distance and Spacing Requirements.

5.2.4.1 Within 200 ft. of each portable tank, there must be a 12-ft. wide access way to permit approach of fire control apparatus.

5.2.4.2 The distances listed apply to properties that have protection for exposures as defined. If there are exposures, and such protection for exposures does not exist, the distances in column 4 must be doubled.

5.2.4.3 When total quantity stored does not exceed 50 percent of maximum per pile, the distances may be reduced 50 percent, but not less than 3 ft.

5.2.5 Open flames and smoking. Open flames, ignition sources and smoking is not be permitted in flammable or combustible liquid storage areas.

5.3 Drainage and Ventilation:

5.3.1 Drainage.

5.3.1.1 Emergency drainage systems will be provided to direct flammable or combustible liquid leakage and fire protection water to a safe location. This may require curbs, scuppers, or special drainage systems to control the spread of fire.

5.3.1.2 Emergency drainage systems, if connected to public sewers or discharged into public waterways, will be equipped with traps or separator.

5.3.2 Ventilation.

5.3.2.1 Class I liquids must be ventilated at a rate of not less than 1 cubic foot per minute per square foot of solid floor area. This must be accomplished by natural or mechanical ventilation with discharge or exhaust to a safe location outside of the building. Provision must be made for introduction of makeup air in such a manner as not to short circuit the ventilation. Ventilation must be arranged to include all floor areas or pits where flammable vapors may collect.

5.3.2.2 Equipment used in a building and the ventilation of the building must be designed so as to limit flammable vapor-air mixtures under normal operating conditions to the interior of equipment, and to not more than 5 feet from equipment which exposes Class I liquids to the air.

5.3.3 Maintenance. All fire protection systems will be adequately maintained and periodically inspected and tested to make sure they are always in satisfactory operating condition, and they will serve their purpose in time of emergency.

5.3.4 Sources of Ignition.

5.3.4.1 Adequate precautions must be taken by all employees' to prevent the ignition of flammable vapors. Sources of ignition include but are not limited to open flames; lightning; smoking; cutting and welding; hot surfaces; frictional heat; static, electrical, and mechanical sparks; spontaneous ignition, including heat-producing chemical reactions; and radiant heat.

5.3.5 Grounding. Class I liquids must not be dispensed into containers unless the nozzle and container are electrically interconnected.

5.4 Special Hazards:

5.4.1 Where the need is indicated by special hazards of operation, flammable or combustible liquid processing equipment, major piping, and supporting steel must be protected by approved water spray systems, deluge systems, approved fire-resistant coatings, insulation, or any combination of these.

5.5 Classes of Flammable and Combustible Liquids:

5.5.1 FLAMMABLE LIQUIDS are defined as liquids having flash points below 100F (37.8C) and a vapor pressure not exceeding 40 psia (276 kPA, 2.76 bar) at 100F (37.8C).

5.5.1.1 Flammable liquids are Class I liquids, and are subdivided as follows:

5.5.1.1.1 CLASS 1A LIQUIDS are those having flash points below 73F (22.8C) and a boiling point below 100F (37.8C).

5.5.1.1.2 CLASS 1B LIQUIDS are those having flash points below 73F (22.8C) and boiling points at or above 100F (37.8C).

5.5.1.1.3 CLASS 1C LIQUIDS are those having flash points at or above 73F (22.8C) and below 100F (37.8C).

5.5.2 COMBUSTIBLE LIQUIDS are liquids having flash points at or above 100F (37.8C).

5.5.2.1 Combustible liquids are either Class II or Class III liquids and are subdivided as follows:

5.5.2.1.1 CLASS II LIQUIDS are those having flash points at or above 100F (37.8C) and below 140F (60C).

5.5.2.1.2 CLASS IIIA LIQUIDS are those having flash points at or above 140F (60C) and below 200F (93.4C).

5.5.2.1.3 CLASS IIIB LIQUIDS are those having flash points at or above 200F (93.4C).

NFPA rating	Flash Point	Boiling Point
IA	<73F	<100F
IB&IC	<73F/>73F	>100F/<100F
II & IIIA	>100F but <200F	NA
IIIB	>200F	NA

Container Size				
NFPA	Glass	Safety Cans	Metal Drums	Approved Metal Tank
IA	1 PINT	2 GALLON	60 GALLON	660 GALLON
IB&IC	1 QUART	5 GALLON	60 GALLON	660 GALLON
II & IIIA	1 GALLON	5 GALLON	60 GALLON	660 GALLON
IIIB	5 GALLON	5 GALLON	60 GALLON	660 GALLON

NFPA	Incidental Use**	Storage in Cabinets
IA	25 GAL	60 GAL
IB&IC	120 GAL	60 GAL
II & IIIA	120 GAL	60 GAL
IIIB	120 GAL	120 GAL
** Store one shift's supply or the quantity in this table whichever is smaller		

5.6 Housekeeping:

5.6.1 General. Maintenance and operating practices must be in accordance with established procedures that will tend to control leakage and prevent the accidental escape of flammable or combustible liquids. Spills must be cleaned up promptly.

5.6.2 Access. Adequate aisles must be maintained for unobstructed movement of personnel and so that fire protection equipment can be brought to bear on any part of flammable or combustible liquid storage, use, or any unit physical operation.

5.6.3 Waste and residue. Combustible waste material and residues in a building or unit operating area must be kept to a minimum, stored in covered metal receptacles and disposed of daily.

5.6.4 Clear zones. Ground area around buildings and unit operating areas must be kept free of weeds, trash, or other unnecessary combustible materials.

5.7 Recordkeeping:

5.7.1 Records will be kept for the following items and duration(s)

5.7.1.1 Waste disposal information - 5 years or per State or Federal guidelines, whichever is longer.

5.7.1.2 Inspection reports (informal audits) – until superseded or a formal audit takes place, whichever is longer.

5.7.1.3 Audit reports (formal audits) – 3 years or until all corrective actions are completed, whichever is longer.

5.7.1.4 Training records – until superseded or for the duration of employee assignment.

6. Training and Information.

6.1 All employees working with flammable and combustible liquids will receive initial training applicable to their areas of responsibility. Training will establish employee proficiency in hazard control methods and procedures, as necessary.

6.2 Training includes:

6.2.1 Instruction in the purpose and use of applicable procedures. (Including employees are not directly affected by the use or storage of flammable and combustible materials but who require instruction about the procedures, and prohibitions relating to use and storage.)

6.2.2 Recognition and control of applicable hazards.

6.2.3 Use of personal protective equipment.

6.3 Training is performed:

6.3.1 Whenever there is a change in their job assignments, a change in equipment or processes that present a new hazard, or when there is a change in these procedures.

6.3.2 Whenever an audit or inspection reveals, or there is reason to believe, that there are deviations from or inadequacies in the employee's knowledge or use of these procedures.

7. Definitions.

- Fire Area - An area of a building separated from the remainder of the building by construction, having a fire resistance of at least 1 hr and having all communicating openings properly protected.

- Incidental Storage or use of Liquids - The use, handling and storage of liquids that is incidental to the operations. This can be further defined as the quantity of liquid that may be located outside of an inside liquid storage room or storage cabinet or in any one fire area of a building shall not exceed:
  - A supply for one shift, in safety cans or original shipping containers
  - 25 gallons of Class IA liquids in containers
  - 120 gallons of Class IB, IC, II, or III liquids in containers
  - Quantities for totes and portable tanks (Contact Insurance Carrier)

- Inside Liquid Storage Area - A room or building used for the storage of liquids in containers separated from other types of occupancies.

- Listed - Equipment or materials included in a list published by nationally recognized testing laboratories acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of listed approved equipment or materials and whose listing states either that the equipment or material meets appropriate standards or has been tested and found suitable for use in a specified manner.

- Safety Can - An approved, closed, metal container of not more than 5 gallons capacity, having a self-closing cap on the fill and pouring spouts, and may have a flame-arresting screen (viscous-liquid cans are not equipped with flame-arrestors and Waste-Liquid cans may have a latch to keep the fill cap open while adding waste material). The cap must be capable of safety relieving internal pressure when the can is exposed to fire or excessive heat.
  - Approved - Any container having the approval of Underwriters laboratory (UL) and or Factory Mutual (FM).
  - Closed - Sealed by means of a self-closing cap, so that neither liquid nor vapor will escape at ambient temperatures and pressures, or when tipped.
  - Flame-Arresting Screen - A perforated metal screen threaded into the fill and pouring spouts of safety cans to prevent ignition of the contents from external sources.
  - Self-Closing Cap Assembly - A gasket closure for the fill and pouring spouts. The cap is held open by applying hand-pressure on a spring-loaded lever and closes upon release.

- Storage Cabinets - Maximum Capacity. Not more than 60 gallons of Class I or Class II liquids nor more than 120 gallons of Class III liquids may be stored in a storage cabinet. The design and construction shall be based on 29 CFR 1910 Subpart H and NFPA-30. Not more than three storage cabinets shall be located in any one-fire area.

ARCITECHTURAL CONCRETE PLUS, LLC.

PROGRAM OVERVIEW

GENERAL SAFETY AWARENESS PROGRAM

REGULATORY STANDARD: *OSHA General Duty Clause*

INTRODUCTION: This program assists in establishing clear company goals and objectives for safety. It provides for the identification, evaluation and mitigation of safety hazards. It establishes employee training requirements and details general work rules, recordkeeping, emergency evacuation planning, audits and inspections and records retention.

TRAINING:

- Recommended training for an overview of workplace hazards.

ACTIVITIES:

- Ensure the workplace is maintained free of a hazard to which employees of the employer were exposed
- Inspect the workplace for hazards that are likely to cause death or serious physical harm
- Ensure processes are in place to correct hazards

FORMS:

- General Safety Rules
- New Employee Safety Orientation Training
- Training Attendance Roster
- Verification for Supply Requirements for First Aid Kits

Table of Contents

General Safety Awareness Program

1. Purpose. This document provides a written general safety program for the company. This program is designed to establish clear company goals and objectives and will be communicated to all employees.

2. Scope. Applies to all employees at company facilities and sites.

3. Responsibilities.

3.1 Area Management will:

3.1.1 Identify and evaluate any safety hazards.

3.1.2 Prioritize and address safety hazards based on risk level.

3.1.3 Scheduled and recorded assured equipment grounding conductor program on construction sites, covering all cord sets, receptacles which are not part of the permanent wiring of the building or structure, and equipment connected by cord and plug which are available for use or used by employees.

3.1.4 Provide reasonable solutions to reduce or eliminate recognized safety hazards.

3.1.5 Enforce federal, state and company safety rules and regulations in the workplace.

3.2 Employees will:

3.2.1 Report safety concerns and hazards to your Supervisor.

3.2.2 Participate in the resolution of the recognized safety hazards, as needed or required.

3.2.3 Conduct their work activities in a safe manner.

3.2.4 Abide by all the safety rules and regulation established by the company.

3.2.5 Assist in maintaining their work area in a clean and neat condition.

3.3 Safety Representative must (as needed):

3.3.1 Provide assistance to management in the resolution of recognized safety hazards.

4. Procedure.

4.1 General Work Rules:

4.1.1 General Duty Clause

4.1.1.1 OSHA's general duty clause states that companies must provide a place of employment that is free from recognized hazards.

4.1.1.2 Each employee is responsible to comply with the standards and regulations that are applicable to their work activities.

4.1.2 Housekeeping

4.1.2.1 Every safety management program includes standards for general housekeeping. Housekeeping ensures that materials and contaminants do not accumulate and cause hazards to employee safety and health.

4.1.2.2 Workplaces will be cleaned on a regular basis.

4.1.2.3 Restrooms will be kept in a sanitary condition.

4.1.2.4 Materials will be stored in designated areas and not allowed to accumulate in places where employee safety could be at risk (i.e. aisles, corridors, stairwells, near exits, around machinery or equipment where employees work, etc.).

4.1.2.5 Tools and equipment will be stored in their appropriate places.

4.1.2.6 Chemicals will be handled according to their instructions. Spills or leaks will be cleaned up immediately and prevented from reoccurring.

4.1.2.7 Protective equipment will be used, as needed or required.

4.2 Written Standard Operating Procedures:

4.2.1 Job Hazard Analysis (Identifying Hazards) - Each job task will be reviewed for safety hazards. Recognized safety hazards will be prioritized and addressed based on their risk level.

4.2.2 Written Procedures

4.2.2.1 Develop written procedures outlining the steps to take to reduce or eliminate recognized safety hazards. These procedures must identify when the use of personal protective equipment (PPE) is necessary.

4.2.2.2 All companies must have:

4.2.2.2.1 Emergency Evacuation and Fire Prevention Programs (written if >10 employees).

4.2.2.2.2 Hazard Communication Program in workplaces where chemicals are used or stored.

4.2.2.3 Written procedures are required if there are exposures to:

4.2.2.3.1 Blood or bloodborne pathogens

4.2.2.3.2 Hazardous chemical exposures

4.2.2.3.3 Confined spaces

4.2.2.3.4 Control of hazardous energy (Lock-out/Tag-Out)

4.2.2.3.5 Live electrical energy (>50 volts)

4.2.2.3.6 Noise levels >85 dBa

4.2.2.3.7 Laboratories

4.2.2.3.8 Forklifts

4.2.2.3.9 PPE required activities

4.2.2.3.10 Physical hazards

4.2.2.3.11 Radiation

4.2.2.3.12 Respiratory hazards

4.2.2.3.13 Shipping and handling of hazardous materials

4.2.2.3.14 Lasers (>Class 2)

4.3 Recordkeeping (Accident and Incident Investigation and Reporting):

4.3.1 Incidents are work-related activities that cause concern for the health or safety of employees. All accidents and injuries (and work-related illnesses) are considered incidents.

4.3.2 Reporting of incidents is required for many companies. Specific information about incidents must be identified and recorded on specific OSHA forms.

4.3.3 Investigation may be required to determine some information that is required to be reported.

4.3.4 Exemptions from Recordkeeping exist for some industries in general and for employers with fewer than 10 employees. For a full listing of exempted industries, see the OSHA website at www.OSHA.gov, or reference the listing in the OSHA Recordkeeping Exemption Listing form associated with this program.

4.4 Emergency Evacuation Planning:

4.4.1 All companies must have a program for emergency evacuation of their employees.

4.4.2 Companies with more than 10 employees must have this information in writing.

4.4.3 Companies should post their evacuation routes to assist employees and others during an evacuation situation.

4.4.4 A review of the emergency action program must occur for every employee when the program is developed, upon initial assignment or new hire, when the employee's responsibilities under the program change and whenever the program is changed.

4.4.5 Any employees that have specific duties and requirements under the program (i.e. assisting others, locking sensitive information, area searchers or wardens, etc.) must be specifically trained in their duties and responsibilities.

4.5 Hazard Communication:

4.5.1 Every employee exposed or potentially exposed to hazardous chemicals in the workplace must be trained and informed of the hazards of those chemicals and the measures to be used to protect themselves from exposure. This training must occur initially and whenever changes to hazards in the workplace occur.

4.5.2 Material Safety Data Sheets are required for all hazardous chemicals or mixtures used or stored in the workplace.

4.5.3 A hazardous chemical inventory list must be maintained at the workplace (either one master listing or individual area listings) that list the hazardous materials by name (as it appears on the MSDS) the manufacturer's name and phone number and any "common names" that the company may call the product (if they are different than the MSDS name).

4.5.4 A written program must be present in the workplace describing how the requirements of the regulation are implemented.

4.5.5 All hazardous chemicals must have labels indicating the name, manufacturer and hazards of the hazardous components of the product.

4.6 Electrical Safety

4.6.1 Any exposure greater than 50 volts requires electrical safety training and information be provided to employees. Employees with such exposure require the knowledge to understand the magnitude of the hazard they are exposed to and the measures needed to prevent injury from such exposure.

4.6.2 A daily visual inspection shall be made of the following to determine any external defects or indications of internal damage prior to use:

4.6.2.3 Cord sets, attachment cap, plug & receptacle of cord sets & any other equipment connected by cord & plug, such as deformed or missing plug, insulation damage.

4.6.2.4 Damaged items shall not be used until repaired.

4.6.3 All electrical equipment shall be tested:

4.6.3.3 Before each use.

4.6.3.4 Before equipment is returned to service following any repairs

4.6.3.5 Before equipment is used such as when a cord has been run over.

4.6.3.6 At intervals not to exceed 3 months,

4.6.3.7 Cord sets & receptacles which are fixed & not exposed to damage shall be tested at intervals not exceeding 6 months

4.6.4 All electrical installations and equipment must meet the installation and maintenance requirements under the National Electrical Code.

4.6.4.3 Companies must ensure that electrical service panel boxes and equipment shutoffs are clear and unobstructed at all times for use during an emergency.

4.6.4.4 Electrical service panel boxes must have covers and those covers must remain in the closed position when the panel is not being accessed.

4.6.4.5 Electrical sources and outlets within 3 feet of any water source (such as a sink or drinking fountain) must be GFCI (Ground Fault Circuit Interrupt) protected.

4.6.4.5.1 A conductor used as a grounded conductor shall be identifiable and distinguishable from all other conductors. A conductor used as an equipment grounding conductor shall be identifiable and distinguishable from all other conductors.

4.7 Audits and Inspections:

4.7.1 Safety audits are formal reviews of employee activities, workplace processes and systems, and documentation. Audits normally use pre-established or written protocols or inspection reports to assure that the written procedures and process flows indicate what the employees are supposed to do, and that employees are following the procedures as written. Audits will normally have a final written summary report of the non-conformances that is presented to management. Each finding or non-conformance will have corrective actions assigned by management to correct the deficiency in the system.

4.7.2 Inspections are informal reviews of employee activities, workplace processes, systems and documentation. Inspections may use pre-established written checklists, or may be even less-formal. The checklists are normally in a yes/no format that indicates whether or not the activity or process is compliant with what is required. Inspection findings are generally discussed with area supervisors or management, and the retention of the checklist (to assure that the items have been corrected before the next inspection) is normally the only documentation maintained.

4.7.3 Some regulations require that procedures or activities be inspected, and that the inspection documentation be retained for a specified period of time. However, inspection reports are generally kept only until all action items are addressed or they are superseded by subsequent inspection reports.

4.8 Communications:

4.8.1 Employees are encouraged to voice concerns and suggestions to their supervisors or to the Safety Officer. These communications can be verbal or written.

4.8.2 Management will provide employee training as the need arises or regulations require.

4.9 Safety Committee:

4.9.1 Some states require safety committees if companies have more than 20 employees. It is generally recommended that any company with more than 20 employees establish a safety committee.

4.9.2 Committees should meet at least quarterly and be comprised of at least 3 employees. A member of management and/or the safety officer may serve as additional members of the committee. The committee chairperson should not be a member of management or the company Safety Officer.

4.9.3 Safety committees should discuss safety concerns at the company. They may be charged with performing area inspections, injury report reviews and investigations, training, or other safety-related duties that are appropriate to the business needs of the company.

4.10 Records Retention:

4.10.1 Training Records are maintained until they are superseded by new training.

4.10.2 Audit Reports are kept for 5 years or until all findings are corrected, whichever is longer.

4.10.3 Inspection Reports are kept until all findings are corrected, the reports are superceded by new reports, or for a duration specified by a specific regulation, whichever is longer.

4.10.4 OSHA 300 logs and associated Injury and Illness Records are kept for 5 years.

4.10.5 Certain hazardous chemical exposure records (e.g. cancer causing agents, benzene, asbestos, and mercury) and biological exposure records (e.g. needle stick injuries of contaminated blood or body fluids) are kept for the duration of employment plus 30 years.

4.10.6 Other safety records are generally kept only until the actions that are required to be taken are complete.

5. Safety Information.

5.1 Ventilation

5.1.1 General building ventilation systems are usually adequate to remove particulate matter and circulate fresh air throughout the building. Ventilation concerns are generally caused by:

5.1.1.3 faulty filters in fresh air ducts

5.1.1.4 corridors leading from outside areas (where dust and particulate matter can be drawn into the building)

5.1.1.5 enclosed rooms where several printers or copiers are located in a small space (due to paper dust and/or toner dust being generated).

5.2 Lighting. The role of proper lighting is to provide a safe, comfortable and efficient visual environment. The following safe lighting criteria will be used to evaluate lighting conditions in office areas.

5.2.1 Bare light sources will not be placed in the visual working field of any employee. Light sources will be properly shielded in these instances.

5.2.2 The luminance and reflectance of surfaces of furnishings, shades, louvers, acoustic screens, will be considered to reduce their reflectance.

5.2.3 Windows will be covered where appropriate.

5.2.4 Wall surface colors and degree of reflectance will be appropriate to the work area.

5.2.5 Furniture should be arranged so that the luminaire is beside rather than in front of the operator. Light will then be directed across the work surface rather than into the worker's eyes.

5.3 Eye Strain. Adjusting the screen for the minimum amount of glare and best contrast will reduce the amount of eyestrain our employees' experience.

5.3.1 Monitor/VDT problems. Correct placement of the VDT can relieve stress on the neck and shoulders. Adjust the monitor so screens can be read with the head up and facing forward (at about eye level). Employees with bifocals should be able to read without tilting their head. Distance is key in that employees should not have to move to focus.

5.3.2 Glare and contrast. The two major sources of eye strain from working with a VDT are glare and poor contrast. Most offices have diffused overhead lighting to reduce screen glare, but glare from windows or other light sources, like lamps, should be shielded. Blinds can be closed to reduce light glare. Desks and work areas can be repositioned to reduce glare, or the brightness and contrast controls on a VDT can be adjusted.

5.3.3 Minimizing Eye Strain. Reading from a VDT for hours at a time can be very hard on the eyes. The characters on a VDT screen are not as sharp as print on paper--they are almost always a little bit fuzzy. They are also always moving, and even though they may not move enough to notice, they move enough to make focusing difficult. Employees should be encouraged to take micro breaks or switch to other non-computer based tasks to reduce eye strain.

5.3.4 Supervisor involvement. Encourage employees to have their eyes examined annually--more often if they are having vision problems or if their eyes feel tired at the end of the day. Even when VDT work does not cause a vision problem, the strain of reading from a monitor for long periods will make it difficult for employees to continue ignoring uncorrected or undercorrected vision problems they might already have.

5.4 Ergonomic Improvements. Ergonomic improvements can dramatically improve worker safety and productivity. Employees are most likely to work efficiently and accurately when they do not have to strain. Supervisors should be given adequate training in recognition and control of ergonomic improvements.

5.4.1 Problem recognition. Supervisors should know the symptoms of Cumulative Trauma Disorders (CTD) and recognize when the stress involved in a particular job has the potential for contributing to a CTD. Make sure employees are working in the best way possible.

5.4.2 Cumulative trauma disorders. The most common CTDs are *Tendinitis* (inflammation of a tendon, usually at the wrist or elbow), *Carpal Tunnel Syndrome (CTS)* (caused by pressure on the nerve in the wrist) symptoms include numbness, difficulty holding objects and restricted movement), and *lower back problems* (strains caused improper lifting, or improper seating or poor work station design).

5.4.3 Data entry. Data entry is probably the biggest contributor to CTS. With the fingers resting on the home keys of the keyboard, and shoulders relaxed, the employee's wrists and forearms should be in a straight line and more or less parallel to the floor. Surface or chair height adjustments may help (so employees type or write with body erect with feet flat on the floor.

5.3.3.1 The edge of the seat should not contact the back of the knees. Arm rests and keyboard wrist rests can be provided to relieve the pressure on the upper body. Footrests can assist in relieving strain on the back. Keyboard placement or copy stands, and telephone headsets may improve working postures. Back supports or lumbar supports on chairs can help prevent strain. Repetitive force and lifting can be minimized to prevent injury, or frequent breaks can be offered. Employees should be encouraged to take "stretch breaks" even if only for a minute or two.

5.3.4 Supervisor involvement. Make changes slowly, one at a time, and follow up on the effects. Observation and open communication with employees are our two most valuable tools for reducing the risks of ergonomic disorders in the workplace. If an employee has symptoms of a CTD, encourage him or her to get medical attention and work with the employee to find out if changes should be made in the job design.

5.4 Disciplinary Actions for Willful Unsafe Acts. Employees who willfully endanger themselves or the safety of their co-workers will be subject to the disciplinary action procedures stipulated by company policy or the Employee Handbook.

6. Training and Information.

6.1 Employee Orientation and General Safety Training:

6.1.1 All new employees will be provided with a general safety orientation upon initial assignment. This orientation will include:

6.1.1.1 A review of the employee responsibilities with regard to workplace safety and an overview of the general safety workplace rules.

6.1.1.2 The hazards that may be encountered in the workplace.

6.1.1.3 The process for reporting hazards, accidents, injuries and near-misses.

6.1.1.4 It is additionally recommended that the orientation include information on office safety and ergonomics.

6.1.2 Employees who transfer or change jobs within the company will be provided with work area specific training in the hazards they may encounter.

7. Definitions.

- *MSDS* - Material Safety Data Sheets.

- *CTD* - Cumulative Trauma Disorder is a medical condition caused by repetitive forces or motion.

- *CTS* - Carpal Tunnel Syndrome is a medical disease that affects the nerves in the wrist.

- *VDT* - Visual Display Terminals like computer monitoring equipment.

PROGRAM OVERVIEW

HAND AND PORTABLE POWER TOOLS SAFETY PROGRAM

REGULATORY STANDARD: OSHA - 29 CFR 1910.241 – 244
- 29 CFR 1926.300 – 305

INTRODUCTION: Tools can present a variety of hazards including cuts, lacerations, blindness from flying particles, and serious contusions if caught in rotating parts or nip points. Tools must be inspected and, when required, employees trained in the proper use, inspection and maintenance of the tools and their guarding systems. Personal protective equipment (such as safety glasses or gloves) may frequently be required, even if guarding systems are in place.

TRAINING:

- Training is recommended for power tool use
- Training and licensing is required for tools that use explosive charges (powder-actuated)

ACTIVITIES:

- Inspect tools before use to ensure they are in good operating condition. Look for items such as housing integrity, complete insulation on cord systems, and that grounding pins have not been removed from plug-sets.

FORMS:

- Guarding and Safety Requirements
- Program Assessment
- Training Attendance Roster

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Hand and Portable Power Tools

1. Purpose. The company requires that hand and portable power tools be purchased, maintained, and used only by qualified personnel who understand the limitations and requirements for the safe use of such tools. This safety program will be reviewed and evaluated:

1.1 On an annual basis or more frequently as needed.

1.2 When changes occur to 29 CFR 1910.221 - 244 that prompt revision of this document.

1.3 When facility operational changes occur that require a revision of this document.

2. Scope. Applies to all locations where portable hand and power tools are used or maintained.

3. Responsibilities.

3.1 Management/Supervisors:

3.1.1 Purchase only those electrical tools that have been listed by a Nationally Recognized Testing Laboratory (NRTL) such as Underwriter's Laboratory (UL).

3.1.2 Ensure that procedures are in place to conduct visual inspections of tools prior to use.

3.1.3 If testing is required (e.g., GFCI testing before each use) procedures will be in place to ensure compliance.

3.1.4 Ensure that employees using tools understand and follow manufacturer's instructions, routinely inspect tools, and use them only for the purpose for which they were designed.

3.1.5 Be aware of and make available, as appropriate, ergonomically designed tools for repetitive tasks and for those jobs for which a job hazard analysis or ergonomic assessment indicates a need for such tools.

3.1.6 Ensure that a maintenance program is in place to identify and repair defective or unsafe tools. Repairs to portable electrical tools may only be made by an authorized manufacturer's tool service/repair group or by the approved company sources.

3.1.7 Training may be conducted as part of an apprenticeship program or in other recognized training forums.

3.1.8 Employees who indicate they have had prior training will be required to demonstrate understanding and capabilities prior to being assigned to work.

3.1.9 Retain manufacturer's instructions for training/reference purposes.

3.1.10 Ensure that periodic assessments and inspections of tools and tool use are performed.

3.2 Employees:

3.2.1 Use only company provided or approved tools. Tools brought from home must have prior permission from the company and may be subject to inspection.

3.2.2 Attend training, as needed or required, for tool use.

3.2.3 Report incidents, accidents or signs and symptoms of injury to your supervisor.

3.3 Safety Officer (as needed or required):

3.3.1 Assist in the development and implementation of this program.

4. Procedure.

4.1 General Requirements:

4.1.1 No one will use an unsafe/defective tool. Tools that are damaged or defective will be removed from service.

4.1.2 Hand and power tools that may generate sparks or high temperatures will not be used in areas that are hazardous due to the presence of flammable or combustible materials.

4.1.3 The company is responsible for supplying proper power and specialized application tools for employee use.

4.1.4 Only qualified/trained personnel will operate powder-actuated tools.

4.1.5 Before a job is started, the supervisor or designee will ensure that the employee is fully aware of the hazards associated with the particular tool to be used.

4.1.6 Either Ground Fault Circuit Interrupter (GFCI) Protection or an Assured Equipment Grounding Conductor Program will be provided for all 120V (or greater) powered tools.

4.1.7 Adapters that interrupt the continuity of the equipment grounding conductor will not be used (e.g., 3-wire to 2-wire adapter.)

4.1.8 Double-insulated tools do not require an equipment grounding conductor (3rd wire) in the cord, but they do require GFCI protection.

4.1.9 Modifications will not be made to any tool or related equipment. Follow site or business unit established procedures when repairs are necessary.

4.1.10 Do not abuse power cords or hoses. Never carry tools by the cord or hose or yank to disconnect. Protect cords and hoses from heat, oil, and sharp edges.

4.1.11 Cords and hoses will be routed in such a manner as to not create a tripping hazard.

4.2 Types of Tools Appropriate for Use:

4.2.1 Ensuring the type of tool is appropriate for the job requires:

4.2.1.1 Recognition of applicable hazards associated with the work to be completed.

4.2.1.2 Tool determination and additional requirements.

4.2.1.3 Procedures for removal of a tool from service.

4.2.1.4 Where tools are used which could present a hazard to anyone other than the user, all other employees will be instructed concerning hazards.

4.2.2 Tool identification. Tools having identification numbers will be checked for legibility.

4.3 Pre-Use Safety:

4.3.1 Use the correct tool for the job.

4.3.2 Tools producing 100 dB (A) of noise will be labeled with a "Hearing Protection Required" sticker or tag.

4.3.3 Remove adjusting keys and wrenches before connecting to the power supply.

4.4 Pre-Use Inspection:

4.4.1 Prior to each use, visually inspect all portable electric tools and accessories for damages or defects, per the following:

4.4.1.1 Portable electric tools-check:

4.4.1.1.1 Tool general condition.

4.4.1.1.2 Cord for damage or deterioration.

4.4.1.1.3 Cord grip tightness.

4.4.1.1.4 Plug cap condition (grounding prong integrity).

4.4.1.1.5 Inspect extension cords and equipment for loose parts and damaged cords.

4.4.1.1.6 Portable GFCI's - Test per manufacturer's specifications.

4.4.1.2 Before using the tool, check workplace for nails, defects, or similar hazards/imperfections.

4.4.1.3 Attachment Plug/Connector Body/Cord; check for:

4.4.1.3.1 General condition

4.4.1.3.2 Cord grip tightness

4.4.1.3.3 Grounding Prong integrity

4.4.1.3.4 Polarization integrity

4.4.1.3.5 Condition of outer cord jacket. Cord will not be spliced and must be replaced if outer jacket is damaged

4.4.1.3.6 Boot and visible parts of body for damage, loose parts, or deterioration

4.4.1.3.7 Portable lights-check

4.4.1.3.8 Handle, guard and other visible parts for damage, loose parts or deterioration

4.4.1.3.9 Lamp (should be rough-service type)

4.4.1.3.10 Low voltage lights (12 volts) to ensure that transformer has not been by-passed. Check lamp voltage rating.

4.5 In-Use Safety:

4.5.1 Dress appropriately for the job

4.5.1.1 Do not wear loose clothing or dangling jewelry.

4.5.1.2 Confine long hair in a hair-net, cap, or fasten securely to the back of the head.

4.5.1.3 Use extreme care when wearing gloves.

4.5.1.4 Safety glasses are the minimum requirement when using any tool; additional PPE requirements may be necessary depending upon tool being used and job application (e.g., face shield, side shields, goggles, etc.)

4.5.1.5 Use hearing protection if required.

4.5.2 Use all tools per manufacturer's recommendations.

4.5.3 Keep cutting tools in good condition. Sharpen/replace when necessary.

4.5.4 Never use fingers to pull or dislodge chips or turnings from tools or parts. Use pliers, rakes, or hooks.

4.5.5 In some areas, compressed gas lines have been installed for specific uses. Be sure that air powered tools are hooked up only to lines supplied for the purpose.

4.5.6 Do not set down or carry a portable power tool in any way so that the starting-trigger or button can be accidentally struck.

4.5.7 Appropriate precautions will be utilized when tools are used in a wet location (e.g., electrically insulated gloves).

4.6 Post-Use Safety:

4.6.1 Disconnect tools when not in use.

4.6.2 Never lubricate, clean, repair, or adjust a tool while it is connected to a power source.

4.6.3 After a job is finished, clean all scrap and debris from the work table and surrounding area. Use proper receptacles.

4.6.4 Take care of all tools. Keep them sharp and clean. Follow manufacturer's instructions for lubricating, changing accessories, and inspection.

4.7 Repair:

4.7.1 All electric tool repairs will be made by a factory authorized tool repair service or company designated portable power tool repair service.

4.7.2 The only exception is cord plugs and connector bodies that may be replaced by a qualified person with an electrical background. Upon completion of plug or body replacement, ground integrity will be tested.

4.7.3 No repairs will be made to portable GFCIs.

5. Safety Information.

5.1 Specialized Applications:

5.1.1 Hand and power tools that may generate sparks or high temperatures will not be used in areas that are hazardous due to the presence of flammable or combustible materials. Use of non-sparking tools will be required unless monitoring ensures levels below 25% of the lower explosive limit (LEL). For more information, reference Portable Electronic Devices in Hazardous Areas.

5.1.2 Training for use of a powder actuated tool is provided by the manufacturer (usually HILTI).

5.1.2.1 A license is issued after training; individuals using powder actuated tools must have the license on their person when using the tool.

5.1.2.2 A record of training will be kept in personnel training files or equivalent recordkeeping system.

5.2 Power Tool Precautions:

5.2.1 Power tools can be hazardous when improperly used. The company uses several types based on the power source they use such as electric, liquid fuel, hydraulic, pneumatic, and powder-actuated. The following precautions will be taken by employees to prevent injury.

5.2.1.1 Power tools will always be operated within their design limitations.

5.2.1.2 Eye protection, gloves, and safety footwear are recommended during operation.

5.2.1.3 Store tools in an appropriate dry location when not in use.

5.2.1.4 Work only in well illuminated locations.

5.2.1.5 Tools will not be carried by the cord or hose.

5.2.1.6 Cords or hoses will not be yanked to disconnect it from the receptacle.

5.2.1.7 Cords and hoses will be kept away from heat, oils, and sharp edges or any other source that could result in damage.

5.2.1.8 Tools will be disconnected when not in use, before servicing, and when changing accessories such as blades, bits, and cutters.

5.2.1.9 Observers will be kept at a safe distance at all times from the work area.

5.2.1.10 Work will be secured with clamps or a vice where possible to free both hands to operate tools.

5.2.1.11 To prevent accidental starting, employees should be continually aware not to hold the start button while carrying a plugged in tool.

5.2.1.12 Tools will be maintained in a clean manner and properly maintained in accordance with the manufacturer’s guidelines.

5.2.1.13 Ensure that proper shoes are worn and that the work area is kept clean to maintain proper footing and good balance.

5.2.1.14 Ensure that proper apparel is worn. Loose clothing, ties, or jewelry can become caught in moving parts.

5.2.1.15 Tools that are damaged will be removed from service immediately and tagged "Do Not Use". They will be reported and turned over to the job site supervisor or Safety Officer for repair or replacement.

5.2.1.16 Cracked saws. All cracked saws will be removed from service.

5.2.1.17 Grounding. Portable electric power tools will meet the electrical requirements of this safety program and 29 CFR 1910.331 - 335.

5.2.1.18 Compressed air used for cleaning. Compressed air will not be used for cleaning purposes except where reduced to less than 30 p.s.i. and then only with effective chip guarding and personal protective equipment.

5.3 Methods of Guarding:

5.3.1 One or more methods of guarding will be provided where required to protect the operator and other employees in the area from hazards such as those created by point of operation, in-running nip points, rotating parts, flying chips and sparks. Examples of guarding methods are barrier guards, two-hand tripping devices, electronic safety devices, etc. The guard will be such that it does not offer an accident hazard in itself. Employees will:

5.3.1.1 Inspect tools without guards for signs of guard removal. If it is evident that a guard is required, tag-out the tool and obtain a replacement. Tools will not be energized during inspection.

5.3.1.2 Inspect tools having guards for proper operation and maintenance prior to use. Tools will not be energized during inspection.

5.3.1.3 Never remove a guard during use.

5.4 Self Assessment:

5.4.1 Each division/work unit should conduct a self-assessment to assess compliance with this standard and develop action plans to correct deficiencies. See Section 6 for more information.

6. Training and Information.

6.1 Powder Actuated Tools:

6.1.1 Users of powder-actuated tools must be licensed and trained.

6.1.2 Training may be conducted as part of an apprenticeship program or in other recognized training forums.

6.1.3 Employees who indicate they have had prior training will be required to demonstrate understanding and capabilities prior to being assigned to work.

6.1.4 Manufacturer's instructions will be retained for training/reference purposes.

6.2 Initial and Re-Training:

6.2.1 This safety program will be provided to and read by all employees receiving training. Training will be conducted on an as needed basis or when the following conditions are met:

6.2.1.1 Re-training will be provided for all authorized and affected employees whenever (and prior to) there being a change in their job assignments, a change in the type of tools used, or when a known hazard is added to the work environment.

6.2.1.2 Additional re-training will also be conducted whenever a periodic inspection reveals (or whenever there is sufficient reason to believe) there are deviations from or inadequacies in the employee's knowledge or use of tools.

6.2.1.3 The re-training will reestablish employee proficiency and introduce new or revised methods and procedures, as necessary.

6.3 Verification:

6.3.1 The company will verify that employee training has been accomplished and is being kept up to date. The documentation will contain each employee's name and dates of training.

7. Definitions.

- *Powder Actuated Tools* – A tool that uses an explosive charge to drive a bolt or nail. Normally used in concrete construction or steel erection. Electrically powered nail guns are not considered a powder actuated tool.

Architectural Concrete Plus, LLC.

PROGRAM OVERVIEW

HAZARD COMMUNICATION SAFETY PROGRAM

REGULATORY STANDARD: *OSHA - 29 CFR 1910.1200*
- 29 CFR 1926.59

INTRODUCTION: Outlines the requirements for ensuring evaluation of the hazards of all chemicals imported into, produced, or used in the workplace. It establishes means for communicating hazard information to all affected workers. This program allows for hazard identification and has requirements for material safety data sheets (MSDS). It outlines labeling requirements and details employee training requirements, including non-routine task training. The program also defines communication requirements for contractors and vendors.

TRAINING:

- All employees and contractors must be made aware of the hazards they may encounter and the precautions they must take to protect themselves from these hazards.
- Employees or contractors must be trained on initial assignment and whenever any new physical, chemical or health hazards are introduced, when non-routine tasks or procedures are required, or when employees are working with or near unlabeled piping systems that contain hazardous chemicals.

ACTIVITIES:

- Determine if hazardous chemicals are present in the workplace
- Ensure the availability of a Material Safety Data Sheet (MSDS) for each hazardous chemical or mixture in the workplace
- Ensure a Hazardous Chemical Inventory List is maintained
- Evaluate the hazards for each chemical or mixture used and/or stored in the workplace
- Ensure proper labeling of chemical containers
- Complete the written program
- Employees trained
- Process to evaluate and document any new hazards or changes
- Personal protective equipment identified

FORMS:

- Chemical Inventory List
- Hazard Communication Written Program
- Program Assessment
- Training Attendance Roster
- As needed:
  - Michigan Specific Information
  - Minnesota Specific Information

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Hazard Communication Program

1. Purpose. To provide an effective, written hazard communication program in compliance with company, State and Federal regulatory requirements. Hazard Communication applies to all chemicals and mixtures purchased, manufactured, used, and/or stored by the company to which employees, contractors, tenants or visitors may be exposed. (Note that Laboratories, as defined by OSHA regulations, are not covered under this program.)

2. Scope. This program applies to all operations at company facilities and job-sites. This program does not apply to articles, food or beverage items, or consumer products normally purchased at consumer markets, provided they are used as intended by the manufacturer of the material, and the duration and frequency of exposure is as intended based on normal product use. (For example: if window cleaner is used to clean windows, then this program does not apply, however, if it is used for another reason, or blended with another material, then this program applies).

3. Responsibilities.

3.1 Management (or their designee) must:

3.1.1 Perform a hazard determination. The company is required to determine the hazards of any products or chemicals they *manufacture and/or sell*. Such items require the company to produce and maintain up-to-date Material Safety Data Sheets (MSDS), and provide these to suppliers and customers with initial shipment, when changes occur, or upon request. An MSDS must include:

3.1.1.1 Identity of the product, as used on the label (its chemical or common name, and hazardous ingredients or hazardous components)

3.1.1.2 Physical and chemical characteristics (i.e. vapor pressure, flashpoint, pH)

3.1.1.3 Health Hazards (signs, symptoms or associated medical conditions)

3.1.1.4 Primary routes of entry (inhalation, ingestion, absorption)

3.1.1.5 OSHA, ACGIH or other exposure limits known

3.1.1.6 Toxicological information, including carcinogenicity

3.1.1.7 Safe handling precautions (hygiene practices, spill or leak clean-up, etc.)

3.1.1.8 Control measures (PPE, ventilation, etc.)

3.1.1.9 Emergency and First-aid procedures

3.1.1.10 Date of last revision to the MSDS

3.1.1.11 Name address and telephone number of the manufacturer, including emergency contact information.

3.1.2 Ensure a Chemical Inventory List is maintained either for the company as a whole, or for each department or work area. (See FORM for a Chemical Inventory List Template.) Chemical lists must include:

3.1.2.1 The trade-name of the chemical or material as it appears on the MSDS

3.1.2.2 The name of the chemical or material (if it is different than the manufacturer's trade name)

3.1.2.3 The manufacturer's name

3.1.2.4 The manufacturer's telephone number

3.1.2.5 Emergency contact information (company name and telephone number) if different than the manufacturer

3.1.3 Evaluate the hazards for each chemical or mixture *used or stored* in the workplace.

3.1.3.1 Determine if the quantity or type of chemical presents a hazard to the employees, the nature of the hazards, and the means that employees will use to protect themselves from these hazards.

3.1.3.2 This information is generally found on the Material Safety Data Sheet (MSDS) for the product. A safety professional or certified industrial hygienist may assist in this evaluation.

3.1.4 Maintain a written hazard communication program. (See the attached form for a sample program template.) This program must contain or describe:

3.1.4.1 A list of hazardous chemicals

3.1.4.2 Access to and maintenance of a current MSDS

3.1.4.3 Labeling procedures

3.1.4.4 Protective measures

3.1.4.5 Training program elements

3.1.4.6 Provisions for contractors (multi-employer workplaces)

3.1.4.7 Procedures for evaluating the hazards of any non-routine tasks (e.g. one-time chemical uses) and for evaluating any unlabeled pipes in the work area that contain hazardous chemicals

3.1.5 Assure labels and other forms of warning are affixed to chemical containers, as appropriate.

3.1.5.1 Full labeling: All containers must be labeled with the chemical name, appropriate hazard warnings and the manufacturer name and address. Vendor labels should be in compliance. Such labels may not be defaced or covered.

3.1.5.2 Shortened labeling: May be used for *process materials* and must contain the chemical identity (referenced back to the MSDS), and appropriate hazard warnings and the MSDS.

3.1.5.3 Labels should be on all containers at all times. However, labels are not required for portable containers provided they are immediately used by the employee on that work-shift *and* remain in the direct control of the employee at all times.

3.1.5.4 All labels must be in legible English. Other languages may be used, provided a label in English is also provided.

3.1.5.5 Pipes or piping systems that contain a hazardous chemical shall be identified to employees by at least one (1) readily accessible label, sign, placard, written operating instructions, process sheet, batch ticket or substance identification system.

3.1.6 Assure Material Safety Data Sheets (MSDS) for each chemical used in the workplace are:

3.1.6.1 Readily accessible and available by employees on each work shift

3.1.6.2 Written in English

3.1.6.3 Obtained from the manufacturer or supplier of the chemical or material before it is used at the workplace, if one did not accompany the shipment

3.1.6.4 Kept for the duration of employment plus 30 years if chemical *over-exposures* have occurred

3.1.6.5 Kept for the duration of its use or storage, at a minimum. (It is recommended that all MSDS's be kept for the duration of employment of person using the material.)

3.1.6.6 Kept in a single area and filed alphabetically by name (recommended), however, current copies may be kept in each work area

3.1.7 Train and inform employees on initial assignment and whenever a new physical, chemical or health hazard is introduced into the workplace, or when non-routine tasks or procedures are required. Training includes:

3.1.7.1 The information required in the OSHA Standard

3.1.7.2 Identification of the work areas where chemicals are used

3.1.7.3 The location and availability of the written program, chemical inventory list(s), and MSDS

3.1.7.4 Information on the methods used to detect the presence or release of chemicals in the workplace (monitors, alarm systems, odors, visual appearance, etc.)

3.1.7.5 The physical and health hazard information of the chemicals present

3.1.7.6 The measures employees can take to protect themselves from identified chemical hazards (procedures, personal protective equipment, etc.)

3.1.7.7 The labeling system used in the workplace

3.1.7.8 The details of this program

3.1.8 Develop and implement a method of communication between any contractors and the company which describes and outlines:

3.1.8.1 The method used to communicate hazards and precautions

3.1.8.2 The method used to access an MSDS

3.1.8.3 The method used to communicate emergency situations

3.1.8.4 The labeling methods used

3.1.9 Review this program annually to assure the above requirements are met.

3.1.10 Businesses in Michigan must post signs throughout the workplace for any new chemical used or stored at the facility. A copy of this poster and required elements of the posting is included on a form within this hazard communication program.

3.1.11 Businesses in Minnesota must comply with additional requirements outlined on the appropriate form within this hazard communication program.

3.2 Employees must:

3.2.1 Attend Hazard Communication Training upon initial assignment, and when changes to the workplace hazards occur (through process changes or a change of work assignment).

3.2.2 Re-label any containers into which hazardous chemicals or mixtures are transferred. Labeling includes the name of the material, manufacturer name and phone number, and appropriate hazard warnings. Such containers do not require labeling if they are

portable containers which will be immediately used by the employee on that work-shift and which remains in the direct control of the employee at all times

3.2.3 Inform management of any changes to chemicals or chemical uses.

3.3 Safety Officer must (as needed or required):

3.3.1 Assist in the development and maintenance of the written program or training requirements.

3.3.2 Assist in the determination and evaluation of chemical hazards in the workplace.

4. Procedure.

4.1 General:

4.1.1 Determine if hazardous chemicals are present in the workplace

4.1.2 Ensure the availability of a Material Safety Data Sheet (MSDS) for each hazardous chemical or mixture in the workplace

4.1.3 Ensure a Hazardous Chemical Inventory List is maintained

4.1.4 Evaluate the hazards for each chemical or mixture used and/or stored in the workplace

4.1.5 Ensure proper labeling of chemical containers

4.1.6 Create and maintains a written program

4.1.7 Train employees

4.1.8 Maintain a process to evaluate and document any new hazards or changes to the workplace that would affect the above requirements, including any non-routine tasks or procedures, or unlabeled piping systems that contain hazardous chemicals.

4.2 Personal Protective Equipment Requirements:

4.2.1 Based on the types of hazardous materials at the workplace, employees must be provided with personal protective equipment.

4.2.1.1 Training must be provided as needed for protective equipment use.

4.2.2 Personal Protective Equipment includes: Gloves, Eyewear, Head or Foot protection, Protective Clothing, Respiratory Protection, Hearing Protection and Other Equipment such as Eyebath Stations or Emergency Showers

4.2.2.1 Tools and receptacles for maintenance and disposal must be provided and employees informed in their use.

4.2.2.2 Eyebaths must be approved types (personal eyewash bottles are NOT approved equipment, stations must be either permanently plumbed or portable stations that are capable of delivering a set amount of flushing fluid for 15 minutes.).

5. Safety Information.

5.1 Trade Secret Information

5.1.1 Trade Secrets are products which, when the chemical identity of the product is revealed, would jeopardize the manufacturer's competitive advantage. Trade secret materials (and requests to reveal trade secret information) must comply with the requirements of OSHA 1910.1200(i) and Appendix D. Trade Secret information must be revealed to a health care professional when either:

5.1.1.1 A medical emergency exists, or

5.1.1.2 In a non-emergency situation, when a healthcare or safety professional, toxicologist or similar person provides a detailed written request *and* one of the following situations occurs:

5.1.1.2.1 A hazard exposure evaluation depends upon the information

5.1.1.2.2 To conduct sampling to determine exposure levels (including medical surveillance or pre-assignment) to potentially exposed employees

5.1.1.2.3 To provide medical treatment to exposed employees

5.1.1.2.4 To assess PPE requirements for exposed employees

5.1.1.2.5 To design or assess engineering controls for exposed employees

5.1.1.2.6 To conduct health assessment and health-effect studies

5.1.1.2.7 Signed confidentiality statements may be required.

5.2 Required Documentation and Records:

5.2.1 Material Safety Data Sheets (preferably a master file in a single location).

5.2.2 Chemical Inventory Lists.

5.2.3 Training Records.

5.3 Obsolete MSDS's or Discontinued Products:

5.3.1 MSDS's for products no longer *used* at company facilities and job-sites are kept on file in a "discontinued MSDS" file for at least 5 years from the last date of use.

5.3.2 MSDS's for chemicals and products no longer *made* by the company are kept on file for at least 30 years, and appropriate information is made available upon written request.

6. Training and Information.

6.1 All employees and contractors must be made aware of the hazards they may encounter and the precautions they must take to protect themselves from these hazards.

6.2 Employees or contractors must be trained on initial assignment and whenever any new physical, chemical or health hazards are introduced, when non-routine tasks or procedures are required, or when employees are working with or near unlabeled piping systems that contain hazardous chemicals. Training includes:

6.2.1 The information required in the OSHA Standard

6.2.2 Identification of the work areas where hazardous chemicals are used

6.2.3 The location and availability of the written program, chemical inventory list(s), and MSDS.

6.2.4 Information on the methods and observations used to detect the presence or release of chemicals (monitors, alarm systems, odors, visual appearance, etc.) including any "non-routine" tasks that employees may be asked to periodically perform which are beyond their regularly assigned duties

6.2.5 The physical and health hazard information of the chemicals present

6.2.6 The measures employees can take to protect themselves from identified chemical hazards (procedures, personal protective equipment, etc.)

6.2.7 The labeling system used in the workplace

6.2.8 The details of this program

6.2.9 The requirements of use, handling, storage and disposal of any Personal Protective Equipment

7. Definitions.

- *Article* - A product whose use is dependant upon the product's size and shape and which does not constitute a hazard. (i.e. furniture, toys, packaging, etc.)

- *Laboratory* - A facility where relatively small quantities of hazardous chemicals are used on a non-production basis. The following conditions must be met:
  - Chemical manipulations are carried out on a "laboratory scale"
  - Multiple chemical procedures or chemicals are used
  - The procedures involved are not part of a production process, nor in any way simulate a production process
  - "Protective laboratory practices and equipment" are available and in common use to minimize the potential for employee exposure to hazardous chemicals

- *MSDS* - Material Safety Data Sheets are reference documents that outline the product information, hazards and other required elements for hazardous chemicals or materials. These documents are produced by the manufacturer of the chemical or material and must be maintained at any workplace where they are used or stored.

- *Process Materials* - Chemicals that are routinely used in a chemical process or as part of a mixture for a chemical process.

PROGRAM OVERVIEW

LASER SAFETY PROGRAM

REGULATORY STANDARD: OSHA - 29 CFR 1926.54, Non-ionizing Radiation
21 CFR 1040, FDA Laser Requirements
ANSI - Z136.1, Safe Use of Lasers

INTRODUCTION: Provides specific requirements and guidelines ensuring the safety of laser operators and other individuals likely to be exposed to laser hazards. This program contains training, medical surveillance and warning signs requirements. It also has provisions for written safe operating procedures, design and construction and laser classification.

TRAINING:

- Operators must be aware of the hazards encountered and the protective control measures required for use, based on the class and type of laser and the level of hazard encountered.

ACTIVITIES:

- Determine the type and class of laser used
- Ensure all class 3 and higher lasers have appropriate labels and signs
- Ensure employees using class 3 and higher lasers are appropriately trained
- Write safe laser operating procedures for class 3 and higher lasers

FORMS:

- Authorized laser operator record (for class 3 or higher laser)
- Laser Operating Procedure (for class 3 or higher laser)
- Program Assessment
- Training Attendance Roster

Table of Contents

Laser Safety Program

1. Purpose. This laser safety program is intended to provide specific requirements and guidelines based on ANSI Z136.1 to ensure the safety of laser operators and other individuals likely to be exposed to laser hazards. In practice, the hazard classification of a laser is determined, and then the appropriate controls are applied taking into account the laser environment and the potential for excessive personnel exposure. The company will evaluate this program:

1.1 On an annual basis, or more frequently as needed.

1.2 When changes occur to 29 CFR 1926.54, Non-ionizing Radiation and ANSI Z136.1, Safe Use of Lasers, that prompt revision of this document.

1.3 When facility operational changes occur that require a revision of this document.

2. Scope. This program applies to all lasers operated by company employees, and all lasers owned by the company.

3. Responsibilities.

3.1 Management/Supervisor:

3.1.1 Evaluate laser needs and usage.

3.1.2 Ensure any lasers used or purchased are evaluated for safety controls and requirements before being placed into service.

3.1.3 Ensure controls and protective equipment is provided.

3.1.4 Provide appropriate storage containment for lasers when not in use.

3.1.5 Appoint a designated person to serve as the Laser Safety Officer, if required.

3.1.6 Train employees.

3.1.7 Provide for appropriate medical surveillance systems for the operators (primarily eye examinations).

3.1.8 Enforce the use of written procedures.

3.1.9 Provide registration and tags, as appropriate.

3.1.10 Provide for emergency services, as needed.

3.1.11 Maintain documentation and records.

3.2 Laser Operators (employees):

3.2.1 Follow written procedures.

3.2.2 Attend Training.

3.2.3 Participate in medical surveillance systems, as needed or required.

3.2.4 Use protective equipment and controls, as appropriate.

3.2.5 Operate lasers only when trained, and in a safe and responsible manner.

3.3 Laser Safety Officer (as needed or required):

3.3.1 Assist in the development and implementation of this program.

3.3.2 Oversee the storage, use and shipment of lasers and laser-products.

3.3.3 Ensure training and surveillance systems are maintained appropriately.

3.3.4 Maintain documentation and records, including registration and tags.

3.3.5 Assist in determining laser classifications and needs.

4. Procedure.

4.1 General Safety Requirements:

4.1.1 Class 3b and 4 lasers will receive a preliminary safety review and approval by the Laser Safety Officer prior to acquisition or fabrication of the laser. These lasers also will receive a final safety review and approval by the Laser Safety Officer prior to initial use of the laser. The final review will cover user qualifications, safe operations, including electrical safety, area controls, and written procedures, if required.

4.1.2 Each laser (except Class 1) will be registered with the Laser Safety Officer and carry a laser identification tag with its unique laser registration number (assigned by the company). This is in addition to Material Control inventory numbers, if any. The tag will be installed in a manner not obstructing laser installation/mounting and so that it can easily be read.

4.1.3 Each laser and laser application will meet the safety standards of ANSI Z136.1 or an equivalent level of safety approved by the Laser Safety Officer. The requirements specific to each laser class are listed and keyed to applicable sections of ANSI Z136.1.

4.1.4 All lasers will carry a warning label containing the laser classification, type, and other information required by ANSI Z136.1. This label normally comes affixed to lasers that have been purchased commercially. The label will not interfere with laser operation or mounting.

4.1.5 Class 3b or 4 lasers will be used in controlled areas in order to restrict access of unauthorized personnel. The level of control depends on the laser class.

4.1.6 Each controlled laser area will be posted with an appropriate warning sign.

4.1.7 Each operator of a Class 2, 3a, 3b or 4 Laser will meet company training and medical surveillance requirements, as applicable.

4.1.8 Each operator of a Class 3b or 4 laser will wear protective equipment (e.g., eyewear), as required.

4.1.9 Written safety program requirements will be met.

4.2 Electrical Safety Requirements:

4.2.1 Lasers will meet electrical and safety requirements as required by OSHA and ANSI regulatory standards. These requirements are too detailed for this document. The requirements of ANSI Z136.1 should be reviewed. Some examples include:

4.2.1.1 Fail-safe Control Systems

4.2.1.2 Barriers and Safety Interlocks

4.2.1.3 Safety Interlocks for Transmission Lines

4.2.1.4 Remote-control Interlocks

4.2.1.5 Laser Activation Warning Systems and Enunciators

4.2.1.6 Grounding Methods

4.2.1.7 Temporary Bypassing of Safety Interlocks

4.2.1.8 Safety Watch and CPR trained personnel.

4.2.2 Types of Hazards. Some examples include:

4.2.2.1 Inadequate shock-reaction space

4.2.2.2 Induced voltages in closed magnetic circuits

4.2.2.3 High impedance in grounding conductors

4.2.2.4 Improper tagging practices.

4.3 Design and Construction Practices:

4.3.1 A fail-safe control system maintains the desired protective function when the systems final control element returns to the safe position upon activation of its initial control device and upon failure of its power source.

4.3.2 Fail-safe control systems will be analyzed successfully using the Single Failure Criterion of IEEE Standard 379 before completion of the design.

4.3.3 Energy barriers, where required in the Laser Safe Operating Procedures and where readily removable, will have their positions monitored by initial control devices, such as limit, photocell, or proximity switches, which will be considered part of the personnel-safety interlock system for the laser.

4.3.4 Personnel, equipment, and service access-door positions will be monitored where required in the Laser Safe Operating Procedure by initial control devices having hardwired final control elements arranged to de-energize the power supply for the laser upon unauthorized access attempts.

4.3.5 Where transmission-line enclosures are used, plug and receptacle or pin and socket connectors having one end shorted should be run parallel to transmission-line enclosures and across breaks to ensure continuous enclosure while the beam is operating.

4.3.6 Remote control of Class 3b or Class 4 beam operation will be delegated by sequentially keyed local-remote control stations. The sequential keying will be considered part of the personnel-safety interlock system for the laser.

4.3.7 Visual indicators used in laser-activation warning systems and enunciators will have self-checking features, such as push-to-test lights, included in the system design.

4.3.8 Laser control elements and devices and emission delay periods will be listed in the Laser Safe Operating Procedure together with any exceptions to the applicable safety-related design criteria accepted by the Laser Safety Officer.

4.3.9 Where single-point grounding systems are used with laser power supplies, systems, or structures, their design criteria will be documented and approved by the Laser Safety Officer or other designated person. Covered copper braid or flat copper bar will be considered for use as grounding conductors in circuits having fast rise-times.

4.3.10 Laser safety training, when required by the Laser Safe Operating Procedure, will include capacitor bank assessor certification and orientation to the safety tagging procedures of Lockout/Tagout of Energy Isolation Devices.

4.3.11 Periodic safety inspections will be performed on personnel safety interlock systems and capacitor banks within operational laser systems.

4.4 Written Laser Safe Operating Procedures:

4.4.1 An approved written Laser Safe Operating Procedure is required for certain lasers that are high powered or that emit invisible radiation. However, the Laser Safety Officer may recommend or require a written procedure for any laser or laser application where it is deemed necessary for ensuring adequate safety controls. The following Class 3b lasers require an approved written procedure:

4.4.1.1 Those that produce beams invisible to the eye.

4.4.1.2 Continuous wave (cw) lasers that produce visible beams with greater than 15 mW power. (HeNe lasers with 15 mW or less normally do not require a written procedure. However, all other safety requirements apply.)

4.4.1.3 All Class 4 lasers and laser systems require a written Laser Safe Operating Procedure.

4.4.1.4 Required written Laser Safe Operating Procedure normally is prepared by the principal authorized laser operator. The procedure will follow the outline in Appendix 1 and will receive Laser Safety Officer and line management approval before the laser is operated. Laser Safe Operating Procedure standard cover sheets are available from the Laser Safety Officer. The Laser Safe Operating Procedure will be reviewed and updated every two years (or as changes occur by the principal authorized laser operator).

4.5 Laser Medical Surveillance:

4.5.1 All employees who are routinely engaged in work where they may be exposed to laser radiation from any class laser that requires a written safe operating procedure must comply with the company laser medical surveillance program.

4.5.2 The purpose of laser medical surveillance is twofold. The first purpose is to establish a baseline of ocular conditions before exposure to laser radiation. The second purpose is to detect and document, as early as possible, ocular damage in the event of a suspected exposure incident. Both serve to assess the effectiveness of control measures and to institute appropriate therapeutic measures.

4.5.3 Laser medical surveillance includes a preliminary baseline eye exam. Additional eye exams may be required in the event of exposure or suspected exposure to laser radiation above the Maximum Permissible Exposure (MPE). An eye exam also is required upon termination of laser work or upon termination of employment. Other routine eye exams are not required.

5. Safety Information.

5.1 Laser Protective Equipment:

5.1.1 The Laser Safety Officer will review and approve protective eyewear to assure that it is appropriate for the use for which it is intended. The eyewear to be used will depend on the wavelength(s) and intensity of the accessible radiation.

5.1.2 In some cases, other protective equipment, such as clothing to protect the skin, may be required. Such requirements will be addressed in written Laser Safe Operating Procedure.

5.2 Laser Warning Signs:

5.2.1 In some cases, other protective equipment, such as clothing to protect the skin, may be required. Such requirements will be addressed in written Laser Safe Operating Procedure.

5.2.2 Laser warning signs will meet the standards of ANSI Z136.1. Class 1 lasers do not require a sign.

5.2.3 The word CAUTION will be used with all Class 2 and Class 3a lasers. The word DANGER will be used with all Class 3b and Class 4 lasers.

5.2.4 Precautionary instructions and protective actions:

5.2.4.1 Class 2: Laser Radiation - Do Not Stare Into Beam. Do Not Direct the Beam Towards the Eye of Individuals.

5.2.4.2 Class 3: Laser Radiation - Avoid Direct Exposure to Beam.

5.2.4.3 Class 4: Laser Radiation - Avoid Eye or Skin Exposure to Direct or Scattered Radiation.

5.2.5 Additional precautionary instructions and protective actions that may be required are Invisible Laser Radiation; Knock Before Entering; Do Not Enter When Light Is On; Restricted Area, etc.

5.2.6 All warning signs and labels will be displayed conspicuously in locations where they best will serve to warn individuals of potential safety hazards. Normally, warning signs are posted at entryways (e.g., on doors) to laser controlled areas. Warning labels are affixed to the lasers in a conspicuous location.

5.2.7 Posted laser warning signs will be removed by the laser operator if the laser has been removed from the room or area.

Laser Requirement Summary					
This Requirement	*For These Lasers*				
Warning Label	1	2	3a	3b	4
Warning Sign		2	3a	3b	4
Registered with the Laser Safety Officer		2	3a	3b	4
Read & Sign Information Sheet		2	3a		
Laser Safety Operator Training				3b	4
Laser Safe Operating Procedure				3b	4
Medical Surveillance				3b	4
*If invisible to the eye, and if cw laser, visible beams > 15 mW power.					

5.3 Safe Laser Practices:

5.3.1 The following control measures are recommended as a guide to safe laser use. Some of the measures may be required, particularly in the case of high-powered lasers or lasers that emit invisible radiation. See ANSI Z136.1.

5.3.2 Recommended Work Area Controls

5.3.2.1 A laser should be isolated from areas where the uninformed and curious would be attracted by its operation. Doors should be closed or locked to keep out unwanted onlookers.

5.3.2.2 The illumination in the area should be as bright as practicable in order to constrict the eye pupils of users.

5.3.2.3 The laser should be set up so that the beam path is not at normal eye level, i.e., so it is below 4.5 feet and above 6.5 feet.

5.3.2.4 Where practical, the laser system or beam should be enclosed to prevent accidental exposure to the beam.

5.3.2.5 The potential for specular reflections should be minimized by shields and by removal of all unnecessary shiny surfaces.

5.3.2.6 Windows to hallways or other outside areas should be provided with adequate shades or covers.

5.3.2.7 The main beams and reflected beams should be terminated or dumped. Note that this is required for any accessible laser for which the Maximum Permissible Exposure (MPE) could be exceeded.

5.3.2.8 The active laser never should be left unattended unless it is a part of a controlled environment.

5.3.2.9 Good housekeeping should be practiced to ensure that no specular reflector is left in or near the beam.

5.3.2.10 Warning devices should be installed for lasers with invisible beams to warn of operation.

5.3.3 Recommended Laser Use Controls

5.3.3.1 Avoid looking into the primary beam at all times.

5.3.3.2 Do not aim the laser using the eye; direct reflections could cause retinal damage.

5.3.3.3 Avoid looking at the pump source.

5.3.3.4 Clear all personnel from the anticipated path of the beam.

5.3.3.5 Before operating the laser, warn all personnel and visitors of the potential hazard, and ensure all safety measures are satisfied.

5.3.3.6 Be especially cautious around lasers that operate at frequencies not visible to the human eye.

5.3.3.7 Do not wear bright, reflective jewelry or other objects.

5.3.3.8 Use proper eye protection. Keep in mind:

5.3.3.8.1 No matter how good the glasses, no protection is provided unless they are worn.

5.3.3.8.2 All safety glass lenses may shatter, and all plastic lenses may melt when the maximum radiant exposure for the particular lens is exceeded.

5.3.3.8.3 Laser safety glasses may not provide eye protection with other than the laser for which they are specified, unless the frequency produced is the same and power output is not greater.

5.4 Associated (non-beam laser hazards):

5.4.1 Depending on the type of laser used, associated hazards other than those from beam radiation may be involved. Such hazards to personnel, if they exist, should be addressed in written Laser Safe Operating Procedure.

5.4.2 Atmospheric Contamination.

5.4.2.1 Vaporized target material: Materials may include carbon monoxide, ozone, lead, mercury, lithium, and other metals.

5.4.2.2 Gases from flowing gas lasers or by-products of laser reactions such as fluorine, hydrogen cyanide, and many others.

5.4.3 Gases or vapors from cryogenic coolants.

5.4.4 Chemicals - Chemicals, including dyes and solvents, from certain dye lasers have been shown to be carcinogenic, toxic, or otherwise hazardous.

5.4.5 Cryogenic Coolants - Cryogenic liquids, such as liquid nitrogen or hydrogen, may cause burns.

5.4.6 Electrical Hazards - The potential for electrical shock is present in most laser systems. Pulsed lasers utilize capacitor banks for energy storage and cw lasers generally have high voltage DC or RF electrical power supplies.

5.4.7 Explosive Hazards - The potential exists for explosions at capacitor banks or optical pump systems during the operation of some high power lasers. Explosive reactions of chemical laser reactants or other gases used within the laser laboratory could cause damage to equipment or injury to personnel.

5.4.8 Jewelry - The use of jewelry (watches, rings, etc.) is often an overlooked source of exposure to a beam reflected by a mirror-like surface.

5.4.9 Ultraviolet Radiation - Either direct or reflected from flash lamps and cw laser discharge tubes may cause eye injury. Usually, ultraviolet radiation is a problem only when quartz tubing or windows are used.

5.4.10 Visible Radiation (non-laser) - High luminance radiation emitted from unshielded pump lamps may cause eye injury.

5.4.11 X rays - Potentially hazardous X rays may be generated from high voltage (over 15kV) power supply tubes.

5.5 Laser Classifications and Entry Controls:

5.5.1 Laser classifications and entry controls are summarized below along with a summary of essential requirements.

5.5.2 *Class 1.* Class 1 denotes exempt lasers or laser systems that cannot, under normal operating conditions, produce a hazard.

5.5.2.1 Equipment such as laser printers that completely enclose the laser and laser beam are normally specified as Class 1.

5.5.2.2 Class 1 lasers must be labeled, but are exempt from other requirements.

5.5.3 *Class 2.* Class 2 denotes low-powered visible-radiation lasers or laser systems. Visible cw HeNe lasers above Class 1, but not exceeding 1-milliwatt (mW) radiant power, are common examples of this class. Because of the normal human aversion responses, these lasers normally do not present a hazard, but may present some potential for hazard if viewed directly for extended periods of time.

5.5.3.1 Class 2 lasers must be labeled and registered with the Laser Safety Officer. The warning label or sign will caution users to avoid staring into the beam or directing the beam toward the eye of individuals, and will be placed on or near the laser in a conspicuous location.

5.5.4 *Class 3a.* Class 3a denotes lasers or laser systems that normally would not produce a hazard if viewed for only momentary periods with the unaided eye. They may present a hazard if viewed using collecting optics. Visible cw HeNe lasers above 1 milliwatt (mW), but not exceeding 5 mW radiant power, are common examples of this class.

5.5.4.1 Class 3a lasers must be labeled and registered with the Laser Safety Officer. The warning label or sign will caution users to avoid staring into the beam or directing the beam toward the eye of individuals, and will be placed on or near the laser in a conspicuous location. Lasers used as pointers in auditoriums, classrooms or similar training environments are restricted to be no higher than Class 3a.

5.5.5 *Class 3b.* Class 3b denotes lasers or laser systems that can produce a hazard if viewed directly. This includes intrabeam viewing or specular reflections. Except for the higher power Class 3b lasers, this class laser will not produce hazardous diffuse reflections. Visible cw HeNe lasers above 5 mW, but not exceeding 500 mW radiant power, are examples of this class.

5.5.5.1 Class 3b lasers will be used in areas where entry by unauthorized personnel can be controlled. Entry into the area by personnel untrained in laser safety may be permitted by the laser operator if instructed as to safety requirements and are provided with protective eyewear, if required.

5.5.6 *Class 4.* Class 4 denotes lasers or laser systems that can produce a hazard not only from direct or specular reflections, but also from a diffuse reflection. In addition, such lasers may produce fire and skin hazards.

5.5.6.1 Class 4 lasers will be operated by authorized operators in areas dedicated to their use. Failsafe interlocks will be used to prevent unexpected entry into the controlled area, and access will be limited by the laser operator to persons who have been instructed as to safety procedures and who are wearing proper laser protection eyewear (if required by written procedures) when the laser is capable of emission. Authorized operators are responsible to provide information and safety protection to untrained personnel who may enter the laser controlled area as visitors.

5.5.6.2 For pulsed systems, interlocks will be designed so as to prevent firing of the laser by dumping the stored energy into a dummy load. For continuous wave lasers, the interlocks will turn off the power supply or interrupt the beam by means of shutters.

5.5.6.3 The existence of homemade lasers will be made known to the Laser Safety Officer so that a proper hazard classification based on ANSI standards can be made on the laser.

6. Training and Information.

6.1 All new users of Class 2 and Class 3a lasers and laser pointers will read and sign an information sheet. This will provide proof of training required by ANSI Z136.1-1993.

6.2 All new users of Class 3b and Class 4 lasers will attend a laser safety training. This course will include, but not be limited to, laser classification, biological effects, safety requirements, and recommended safe practices. An exam must be passed for successful completion of the laser safety course.

6.3 All users of Class 3b lasers requiring written Laser Safe Operating Procedure and all users of Class 4 lasers will complete additional training specific to the safe operation of the laser or laser system they are required to operate. The specific training requirements will be defined in the written Laser Safe Operating Procedure. The principal authorized laser operator must complete an "Authorized Laser Operator" form (Appendix 2) for all laser operators trained on the laser.

7. Definitions

- *Authorized Laser Operator* - An individual who has met all applicable laser safety training, medical surveillance, and approval requirements for operating a laser or laser system.

- *Aversion Response* - Movement of the eyelid or the head to avoid an exposure to a noxious stimulant or bright light. It can occur within 0.25 seconds, including the blink reflex time.

- *Continuous Wave (cw)* - The output of a laser, operated in a continuous rather than a pulsed mode. For purposes of safety evaluation, a laser operating with a continuous output for a period 0.25 s is regarded as a cw laser.

- *Controlled Area* - An area where the occupancy and activity of those within is subject to control and supervision for the purpose of protection from laser radiation and related hazards.

- *Diffuse Reflection* - Change of the spatial distribution of a beam of radiation when it is reflected in many directions by a surface or by a medium.

- *Energy (Q)* - The capacity for doing work. Energy content is commonly used to characterize the output from pulsed lasers and is generally expressed in joules (J).

- *Failsafe Interlock* - An interlock where the failure of a single mechanical or electrical component of the interlock will cause the system to go into, or remain in, a safe mode.

- *Infrared Radiation* - Electromagnetic radiation with wavelengths that lie within the range 0.7 m to 1 mm.

- *Intrabeam Viewing* - The viewing condition whereby the eye is exposed to all or part of a laser beam.

- *Irradiant (E) (at a point of a surface)* - Quotient of the radiant flux incident on an element of the surface containing the point at which irradiance is measured by the area of that element. Unit: watt per cm2.

- *Laser* - A device that produces an intense, coherent, directional beam of light by stimulating electronic or molecular transitions to lower energy levels. An acronym for Light Amplification by Stimulated Emission of Radiation.

- *Laser Operator* - See Authorized Laser Operator.

- *Laser Safe Operating Procedure* - A set of operating instructions for a particular laser or laser system. The procedure specifies measures that, if followed, will ensure safe and correct use of the laser or laser system.

- *Laser Safety Officer* - One who has the authority to monitor and enforce the control of laser hazards and effect the knowledgeable evaluation of controls.

- *Laser System* - An assembly of electrical, mechanical, and optical components that includes one or more lasers.

- *Maximum Permissible Exposure (MPE)* - The level of laser radiation to which a person may be exposed without hazardous effect or adverse biological changes in the eye or skin. MPE is expressed in terms of either radiant exposure (joules/cm2) or irradiance (watts/cm2). The criteria for MPE are detailed in ANSI Z136.1.

- *Nominal Hazard Zone (NHZ)* - The nominal hazard zone describes the space within which the level of the direct, reflected, or scattered radiation during normal operation exceeds the applicable MPE. Exposure levels beyond the boundary of the NHZ are below the appropriate MPE level.

- *Optical Density (Dl)* - Logarithm to the base ten of the reciprocal of the transmittance:
  Dl = -log T, where T is the transmittance

- *Principal Authorized Laser Operator* - The authorized laser user who assumes responsibility for the control and safe use of a laser or laser system.

- *Power* - The rate at which energy is emitted, transferred, or received. Unit: watts (joules per second). Also called radiant power.

- *prf* - Abbreviation for pulse repetition frequency. (See repetitively pulsed laser.)

- *Pulsed Laser* - A laser that delivers its energy in the form of a single pulse or a train of pulses. The duration of a pulse is regarded to be 0.25 s.

- *Q-Switched Laser* - A laser that emits short (~30 ns), high-power pulses by means of a Q-switch.

- *Radiant Exposure (H)* - Surface density of the radiant energy received. Unit: joules per cm2.

- *Radiant Flux* - Power emitted, transferred, or received in the form of radiation. Unit: joule (J).

- *Repetitively Pulsed Laser* - A laser with multiple pulses of radiant energy occurring in sequence with a prf 1 Hz.

- *Specular Reflection* - A mirror-like reflection.

- *Transmittance* - (T) The ratio of total transmitted radiant power to total incident radiant power.

- *Ultraviolet Radiation* - Electromagnetic radiation that wavelengths smaller than those of visible radiation; for the purpose of this section on laser safety, 0.2 to 0.4 m.

- *Visible Radiation (Light)* - Electromagnetic radiation that can be detected by the human eye. This term is used commonly to describe wavelengths that lie in the range 0.4 to 0.7 m.

- *Wavelength (g*) - The distance between two successive points on a periodic wave that have the same phase.

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PROGRAM OVERVIEW

LOCK-OUT/TAG-OUT (LO/TO) SAFETY PROGRAM

REGULATORY STANDARD - OSHA - 29 CFR 1910.147

INTRODUCTION: OSHA's Control of Hazardous Energy (Lockout/Tagout) standard covers working on or around equipment where employees may be exposed to the unexpected energization, motion or start-up of machines or equipment. This program details the minimum performance requirements and has provisions for employee training, group lockout/tagout, inspection certifications, protective materials & hardware, application & test of controls, and procedures for shift or personnel changes. The standard does not apply to cord and plug connected electrical equipment where the plug is under the control of the servicing mechanic, or hot tap (i.e. welding) operations. Stand alone equipment like generators and automobiles have lockout restrictions that apply.

TRAINING:

- Training will be provided to Authorized, Affected and Other employees, based on their exposure to LO/TO and Hazardous Energy Control procedures
- Training is required upon initial assignment, when changes in job responsibilities occur, when there are changes to the process or equipment, or whenever deficiencies or deviations from established procedures are noted
- When tag-out only systems are used, all employees will be trained on the limitations of tags

ACTIVITIES:

- Evaluate the potential hazards of specific equipment
- Establish a written program and procedures for each piece or type of equipment
- Communicate with contractors, as required
- Train employees (3 levels: Authorized, Affected and Other)
- Verify Lock/Tag application process
- Evaluate all new equipment (or changes to old equipment) and processes for LO/TO capability
- Perform annual procedure inspections, as required

FORMS:

- Absent Employee Lock Removal
- Determination of Applicability
- Equipment List
- Program Assessment
- Procedure Acknowledgement
- Written Procedure (template)
- Procedure Inspection Certificate
- Procedure List
- Training Attendance Roster

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1. Purpose. This program covers working on or around equipment where employees may be exposed to the unexpected energization, motion or start-up of machines or equipment. This program assists in compliance with 29CFR1910.147 regulations for the control of hazardous energy.

2. Scope. This standard applies to all locations and covers the servicing and/or maintenance of machines and other equipment and processes. The standard does not apply only to cord and plug connected electrical equipment where the plug is under the control of the servicing mechanic, or hot tap (i.e. welding) operations. Stand alone equipment like generators and automobiles have lockout restrictions that apply.

3. Responsibilities.

3.1 Management:

3.1.1 Evaluate the potential hazards of specific equipment

3.1.2 Establish a written program

3.1.3 Establish written LO/TO procedures for each individual or group of similar machines in place

3.1.4 Communicate with contractors regarding the company's Lock-Out/Tag-Out Program and exposures

3.1.5 Train employees (3 levels: Authorized, Affected and Other)

3.1.6 Verify Lock/Tag application process

3.1.7 Account for new equipment and processes

3.1.8 Establish group lockout process as needed

3.1.9 Implement Lock Removal for Absent Employee procedures

3.1.10 Perform annual and periodic inspections, as required

3.1.11 Account for shift and personnel changes, as needed or required

3.2 Safety Officer (as needed or required):

3.2.1 Assist in writing machine specific procedures

3.2.2 Evaluate the potential hazards of specific equipment, and assist in reducing those hazards

3.2.3 Ensure that LO/TO locks and tags are used only for LO/TO purposes

3.2.4 Assure that new equipment (or changes to old equipment) has LO/TO capability

4. Procedure.

4.1 Written Program:

4.1.1 This document serves as the written lock-out/tag-out program for the company. Before performing service or maintenance on equipment or machinery where energy or motion could release and cause injury, the energy sources must be isolated and "locked out".

4.2 Written Procedures:

4.2.1 Up-to-date written procedures are in place and followed for the isolation of an energy source (including locking, blocking and tagging). Procedures must be written for both routine and non-routine service and maintenance work, and including production work such as set-up, cleaning and un-jamming. These procedures must include sufficient detail to provide each employee with control over all hazardous energy they may be exposed to (such as electrical, mechanical, gravitational, hydraulic, pneumatic, chemical, thermal, or other hazards). A template-form is included with this program to assist in writing the required procedures.

4.2.2 Informing contractors of company devices and procedures

4.2.3 Informing employees about differences in the contractor's devices and procedures and about company procedures

4.2.4 Assuring procedures are in place to maintain LO/TO requirements during shift changes or personnel changes to maintain the integrity and continuity of LO/TO requirements

4.3 Application of Locks and Tags or Other Energy Control Devices:

4.3.1 The Six Steps of LO/TO

4.3.1.1 Preparation for Shutdown – the Authorized Employee must have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled and the methods and means to control the energy. This knowledge should include a review of the written procedure.

4.3.1.2 Machine or Equipment Shutdown – Shutdown machine or equipment using the established written procedures (normal operating procedures) after notifying Affected Employees in the area of the shut-down.

4.3.1.3 Machine or Equipment Isolation - Locate and isolate all energy sources.

4.3.1.4 Hazardous Energy Control Device Application – Apply or affix Lock and Tag (or other device) so that equipment is held in a "safe" or "off" position.

4.3.1.5 Stored Energy – Relieve, disconnect or restrain all energy sources so that they are made safe.

4.3.1.6 Verification of Isolation – The authorized employee will verify the isolation and de-energizing of the machine or equipment by trying to activate the machine.

4.3.2 Tags without Locks

4.3.2.1 Tags will accompany LO/TO specific locks at all times, unless:

4.3.2.1.1 If locks cannot be used, tags must be supplemented by other means to ensure an equivalent level of safety to that of a lock application (Example: removing a control switch, circuit breaker or valve handle).

4.3.2.1.2 Where locks are not used, the supplemental means (and its written procedure) must be reviewed with each authorized and affected employee at least annually.

4.3.2.1.3 When equipment is being taken out of service (i.e. abandoned in place or no longer used), non-LO/TO locks and tags will be used. The tag will contain the words "Out of Service" and an appropriate description.

4.3.3 Other Energy Control Devices

4.3.3.1 Blocks, chains, wedges, adapter pins, self-locking fasteners may be used to block machines or equipment from unexpected energization. (For example: A block may be used to wedge open a mechanical power press during tool changes to prevent the machine from cycling).

4.3.3.2 Automotive repair personnel should consult with the vehicle service guidelines to determine if removal of the ignition key is sufficient to ensure energy hazards are controlled, or if batteries must be disconnected during diagnostic or repair activities.

4.3.3.3 Generators and similar stand alone equipment must have the energy sources controlled, through disconnect of the spark plug or lock out of the controls for the engine.

4.3.4 Release from LO/TO or Restoring Equipment to Service

4.3.4.1 Check the work area to ensure that tools and other non-essential items have been removed and that the machine or equipment components are intact.

4.3.4.2 Check the area to ensure that employees have been safely moved away from the work area.

4.3.4.3 Verify that the machine controls are in neutral or off.

4.3.4.4 Remove the lock-out/tag-out device(s).

4.3.4.5 Reenergize the machine or equipment. NOTE: the removal of some forms of blocking may require reenergizing of the machine before safe removal.

4.3.4.6 Notify area employees that the servicing or maintenance work is completed and the machine is ready for use.

4.4 Lock Removal for Absentee Employee Process:

4.4.1 Each LO/TO device shall be removed from the energy isolating device by the employee who applied the device.

4.4.2 When the Authorized Employee who applied the LO/TO device is not available to removed it, the device may be removed under the direction of a single designated person at the company provided this designated person follow specific procedures. At a minimum, these include:

4.4.2.1 Verification that the Authorized Employee who applied the device is not at the facility

4.4.2.2 Efforts are made to contact the Authorized Employee to inform them that their LO/TO device has been removed

4.4.2.3 There are methods followed to ensure the Authorized Employee knows their device was removed BEFORE they resume work

4.4.3 The Safety Officer will either serve as the responsible person or management will designate an individual to serve in this capacity.

4.4.4 To assist in the consistent application of the absentee lock removal process, a form has been provided with this program.

4.5 Tag Application:

4.5.1 Use only company approved LO/TO locks, tags, blocks and other devices

4.5.1.1 Attach tags with nylon cable ties or an equivalent strength material

4.5.1.2 Attach tags to the locks

4.5.1.3 Tags will contain the following information:

4.5.1.3.1 Name of equipment being secured

4.5.1.3.2 Name of person securing

4.5.1.3.3 Date of application (securing)

4.5.1.3.4 How to contact person securing

4.5.1.3.5 Reason for being secured (e.g. taken out of service, repair, etc.)

4.5.1.3.6 A statement prohibiting removal or tampering with the lock or tag

4.5.2 Tags must include a statement such as “Do Not Start”, “Do Not Open”, “Do Not Close”, “Do Not Energize” or “Do Not Operate”.

4.6 New Equipment Design or Major Modifications to Existing Equipment:

4.6.1 Machinery must be able to be locked out or made lockable when they are:

4.6.1.1 Replaced or undergo major repairs

4.6.1.2 Renovated or modified

4.6.1.3 Purchased and installed

4.6.2 New equipment installations must be capable of being locked out as an integral part of the machine (i.e. without the use of chains, etc.).

4.7 Group Lock-Outs:

4.7.1 Group Lock outs will incorporate the use of a group lockout device. Devices may include a lockable container (like a strong-box) to hold the process lock keys and tag-out records for large jobs and long duration work, or a multiple lock adapter (that will not release until all locks have been removed) for single machines that require more than one lock. These group devices are used as controls where there are complex situations involving many different people who all require the machine or process to be locked before they work on it.

4.7.1.1 One "Primary Authorized Person" will be assigned, and vested as responsible, for all the locks on the project and assuring continuity of energy control for the entire group.

4.7.2 A master locking device provides protection from the main energy source. The "Primary Authorized Person" is solely responsible for applying and removing this device.

4.7.3 Each authorized employee involved in the group lockout must affix a personal lock-out or tag-out device to the machine, equipment or into group lockbox or onto the device when their work begins and remove it when their work is completed.

4.8 Shift/Personnel Change Procedures:

4.8.1 Specific procedures to account for shift or personnel changes must ensure the continuity of LO/TO protection, and must include a provision for the transfer of devices between off-going and on-coming employees. This will minimize exposure to hazards from the unexpected energization or start-up of the machine or equipment or the release of stored energy.

4.9 Required Periodic Inspections:

4.9.1 Inspect LO/TO procedures and actual lock-outs (at least annually) to assure they meet regulatory requirements. The inspection is led by a "LO/TO Authorized" employee who has been trained in that procedure. This person must be someone other than the one performing the lock-out. The inspections requirements include:

4.9.1.1 Checking training records to verify people have been trained to the level necessary.

4.9.1.2 That the procedure document was reviewed within the last calendar year. Reviews must ensure the procedures are adequate, understandable and being followed.

4.9.1.3 A majority of the employees authorized to use that procedure participate in this review (group meeting reviews are acceptable).

4.9.1.4 Field check the actual lock-out to assure the equipment is being locked out properly. The inspector and the person locking the equipment are required to participate, at a minimum.

4.9.1.5 Asking operators how they would lock/tag equipment, and verify by demonstration.

4.9.1.6 Note and correct any deficiencies.

4.9.1.7 Document this assessment using the inspection certificate form provided with this program, or an equivalent record. Both the inspector and the person performing the LO/TO must sign the assessment certificate.

4.9.2 If the procedure is found lacking or deficient, it must be revised and all employees who would use that procedure must be retrained to the new procedure before servicing or maintaining that equipment.

4.9.3 Each procedure that is used for "normal" or "routine" lock-outs must be reviewed at least once per year. "Non-routine" lock-outs must have a procedure reviewed before the procedure is used, if it hasn't been used in the last calendar year.

5. Safety Information.

5.1 Specific Requirements for Electrical LO/TO with Greater than 50 volts to Ground:

5.1.1 Only an "Electrical Qualified Person" (Electricians or persons specifically trained by an electrician) can operate the equipment or otherwise verify that the equipment can not be restarted.

5.1.2 Only an "Electrical Qualified Person" can use test equipment to test the circuit elements and electrical parts of the equipment, including exposure to back-feed or inadvertently induced voltage.

5.1.3 Only an "Electrical Qualified Person" can conduct tests and inspections to verify that the equipment can be safely re-energized.

5.1.4 Locks must be accompanied by tags

5.1.5 Safe de-energizing and re-energizing procedures must be determined before service or maintenance is performed and approved in writing by an "Electrical Qualified Person" before the actual LO/TO is performed.

5.2 Records:

5.2.1 Training records will be maintained. Training records include:

5.2.1.1 The name of the employee trained

5.2.1.2 The date of training

5.2.1.3 As needed, information on the specific procedure to which the employee is trained (i.e. a non-routine task).

5.2.2 Copies of training materials (i.e. the specific written procedure and signed inspection certificate) used for non-routine tasks must be kept.

6. Training and Information.

6.1 LO/TO Training – General:

6.1.1 Training will be provided to Authorized, Affected and Other employees, based on their exposure to LO/TO and Hazardous Energy Control procedures.

6.1.2 Training is required:

6.1.2.1 upon initial assignment

6.1.2.2 when changes in job responsibilities occur

6.1.2.3 when new equipment is brought into an area

6.1.2.4 when new processes that present new hazards are introduced

6.1.2.5 when there are changes in the hazardous energy control procedures

6.1.2.6 when deficiencies or deviations from established procedures are noted

6.1.2.7 when an inspection or review reveals deficiencies

6.1.3 There are three specific levels of training required:

6.1.3.1 Authorized employees will receive formal LO/TO training:

6.1.3.1.1 The training should also be supplemented by localized application, procedure or equipment-specific instruction, which includes written procedures and hands-on instruction in LO/TO application.

6.1.3.1.2 The training should enable the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace and the methods and means necessary for energy isolation and control.

6.1.3.2 Affected employees will receive a mid-range level of training to inform them of the purpose of the program, and their limitations and responsibilities under the program.

6.1.3.3 Training for Other employees can be verbally or by another method, and will inform employees about the procedure and program, about the prohibition relating to attempts to start machines or equipment that are locked out or tagged out, and in recognizing LO/TO devices and their purpose.

6.1.4 All levels of training should include information on who serves as the responsible person designated for the Lock Removal for Absent Employee process.

6.2 Tag-Out Only Systems:

6.2.1 When tag-out only systems are used, all employees will be trained on the limitations of tags, including:

6.2.1.1 Tags are warning devices only and do not provide physical restraint

6.2.1.2 Tags may not be removed, except by the person who applied it.

6.2.1.3 Tags must be legible and understandable by all employees

6.2.1.4 Tags must stand up to the conditions where they are applied (wet, cold, heat, etc.)

6.2.1.5 Tags must be secure so they do not inadvertently fall off or get removed

6.2.1.6 Tags may evoke a "false sense of security" and must not be used as a sole-system when locks or other devices can be applied.

6.3 Re-training:

6.3.1 Re-training is required for both Authorized and Affected Employees when:

6.3.1.1 Employee lock-outs are performed incorrectly, reviews reveal deficiencies, or when there is reason to believe there are inadequacies in the employees knowledge of the energy control procedures

6.3.1.2 A change in job assignment requires re-training

6.3.1.3 Modifications to equipment occur which affects the LO/TO procedure or present a new hazard

6.3.1.4 A procedure has been changed since the last time the employee performed LO/TO on that equipment or machinery.

7. Definitions.

- *Authorized Employee* - A person who locks-out or tags-out machines or equipment in order to perform servicing or maintenance (set up operators and tools changes).

- *Affected Employee* – A person whose job requires them to work in an area or operate machinery or equipment on which servicing or maintenance is being performed under lock-out or tag-out.

- *Capable of Being Locked-Out* - An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which (or through which) a lock can be affixed, or it has a locking mechanism built into it. Other energy-isolating devices are "capable of being locked-out" if energy isolation can be achieved without the need to dismantle, rebuild or replace the isolating device, or permanently alter its capability.

- *Energized* – Connected to an energy source or containing residual or stored energy

- *LO/TO or Energy-Isolating Device* - A mechanical device that physically prevents the transmission or release of energy, including, but not limited to the following:
  - a manually-operated electrical circuit breaker, a disconnect switch, or a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors and, in addition, where no pole can be operated independently

- a line valve
- a block
- any similar device used to block or isolate energy
- Push buttons, selector switches and other control-circuit type devices are not energy-isolating devices.

- *Energy source* - Any source of mechanical, hydraulic, pneumatic, chemical, natural, thermal or other energy

- *Other employees* - All persons who are or may be in an area when LO/TO procedures or devices may be utilized.

- *Primary Authorized Person* - An authorized person with the primary responsibility for group lockout applications.

- *Qualified* - Familiar with the construction and operation of the equipment and the hazards involved.

- *Servicing and/or Maintenance* – Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or un-jamming of machines or equipment and making adjustments or tool changes where the employee may be exposed to the **unexpected** energization or startup of the equipment, or a release of hazardous energy.

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PROGRAM OVERVIEW

MACHINE GUARDING SAFETY PROGRAM

REGULATORY STANDARD: OSHA - 29 CFR 1910.212 - 244

INTRODUCTION: Defines types & methods of point of operation guarding and training requirements. It outlines the requirements for inspections of machine guarding systems.

TRAINING:

- Recommended for most workplaces
- Training is required where guards must be removed, or whenever forging equipment is used.

ACTIVITIES:

- Identify risk factors for machinery operations
- Ensure original guards or equivalent measures are in place.
- Ensure safeguarding practices are implemented for any non-routine task where existing guarding practices are insufficient to protect operators.

FORMS:

- Evaluation
- Program Assessment
- Using Presence Sensing Devices (light curtains)
- Training Attendance Roster

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Machine Guarding Safety Program

1. Purpose. Each site or location shall have a process in place to ensure that machines and equipment are provided with guarding systems in order to eliminate or control employee exposure to hazards. This program outlines the principles and performance requirements of machine safeguarding.

2. Scope. This program applies to each type of machine, powered tool or equipment that requires guarding. Equipment and machines include saws and similar large powered tools, mechanical equipment, conveyor systems, and heat producing machines.

2.1 Exclusions: Welding equipment, portable powered tools and mechanical presses are not covered in this program, and have their own separate programs based on regulatory requirements for this type of equipment and operation.

3. Responsibilities.

3.1 Management will ensure that:

3.1.1 Procedures are in place for safeguarding machines and equipment during normal operations.

3.1.2 New and modified equipment is purchased with or provided with guards.

3.1.3 Safeguarding features shall be reviewed or approved by competent personnel during:

3.1.3.1 the design phase of capital projects

3.1.3.2 before newly purchased equipment is placed into service

3.1.3.3 prior to relocation or refurbishment of existing equipment

3.1.4 Safeguarding and safeguarding-devices are maintained.

3.1.5 Routine preventive maintenance and inspection procedures are established, based on an inventory of applicable machines, to ensure proper operation of safeguarding devices and equipment.

3.1.6 Operators receive initial training in specific safeguarding operations and the need for maintaining integrity of such safeguards.

3.1.6.1 Retraining shall be provided whenever there is a change to safeguards or procedures or when employee behavior indicates such a need.

3.1.6.2 Only qualified and trained operators, maintenance, and set-up personnel are authorized to perform adjustments, repairs, and set-ups.

3.1.6.3 Only qualified and trained employees are authorized to interface with moving webs or machine mechanisms and only as outlined by specific written procedures for the equipment.

3.1.7 An environment is promoted where operators are encouraged to report unsafe machines and conditions and suggest improvements to management.

3.1.8 Assure employees understand the function and operation of all safety devices and controls on machines to which employees are assigned.

3.1.9 Test safeguarding and control devices prior to the start of each shift. Continuous running machines shall be tested at each period of downtime.

3.1.10 Immediately report malfunctioning, incorrectly positioned, or missing safeguarding. DO NOT operate machinery until the problem is corrected by personnel authorized and qualified to make such repairs.

3.1.11 Interface with moving webs or machine mechanisms ONLY when necessary, when authorized, and in accordance with procedures.

3.2 Employees will:

3.2.1 Report all unsafe machines and equipment.

3.2.2 Assist, as needed or required, in determining the safeguarding requirements for all machines, tools and equipment that may require them.

3.2.3 Attend training as needed or required.

3.2.4 Understand the function and operation of all safety devices and controls on machines to which they are assigned.

3.2.5 Test safeguarding and control devices prior to the start of each shift as needed or required by procedure.

3.2.6 Immediately report malfunctioning, incorrectly positioned, or missing safeguarding and NOT operate machinery until the problem is corrected by personnel authorized and qualified to make such repairs.

3.3 Safety Officer will:

3.3.1 Assist as needed or required in the evaluation and implementation of safeguarding requirements.

4. Procedure.

4.1 General Requirements for All Guards and Equipment:

4.1.1 Guards must be affixed to the machine whenever possible, or otherwise secured. Guards must be positioned and shaped so that they do not present a greater hazard themselves.

4.1.2 The point of operation where an employee is exposed to injury requires guarding.

4.1.2.1 The guarding device must conform to standards established for that specific type of machine or be constructed so that the operator is prevented from placing any part of their body in the "danger zone" during the operating cycle or use of the equipment. (Equipment examples that require point of operation guards include: cutters, shears, presses, milling equipment, saws, jointers, rollers, and stationary power-driven equipment.)

4.1.2.2 Special hand tools for placing and removing material may be used to permit easy handling of material, and supplement safeguards, but may not replace machine guarding.

4.1.3 Revolving drums, barrels, and containers require interlocked enclosures so that the system cannot revolve unless the guard enclosure is in place.

4.1.4 Equipment with blades must be guarded (unless they are fixed in place and higher than 7 feet from the floor surface). Guards may not have openings more than ½ inch.

4.1.5 Fixed machinery must be anchored and secured to prevent walking or movement during operation.

4.2 Procedures:

4.2.1 Written procedures will be developed and implemented for all machines, tools and equipment that require guarding.

4.2.2 Procedures will include the type of machine, type of guard, uses and reasoning for guards, inspection requirements, preventive maintenance requirements (including any Lock-out/Tag-out LOTO requirements for service or maintenance), and specific steps for maintenance and service. Regularly serviced and maintained equipment will include the time intervals for services in the procedure.

4.2.3 Non-routine tasks or tasks that are not normally performed at the company or with the equipment will have specific procedures written and implemented before the activity takes place. These non-routine procedures will include and evaluation of the anticipated hazards, the use of machine guards, tools and protective equipment to reduce or eliminate any hazards that are anticipated, and emergency shut down procedures.

4.3 New or Altered Equipment Review:

4.3.1 Each piece of machinery or equipment will be reviewed for safeguarding requirements when they are purchased, installed, or when they undergo significant changes to their structure or use.

4.3.2 Reviews will be documented and this documentation should be maintained for the life of the equipment.

4.4 Maintenance:

4.4.1 Employees who perform service or maintenance (including repair, lubrication, clearing jammed parts or materials, and tool changes) must be trained and knowledgeable about the equipment, the guards and the hazards of the maintenance tasks.

4.4.2 Appropriate protective equipment and tools (dogs, tongs, placement boards, etc.) will be provided to maintenance personnel and training provided, where needed or required.

4.4.3 Equipment and machinery will be maintained in good operating condition.

4.4.4 Machinery that requires regular maintenance and service will be tracked, and such service performed at the required intervals.

5. Safety Information.

5.1 Types of Equipment, Tools and Machinery:

5.1.1 General Equipment

5.1.1.1 Guarding must be provided to protect employees and machine operators from hazards such as pinch-points, point-of-operation, in-running nip points, rotating parts, flying chips and sparks. Examples of machine guards are barriers, two-handed tripping devices, interlocks and electronic devices, or specialized tools.

5.1.2 Saws (stationary equipment – not portable)

5.1.2.1 Guarding must protect operators from entering the “danger zone” with any part of their body.

5.1.2.2 Guarding must be constructed to prevent undue vibration.

5.1.2.3 Guarding must be secure, and where needed attached so that the operator can utilize the tool with the materials without undue risk.

5.1.3 Specialized Machinery

5.1.3.1 Specific controls must be in place to assure that equipment can not be accidentally tripped to activate the machine.

5.1.3.2 If an employee can get caught in or on machine parts (such as blades or in moving chains), these parts require guarding.

5.1.3.3 Guards must be inspected regularly. It is recommended that inspections take place before each working shift for regularly used equipment, or before each use for intermittently used equipment, to assure guards are in good operating condition.

5.1.3.3.1 Woodworking Machinery – per 29 CFR 1910.213 - Specific guarding is required for the blades, chains or other exposed hazardous parts on ripsaws, crosscut saws and circular saws, swing and radial saws, band-saws, jointers, tenoning machines, shapers, planers, boring equipment, sanders, lathes, cutters and similar machinery.

5.1.3.3.2 Abrasive Wheel machinery (with wheel diameters >2 inches) – per 29 CFR 1910.215 - requires specific size guards and wheel mounting that restrict wheel access, protect operators from flying particles should the wheel break or shatter, and prevent inadvertent wheel movement.

5.1.3.3.3 Mills and Calenders (rubber and plastics industry only) – per 29 CFR 1910.216 - requires either interlocks, sensing devices or location control guards to prevent an operator from reaching through, over, under or around and coming into contact with a roll bite or to be caught between a roll bite and processing materials. Limit stopping devices must be installed to prevent materials from traveling too fast or beyond the machine limits.

5.1.3.3.4 Forging machinery – per 29 CFR 1910.218 - has specific requirement for guarding of hammers presses, and up setters. Also there are specific requirements for materials of construction to assure the equipment and guard are capable of withstanding the forces and pressures required of them.

5.1.3.3.5 Mechanical Power Transmission – per 29 CFR 1910.219 - equipment requires guarding of exposed parts, belts and chains that are more than 7 feet from the floor surface. Guarding requirements include specific distances for guards from the hazard or total enclosure of the hazard. Specific materials are required (and in some cases specific bracing and methods of affixing guarding) to assure that guards can withstand the forces and power applied. Periodic maintenance and inspection is required to assure guards remain in good operating condition.

5.1.3.3.5.1 Guarding is required for flywheels and prime movers, cranes and shafts, pulleys, belts, ropes and chain drives, gears sprockets and chained friction drives, keys setscrews and other projections, collars, bearing, couplings and clutches, and for shifters and poles.

5.1.3.3.6 Press Brakes – per 29 CFR 1910.217 – requires brake monitoring to automatically prevent the activation of a successive stroke if the safe stopping time or distance could fall outside set limitations. Type B and movable barrier device monitors must detect slide top-stop overrun beyond normal limits. Monitors must indicate when brake performance has deteriorated outside set limits and must monitor the brake system on each stroke.

5.2 Types of Guarding:

5.2.1 Interlocks are a type of guarding that breaks or opens a power circuit when the guard is not in place to prevent the machine or equipment from activating when the guard or interlock is not engaged. (Examples include copiers and similar office equipment that when the drawer or cabinet is opened to clear a jam or add new materials, the equipment automatically shuts off or powers down, or processing tank covers that shut down a process when opened.)

5.2.2 One or Two Hand Tripping Devices are types of guard that require the operator to remove their hand(s) from the material or area of operation to press a button or otherwise activate the machine cycle. These devices are guards that use location of the activation device rather than shielding to assure the operator is in a safe position.

5.2.3 Point of Operation Guards are devices that restrict the access to a dangerous area on machines where materials are being processed. Examples include shielding to prevent contact with a jig or saw blade, shielding over a conveyor or process, or enclosures.

5.2.4 Light Curtains and other Presence Sensing Devices (PSDs) are devices (usually electronic) that have sensors to detect objects or other obstructions and prevent the machine or equipment from activating or cycling while any object or material is in the path of the sensor. PSDs have very specific regulatory requirements. For more information see the Using Presence Sensing Devices form included with this program.

6. Training and Information.

6.1 General Training:

6.1.1 Operators and maintenance personnel will receive initial operations and initial machine safeguarding training prior to operating or maintaining equipment.

6.1.2 Where required, Lock-Out/Tag-Out (LOTO) training will be provided.

6.1.3 Refresher training will be provided prior to operating new or modified equipment, when procedures change, or when employee behavior indicates a need for retraining.

6.2 LOTO (Lock-out/Tag-out) Training:

6.2.1 Employees who perform service or maintenance on machinery and equipment (including lubrication, repair, clearing jammed parts or materials, or tool changes) will be trained in LOTO techniques to the "Authorized Employee" level.

6.2.2 Operators who work with or near machines that have such service or maintenance performed will be trained in LOTO techniques to the "Affected Employee" level.

6.2.3 Maintenance staff and operators will be trained in the hazards presented by the tool, machine or equipment and the means and methods used to reduce or eliminate such hazards, including specific tools used.

7. Definitions.

- *Point of operation* - The area on a machine where work is actually performed upon the material being processed.
- *LOTO* – Lock out/tag-out

PROGRAM OVERVIEW

MARKING INDUSTRIAL HAZARDS SAFETY PROGRAM

REGULATORY STANDARD: OSHA - 29 CFR 1910.144 (Safety Color Codes)
- 29 CFR 1910.145 (Signs and Tags)

INTRODUCTION: Many workplace injuries are the result of insufficient warning signs and color coding. Workplace hazards need to be marked to alert employees to the dangers that exist in a facility or area. Depending on the specific workplace situation, different regulations could apply. The OSHA Safety Color Coding System and criteria for the design and placement of signs and tags establish these requirements. The system also provides the criteria needed to help minimize injuries and to provide accident prevention information to affected workers.

TRAINING:

- Employees must understand the purpose, color codes and meaning of signs used in the workplace.

ACTIVITIES:

- Evaluate the facility to determine where safety signs and markings are required
- Provide appropriate signs and markings as required
- Ensure employees are aware of the signs and their meanings
- Provide equipment, as needed, for employees to comply with the requirements.
- Color Identification:
  - Red will be the basic color for the identification of: Fire protection equipment and apparatus, Danger, & Stop.
  - Yellow will be the basic color for designating caution and for marking physical hazards.
  - All signs will be furnished with rounded or blunt corners and will be free from sharp edges, burrs, splinters, or other sharp projections.

FORMS:

- Training Attendance Roster

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Marking Industrial Hazards Safety Program

1. Purpose. The OSHA Safety Color Coding System and criteria for the design and placement of signs and tags establish requirements and the criteria needed to help minimize injuries and to provide accident prevention information to affected workers. The company will review and evaluate this safety program:

1.1 On an annual basis and more frequently, as needed.

1.2 When changes occur to 29 CFR 1910.

1.3 When facility operational changes occur that require revision.

2. Scope. This program applies to all areas where safety signs and markings are required.

3. Responsibilities.

3.1 Management/Supervisors:

3.1.1 Evaluate the facility to determine where safety signs and markings are required

3.1.2 Provide appropriate signs and markings as required

3.1.3 Ensure employees are aware of the signs and their meanings

3.1.4 Provide equipment, as needed, for employees to comply with the requirements.

3.2 Employees:

3.2.1 Adhere to and follow the requirements indicated by safety signs and markings.

3.3 Safety Officer (as needed or required):

3.3.1 Assist in the development and implementation of this program

4. Procedure.

4.1 Color Identification:

4.1.1 Red. Red will be the basic color for the identification of:

4.1.1.1 Fire protection equipment and apparatus.

4.1.1.2 Danger. Safety cans or other portable containers of flammable liquids having a flash point at or below 80 F, table containers of flammable liquids (open cup tester), excluding shipping containers, will be painted red with some additional clearly visible identification either in the form of a yellow band around the can or the name of the contents conspicuously stenciled or painted on the can in yellow. Red lights will be provided at barricades and at temporary obstructions, as specified in ANSI Safety Code for Building Construction, A10.2-1944. Danger signs will be painted red.

4.1.1.3 Stop. Emergency stop bars on hazardous machines such as rubber mills, wire blocks, flat work irons, etc., will be red. Stop buttons or electrical switches which letters or other markings appear, used for emergency stopping of machinery will be red.

4.1.2 Yellow. Yellow will be the basic color for designating caution and for marking physical hazards such as: Striking against, stumbling, falling, tripping, and "caught in between."

5. Safety Information.

5.1 Accident Prevention Signs:

5.1.1 The following specifications apply to the design, application, and use of signs or symbols intended to indicate and define specific hazards of a nature such that failure to designate them may lead to accidental injury to our workers, the public, or to property damage. The following specifications are intended to cover all safety signs utilized except those designed for streets, highways, railroads, and marine regulations. These specifications do not apply to plant bulletin boards or to safety posters.

5.1.2 New and replaced signs. All new signs and replacements of old signs (on or after August 31, 1971), used will be in accordance with these specifications.

5.2 Classification of signs according to use:

5.2.1 Danger signs.

5.2.2 There will be no variation in the type of design of signs posted to warn of specific dangers and radiation hazards.

5.2.3 All employees will be instructed that danger signs indicate immediate danger and that special precautions are necessary.

5.2.4 Caution signs.

5.2.5 Caution signs will be used only to warn against potential hazards or to caution against unsafe practices.

5.2.6 All employees will be instructed that caution signs indicate a possible hazard against which proper precaution should be taken.

5.2.7 Safety instruction signs. Safety instruction signs will be used where there is a need for general instructions and suggestions relative to safety measures.

5.3 Sign Design and Features:

5.3.1 All signs procured or used will be furnished with rounded or blunt corners and will be free from sharp edges, burrs, splinters, or other sharp projections. The ends or heads of bolts or other fastening devices will be located in such a way that they do not constitute a hazard.

5.3.1.1 Danger signs.

5.3.1.1.1 The colors red, black, and white will be those of opaque glossy samples (as specified in the "Fundamental Specification of Safety Colors for CIE Standard Source "C", American National Standard Z53.1-1967).

5.3.1.2 Caution signs.

5.3.1.2.1 Standard color of the background will be yellow; and the panel, black with yellow letters. Any letters used against the yellow background will be black. The colors will be those of opaque glossy samples as specified in Table 1 of American National Standard Z53.1-1967.

5.3.1.3 Safety instruction signs. Standard color of the background will be white; and the panel, green with white letters. Any letters used against the white background will be black. The colors will be those of opaque glossy samples as specified in Table 1 of American National Standard, Z53.1-1967.

5.3.1.3.1 Slow-moving vehicle emblem. This emblem consists of a fluorescent yellow-orange triangle with a dark red reflective border. The yellow-orange fluorescent triangle is a highly visible color for daylight exposure. The reflective border defines the shape of the fluorescent color in daylight and creates a hollow red triangle in the path of motor vehicle headlights at night. The emblem is intended as a unique identification for, and it will be used only on, vehicles which by design move slowly (25 m.p.h. or less) on the public roads. The emblem is not a clearance marker for wide machinery nor is it intended to replace required lighting or marking of slow-moving vehicles. Neither the color film pattern and its dimensions nor the backing will be altered to permit use of advertising or other markings. The material, location, mounting, etc., of the emblem will be in accordance with the American Society of Agricultural Engineers Emblem for Identifying Slow-Moving Vehicles, ASAE R276, 1967, or ASAE S276.2 (ANSI B114.1-1971).

5.3.1.3.2 Biological hazard signs. The biological hazard warning is used to signify the actual or potential presence of a biohazard and to identify equipment, containers, rooms, materials, experimental animals, or combinations thereof, which contain, or are contaminated with, viable hazardous agents. It this respect the term "biological hazard," or "biohazard," includes only those infectious agents presenting a risk or potential risk to the well-being of humans.

5.4 Sign wording:

5.4.1 Nature of wording. The wording of any sign used will be easily read and concise. All signs will contain sufficient information to be easily understood. The wording will be formed to make a positive, rather than negative suggestion and will be accurate in fact.

5.5 Accident Prevention Tags:

5.5.1 The following specifications apply to the design, application, and use of tags intended to indicate and to identify hazardous conditions, provide a message to our employees with respect to hazardous conditions as set forth in this safety program, or to meet the specific tagging requirements of other OSHA regulatory standards such as the Control of Hazardous Energy Regulatory Standard (Lock-Out Tag-Out).

5.5.2 Intended use. Tags will be used as a means to prevent accidental injury or illness to employees who are exposed to hazardous or potentially hazardous conditions, equipment or operations which are out of the ordinary, unexpected or not readily apparent. Tags will be used until such time as the identified hazard is eliminated or the hazardous operation is completed. Tags need not be used where signs, guarding or other positive means of protection are being used.

5.5.3 General tag criteria. All required tags will meet the following criteria:

5.5.3.1 Tags will contain a signal word and a major message.

5.5.3.1.1 The signal word will be either "Danger," "Caution," or "Biological Hazard," "BIOHAZARD," or the biological hazard symbol.

5.5.3.1.2 The major message will indicate the specific hazardous condition or the instruction to be communicated to the employee.

5.5.3.1.3 The signal word will be readable at a minimum distance of five feet (1.52 m) or such greater distance as warranted by the hazard.

5.5.3.1.4 The tag's major message will be presented in either pictograph, written text or both.

5.5.3.1.5 The signal word and the major message will be understandable to all employees who may be exposed to the identified hazard.

5.5.3.1.6 All employees will be informed as to the meaning of the various tags used throughout the workplace and what special precautions are necessary.

5.5.3.1.7 Tags will be affixed as close as safely possible to their respective hazards by a positive means such as string, wire, or adhesive that prevents their loss or unintentional removal.

5.5.3.2 Types of tags.

5.5.3.2.1 Danger tags. Danger tags will be used in major hazard situations where an immediate hazard presents a threat of death or serious injury to employees. Danger tags will be used only in these situations.

5.5.3.3 Recommended Color Coding.

5.5.3.3.1 "DANGER" - Red, or predominantly red, with lettering or symbols in a contrasting color.

5.5.3.3.2 Caution tags. Caution tags will be used in minor hazard situations where a non-immediate or potential hazard or unsafe practice presents a lesser threat of employee injury. Caution tags will be used only in these situations.

5.5.3.3.2.1 "CAUTION" - Yellow, or predominantly yellow, with lettering or symbols in a contrasting color.

5.5.3.3.3 Warning tags. Warning tags may be used to represent a hazard level between "Caution" and "Danger," instead of the required "Caution" tag, provided that they have a signal word of "Warning," and an appropriate major message.

5.5.3.3.3.1 "WARNING" - Orange, or predominantly orange, with lettering or symbols in a contrasting color.

5.5.3.3.4 Biological hazard tags.

5.5.3.3.4.1 Biological hazard tags will be used to identify the actual or potential presence of a biological hazard and to identify equipment, containers, rooms, experimental animals, or combinations thereof, that contain or are contaminated with hazardous biological agents.

5.5.3.3.4.2 "BIOLOGICAL HAZARD" - Fluorescent orange or orange-red, or predominantly so, with lettering or symbols in a contrasting color.

5.5.3.3.5 Other tags. Other tags may be used in addition to those indicated in this Safety program or in other situations where tags are required, provided that they do not detract from the impact or visibility of the signal word and major message of any required tag.

6. Training and Information.

6.1 The company will ensure that the purpose, color coding, and design of color codes and signs are understood by employees and that the knowledge and skills required for their safe application and usage are acquired by employees.

6.1.1 All employees will be informed as to the meaning of the various color codes, signs and tags used throughout the workplace and what, if any, special precautions are necessary.

6.1.2 Color codes, signs and tags must be legible and understandable by all employees, affected employees, and all other employees whose work operations are or may be in the area, in order to be effective. Non-legible or missing color codes, signs, and tags will be reported to area Supervisors immediately.

6.1.3 Color codes, signs and tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace.

6.1.4 Information will be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment or processes that present new color codes, signs, or tags, or when there is an accident resulting because of a color code, sign, or tag this is defaced or inaccurate.

6.1.5 Additional information will also be provided whenever a periodic inspection reveals, or whenever there is reason to believe, that there are deviations from or inadequacies in the employee's knowledge or use of the color codes, signs, or tags.

6.1.5.3 The information provided must reestablish employee proficiency and introduce new or revised color codes, signs or tags as necessary.

7. Definitions.

- *Biological hazard or BIOHAZARD* - Those infectious agents presenting a risk of death, injury or illness to employees.

- *Major message* - That portion of a tag's inscription that is more specific than the signal word and that indicates the specific hazardous condition or the instruction to be communicated to the employee. Examples include: "High Voltage," "Close Clearance," "Do Not Start," or "Do Not Use" or a corresponding pictograph used with a written text or alone.

- *Pictograph* - A pictorial representation used to identify a hazardous condition or to convey a safety instruction.

- *Sign* - Refers to a surface on prepared for the warning of, or safety instructions of, industrial workers or members of the public who may be exposed to hazards. Excluded from this definition, however, are news releases, displays commonly known as safety posters, and bulletins used for employee education.

- *Signal word* - That portion of a tag's inscription that contains the word or words that are intended to capture the employee's immediate attention.

- *Tag* - A device usually made of card, paper, pasteboard, plastic or other material used to identify a hazardous condition.

PROGRAM OVERVIEW

NOISE EXPOSURE AND HEARING CONSERVATION SAFETY PROGRAM

REGULATORY STANDARD: *OSHA - 29 CFR 1910.95*
- 29 CFR 1926.52

INTRODUCTION: OSHA mandates employers to protect their employees against occupational noise exposure when sound levels exceed established thresholds (85 dBa). This program ensures adherence to the OSHA standard by detailing requirements for audiometric testing, hearing conservation, and training. It also contains recordkeeping parameters and offers guidance in computing noise exposure and estimating the adequacy of hearing protector attenuation.

TRAINING:

- Institute an annual training program for all employees who are exposed to noise at or above an 8-hour time weighted average of 85 decibels

ACTIVITIES:

- Determine where noise levels exist above regulatory levels, conduct monitoring
- Appoint a Hearing Conservation Coordinator
- Establish a written Noise Exposure and Hearing Conservation Program
- Establish engineering controls, administrative controls or protective equipment requirements (in that order) to reduce or eliminate the health and safety effects of noise
- Notify employees exposed at or above action levels
- Ensure employees in noise zones receive baseline and annual audiograms
- Record any noise related hearing loss as required on OSHA recordkeeping forms
- Ensure protective equipment and materials are available, as needed or required
- Track employee training to assure annual and refresher training programs are provided

FORMS:

- Program Assessment
- Computation and Rating Tables
- Text of Standard
- Training Attendance Roster

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Noise Exposure Safety Program

1. Purpose. Company policy is to protect employees from potentially harmful noise by implementing appropriate hearing conservation and noise control measures. Exposure to excessive noise can result in permanent hearing impairment, and can interfere with necessary speech communication and perception of auditory warning signals. The degree to which these effects occur depends on the intensity, spectrum, periodicity and duration of noise exposure in addition to individual susceptibility, the purpose of an occupational Noise Exposure and Hearing Conservation Program is to prevent hearing impairment related to noise exposure at the work-site. The company will review and evaluate this safety program:

1.1 On an annual basis, or more frequently as needed or required.

1.2 Upon changes (to equipment, tools or processes) that affect this program.

1.3 As changes are noted to regulations which require revision of this document.

2. Scope. This program applies to all company facilities or job-sites where noise exposures exist above regulatory levels.

3. Responsibilities.

3.1 Management/Supervisors:

3.1.1 Establish Noise Zone Areas, where required.

3.1.2 Appoint a Hearing Conservation Coordinator. This person can be the Safety Officer for the company or another designated person.

3.1.3 Ensure employees in noise zones receive annual audiograms.

3.1.4 Establish a written Noise Exposure and Hearing Conservation Program.

3.1.5 Ensure protective equipment and materials are available, as needed or required.

3.1.6 Establish engineering controls, administrative controls or protective equipment requirements (in that order) to reduce or eliminate the health and safety effects of noise.

3.1.7 Notify employees of the occurrence of, problems with or changes to audiometric testing.

3.1.8 Provide employees the opportunity to observe (or participate in) audiometric testing.

3.2 Employees:

3.2.1 Report signs and symptoms of noise exposure to supervisors immediately.

3.2.2 Attend required training.

3.2.3 Utilize hearing protective devices, when required.

3.3 Safety Officer (as needed or required):

3.3.1 Assist in the development and implementation of this program.

3.4 Hearing Conservation Coordinator (HCC):

3.4.1 Implement a Noise Exposure and Hearing Conservation Program that includes audiometric testing and training for employees who work in noise zones.

3.4.2 Ensure employees who work in noise zones are appropriately trained.

3.4.3 Ensure employees who work in noise zones utilize protective equipment, as required.

3.4.4 Track employee training to assure annual and refresher training programs are provided.

4. Procedure.

4.1 Audiometric Testing Program:

4.1.1 An audiometric testing program will be maintained that is free of charge for employees whose exposures equal or exceed regulatory action levels (85dBa over 8 hours).

4.1.2 Audio metric tests will be performed by a licensed or certified audiologist, otolaryngologist, or other physician, or by a technician who is certified by the Council of Accreditation in Occupational Hearing Conservation. A technician who performs audiometric tests must be responsible to an audiologist, otolaryngologist or physician.

4.1.3 All audiograms will meet the established regulatory requirements.

4.1.4 Company management will provide protection against the effects of noise exposure when the sound levels within our facility exceed the established limits.

PERMISSIBLE NOISE EXPOSURES	
Duration per day, hours	Sound level dBA *slow response*
8	90
6	92
4	95
3	97
2	100
1 ½	102
1	105
½	110
¼ or less	115

4.1.5 When noise levels are determined by octave band analysis, they may then be converted to the more common "A-Weighted Scale" via a mathematical graph conversion. (This process is outlined in 29 CFR1910.95.) The A-Weighted sound level will be used to determine exposure limits.

4.1.6 When employees are subjected to sound levels exceeding the established limits, the company will provide for audiometric examinations, obtain valid audiograms, and ensure proper controls are reviewed and implemented where feasible. If such controls fail to reduce sound levels to established guidelines, personal protective equipment will be provided and used to reduce sound levels within the levels of the table.

4.1.6.1 If the variations in noise level involve intervals of 1 second or less, it will be considered continuous. When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect will be considered, rather than the individual effect of each.

4.1.6.2 Exposure to impulsive or impact noise will not exceed 140 dB peak sound pressure levels.

4.2 Noise Exposure and Hearing Conservation Program:

4.2.1 The designated Hearing Conservation Coordinator will administer a continuing, effective Noise Exposure and Hearing Conservation Program, whenever employee noise exposures equal or exceed an 8 hour time weighted average sound level (TWA) of 85 decibels measured on the A scale (slow response) or, equivalently, a dose of fifty percent. For purposes of the Noise Exposure and Hearing Conservation Program, employee noise exposures will be computed without regard to any attenuation provided by the use of personal protective equipment. (An 8-hour time weighted average of 85 decibels or a dose of fifty percent will also be referred to as the *action level*.)

4.2.2 Monitoring. When information indicates that any employee's exposure may equal or exceed an 8-hour time weighted average of 85 decibels, this monitoring program will be implemented.

4.2.2.1 The company will conduct sampling on an annual basis, at a minimum, where noise levels are known or suspected to exceed regulatory thresholds. Sampling is designed to identify employees for inclusion in the Noise Exposure and Hearing Conservation Program and to enable the proper selection of hearing protectors.

4.2.2.2 Where circumstances such as high worker mobility, significant variations in sound level, or a significant component of impulse noise make area monitoring ineffective, the Hearing Conservation Coordinator, or other trained and qualified person will use representative personal sampling to comply with the regulatory monitoring requirements.

4.2.2.3 All continuous, intermittent and impulsive sound levels from 80 decibels to 130 decibels will be integrated into the noise measurements.

4.2.2.4 Instruments used to measure employee noise exposure will have been calibrated to ensure measurement accuracy.

4.2.2.5 Monitoring will be repeated whenever a change in production, process, equipment or controls increases noise exposures to the extent that:

4.2.2.5.1 Additional employees may be exposed at or above the action level.

4.2.2.5.2 The attenuation or reduction in noise levels provided by hearing protectors are or may be rendered inadequate to meet the requirements.

4.2.3 Employee notification. The company will notify each employee exposed at or above an 8-hour time weighted average of 85 decibels of the results of the monitoring.

4.2.4 Observation of monitoring. The company will provide affected employees or their representatives with an opportunity to observe any noise measurements conducted.

4.2.5 Baseline audiogram. Within 6 months of an employee's first exposure at or above the action level, the company will establish a valid baseline audiogram against which subsequent audiograms can be compared. Where baseline audiograms cannot be obtained within this timeframe, employees will wear hearing protectors until the baseline audiogram is obtained.

4.2.5.1 Testing to establish a baseline audiogram will be preceded by at least 14 hours without exposure to workplace noise. Hearing protectors may be used as a substitute for the requirement that baseline audiograms be preceded by 14 hours without exposure to workplace noise. The company will notify employees of the need to avoid high levels of non-Noise exposure during the 14-hour period immediately preceding the audiometric examination.

4.2.6 Annual audiogram. At least annually after obtaining the baseline audiogram, the company will obtain a new audiogram for each employee exposed at or above an 8-hour time weighted average of 85 decibels.

4.2.7 Evaluation of audiogram. Each employee's annual audiogram will be compared to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift has occurred. This comparison may be done by an individual trained to the audiometric technician level. If the annual audiogram shows that an employee has suffered a standard threshold shift, a retest will be accomplished within 30 days and the results considered as the annual audiogram.

4.2.8 Problem audiograms. The company will ensure that an audiologist, otolaryngologist, or physician review problem audiograms and determine whether there is a need for further evaluation. The reviewer will be provided the following information:

4.2.8.1 The baseline audiogram and most recent audiogram of the employee to be evaluated.

4.2.8.2 Measurements of background sound pressure levels in the audiometric test room, (if the testing was not conducted at the reviewer’s facility).

4.2.8.3 Records of audiometer calibrations, (if the testing was not conducted at the reviewer’s facility).

4.2.9 Follow-up procedures. If a comparison of the annual audiogram to the baseline audiogram indicates a standard threshold shift has occurred, the employee will be informed of this fact in writing, within 21 days of the determination.

4.2.10 Standard threshold shift. A standard threshold shift is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear. In determining whether a standard threshold shift has occurred, allowance may be made for the contribution of aging (presbycusis) to the change in hearing level by correcting the annual audiogram in accordance with the regulatory standards. Unless a physician determines that the standard threshold shift is not work related or aggravated by Noise exposure, the company will ensure that the following steps are taken when a standard threshold shift occurs:

4.2.10.1 Employees exposed or potentially exposed to high noise will be fitted with hearing protectors, trained in their use and care, and required to use them. For known high noise job assignments, employees will be fitted and trained prior to job assignment.

4.2.10.2 Employees already using hearing protectors will be refitted and retrained in the use of hearing protectors and provided with hearing protectors offering greater attenuation if necessary.

4.2.10.3 Employees will be referred for a clinical audiological evaluation or an otological examination, 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.

4.2.10.4 Employees will be informed of the need for an otological examination if a medical pathology of the ear that is unrelated to the use of hearing protectors is suspected.

4.2.10.5 If subsequent audiometric testing of an employee whose exposure to noise is less than an 8 hour TWA of 90 decibels indicates that a standard threshold shift is not persistent, the company:

4.2.10.5.1 Will inform the employee of the new audiometric interpretation.

4.2.10.5.2 May discontinue the required use of hearing protectors for that employee.

4.2.11 Revised baseline. An annual audiogram may be substituted for the baseline audiogram when, in the judgment of the audiologist, otolaryngologist or physician who is evaluating the audiogram determine that:

4.2.11.1 The standard threshold shift revealed by the audiogram is persistent.

4.2.11.2 The hearing threshold shown in the annual audiogram indicates significant improvement over the baseline audiogram.

4.2.12 Audiometric test requirements. Audiometric tests conducted will meet all regulatory requirements and be administered by a licensed audiologist or other equivalent professional. Audiometric examinations will be administered in a room meeting the regulatory requirements for Audiometric Test Rooms.

4.2.13 Audiometer calibration. The functional operation of the audiometer will be checked and calibrated before each day's use, in accordance with manufacturer's requirements and/or regulatory standards.

4.2.13.1 An exhaustive calibration will be performed at least every two years. Test frequencies below 500 Hz and above 6000 Hz may be omitted from this calibration.

4.2.14 Hearing protectors. The company will make hearing protections available to all employees exposed to an 8-hour time weighted average of 85 decibels or greater at no cost to the employees. Hearing protectors will be replaced at no cost as necessary. The company will ensure that hearing protectors are worn:

4.2.14.1 By any employee who is required by previous testing to wear personal protective equipment.

4.2.14.2 By any employee who is exposed to an 8-hour time weighted average of 85 decibels or greater, and who: has not yet had a baseline audiogram established, or has experienced a standard threshold shift.

4.2.14.3 Employees will be given the opportunity to select their hearing protectors from a variety of suitable hearing protectors provided.

4.2.14.4 The company will provide training in the use and care of all hearing protectors provided to employees.

4.2.14.5 The company will ensure proper initial fitting and supervise the correct use of all hearing protectors.

4.2.15 Hearing protector attenuation. The company will evaluate hearing protector attenuation for the specific noise environments in which the protector will be used in accordance with regulatory requirements. One of the evaluation methods described in Appendix B: Methods for Estimating the Adequacy of Hearing Protection Attenuation will be used.

4.2.15.1 Selected hearing protectors will attenuate employee exposure at least to an 8 hour time weighted average of 90 decibels.

4.2.15.2 For employees who have experienced a standard threshold shift, selected hearing protectors must attenuate their exposure to an 8-hour time weighted average of 85 decibels or below.

4.2.15.3 The adequacy of hearing protector attenuation will be re-evaluated whenever employee noise exposures increase to the extent that the hearing protectors provided may no longer provide adequate attenuation. More effective hearing protectors will be provided where necessary.

5. Safety Information.

5.1 Recordkeeping:

5.1.1 Exposure measurements. The company will maintain an accurate record of all employee exposure measurements.

5.1.2 Audiometric tests. The company will maintain accurate records of the measurements of the background sound pressure levels in audiometric test rooms. Additionally, all employee audiometric test records will be retained. These employee records will include as a minimum:

5.1.2.1 Name and job classification of the employee

5.1.2.2 Date of the audiogram

5.1.2.3 The examiner's name

5.1.2.4 Date of the last acoustic or exhaustive calibration of the audiometer

5.1.2.5 Employee's most recent noise exposure assessment

5.1.3 Record retention. The company will retain audiometric and related records for at least the following periods.

5.1.3.1 Noise exposure measurement records will be retained for two years.

5.1.3.2 Audiometric test records will be retained for the duration of the affected employee's employment.

5.1.4 Access to records. All records cited in this safety program will be provided upon request to employees, former employees, representatives designated by the individual employee, and representatives of OSHA. Copies of this program and the text of the regulation (29CFR1910.95) will be available and will be posted in the work place noise zone.

5.1.5 Transfer of records. If the company ceases to do business, the records will be transferred to the successor employer and maintained by the successor employer. Should the company cease to function entirely, the records will be provided to the respective employees, or as required by current law.

6. Training and Information.

6.1 The company will institute a training program for all employees who are exposed to noise at or above an 8-hour time weighted average of 85 decibels, and will ensure employee participation in such program.

6.2 The training program will be repeated annually for each employee included in the Noise Exposure and Hearing Conservation Program. Information provided in the training program

will be updated to be consistent with changes in protective equipment and work processes. Each employee will be informed of the following:

6.2.1 The effects of noise on hearing.

6.2.2 The purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types, and instructions on selection, fitting, use, and care.

6.2.3 The purpose of audiometric testing, and an explanation of the test procedures.

7. Definitions.

- *Action level*--An 8-hour time weighted average of 85 decibels measured on the A-scale, slow response, or equivalently, a dose of fifty percent.

- *Audiogram*--A chart, graph, or table resulting from an audiometric test showing an individual's hearing threshold levels as a function of frequency.

- *Audiologist*--A professional specializing in the study and rehabilitation of hearing that is certified by the American Speech-Language-Hearing Association or licensed by a state board of examiners.

- *Baseline audiogram*--The audiogram against which future audiograms are compared.

- *Criterion sound level*--A sound level of 90 decibels.

- *Decibel (dB)*--Unit of measurement of sound level.

- *dBA (Decibel "A" weighted)* - A sound level measured using the "A" weighted scale of a sound level meter.

- *HCC* - Noise Exposure and Hearing Conservation Program Coordinator – a person designated to oversee the HCP.

- *HCP* - Noise Exposure and Hearing Conservation Program.

- *Hertz (Hz)*--Unit of measurement of frequency, numerically equal to cycles per second.

- *Medical pathology*--A disorder or disease. For purposes of this instruction, a condition or disease affecting the ear, which should be treated by a physician specialist.

- *Noise dose*--A function of both the sound level (dBA) and duration of exposure in hours per day compared to a maximum allowable exposure, expressed as a percent. For example:
  - A 50% noise dose is the exposure level at which a Noise Exposure and Hearing Conservation Program is required. It is equivalent to an exposure of 85 dBA for 8 hours, 83 dBA for 10 hours or 82 dBA for 12 hours.
  - A noise dose of 100% is equivalent to an average exposure of 90 dBA for 8 hours, 88 dBA for 10 hours, and 87 dBA for 12 hours. Engineering or administrative controls are required when employee exposure reaches 100% dose.

- *Noise dosimeter*--An instrument that integrates a function of sound pressure over a period of time in such a manner that it directly indicates a noise dose.

- *Noise Exposure Zone (Noise Zone)* - an area or an operation within an operating unit, where a person, or group of persons, is identified as routinely receiving a 50% or greater noise dose.

- *Noise Reduction Rating (NRR)* - The reduction in sound level that may be obtained by a hearing protection device if it is worn properly.

- *Otolaryngologist*--A physician specializing in diagnosis and treatment of disorders of the ear, nose and throat.

- *Representative exposure*--Measurements of an employee's noise dose or 8-hour time weighted average sound level that the employers deem to be representative of the exposures of other employees in the workplace.

- *Sound level*--Ten times the common logarithm of the ratio of the square of the measured A-weighted sound pressure to the square of the standard reference pressure of 20 micropascals. Unit: decibels (dB). For use with this instruction, SLOW time response, in accordance with ANSI S1.4-1971 (R1976), is required.

- *Sound level meter*--An instrument for the measurement of sound level.

- *Standard Threshold Shift (STS*) - defined by OSHA as "a change in hearing threshold relative to the baseline audiogram of an average of 10 dBA or more at 2000, 3000 and 4000 Hz in either ear".

- *Time weighted average sound level*--That sound level, which if constant over an 8-hour exposure, would result in the same noise dose as is measured.

PROGRAM OVERVIEW

OSHA RECORDKEEPING SAFETY PROGRAM

REGULATORY STANDARD - OSHA - 29 CFR 1904

INTRODUCTION: The OSHA Recordkeeping Standard requires certain industry segments to evaluate workplace injuries and illnesses, and mandates these employers to collect, compile, retain, analyze and communicate this information to employees. This program establishes criteria for logging occupational injuries or illnesses, posting the annual summary and record retention.

TRAINING:

- Recommended that for supervisors and managers to assist in determining what is recordable.

ACTIVITIES:

- Determine if recordkeeping standards apply
- Maintain appropriate records: OSHA 300, 300A, and 301 (or equivalent) forms
- Supply the records and documentation to OSHA, as needed or required
- Notify OSHA within 8 hours of fatalities or of significant incidents which meet set requirements
- Post appropriate summaries of the OSHA recordkeeping forms
- Encourage employees to report any incidents (injuries, illnesses, and near-miss incidents)
- Report the contents and summaries of these documents upon being notified in writing by the Bureau of Labor Statistics that the employer has been selected to participate in a statistical survey of occupational injuries and illnesses
- Retain log and summary of all recordable occupational injuries and illnesses (OSHA 300 and OSHA 300A or equivalent) for 5 years

FORMS:

- OSHA 300 Form
- OSHA 300A Form
- OSHA 301 Form or
- Accident, Incident, Near Miss Investigation Report
- Training attendance roster

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OSHA Recordkeeping Safety Program

1. Purpose. Records are required to be kept by most employers that indicate the number, types and severity of work related injuries, illnesses and fatalities. The OSHA Recordkeeping Safety Program is designed to assist the company in compliance with the requirements of 29CFR1904 (OSHA's Recordkeeping Standard). The company will review and evaluate this safety program:

1.1 On an annual basis, or more frequently if required.

1.2 When changes occur to 29 CFR 1904 that prompt revision of this document.

1.3 When facility operational changes occur that require a revision of this document.

2. Scope. The OSHA Recordkeeping Safety Program applies to all facilities and job sites where company employees work.

3. Responsibilities.

3.1 Management/Supervisors:

3.1.1 Determine if recordkeeping standards apply.

3.1.2 Maintain appropriate records.

3.1.3 Supply the records and documentation to OSHA, as needed or required.

3.1.4 Notify OSHA within 8 hours of fatalities or incidents with multiple hospitalizations (3 or more employees) or any fatality, as needed or required.

3.1.4.1 CALIFORNIA – requires the reporting for one or more persons admitted to the hospital for treatment (not observation) for a period of more than 24 hours or if an employee loses any member of the body (finger, arm, leg, etc.) or suffers any serious permanent disfigurement. This does not include injuries, illnesses or deaths resulting from a criminal act or an accident on a public street or highway.

3.1.5 Post appropriate summaries of the OSHA recordkeeping forms.

3.1.6 Encourage employees to report any incidents (injuries, illnesses, property damage and near-miss incidents).

3.2 Employees:

3.2.1 Report any work related injuries or illnesses immediately to management or your supervisor.

3.3 Safety Officer (as needed or required):

3.3.1 Assist in the implementation of the OSHA Recordkeeping Safety Program.

4. Procedure.

4.1 General Recordkeeping Requirements:

4.1.1 Companies with eleven (11) or more employees at any time during the calendar year must comply with the provisions of the recordkeeping standard (29 CFR 1904).

4.1.2 The company will maintain a log of occupational injuries and illnesses on the required OSHA 300, 300A and 301 (or equivalent) forms.

4.1.2.1 The company will report the contents and summaries of these documents upon being notified in writing by the Bureau of Labor Statistics that the employer has been selected to participate in a statistical survey of occupational injuries and illnesses.

4.2 Log and Summary of Occupational Injuries and Illnesses (OSHA 300). The log will be used for classifying occupational injuries and illnesses, and for noting the extent of each case. The log shows when the occupational injury or illness occurred, to whom, the regular job of the injured or ill person at the time of the injury or illness exposure, the department or area in which the person was employed, the type of injury or illness, how much time was lost, whether the case resulted in a fatality, etc. The company will:

4.2.1 Maintain a log and summary of all recordable occupational injuries and illnesses by calendar year, each year. Past logs must be maintained for 5 years, after which they may be discarded.

4.2.1.1 Each year's form will be updated to include newly discovered cases and to reflect changes that occur in recorded cases after the end of the calendar year. If, during the 5-year retention period, there is a change in the extent or outcome of an injury or illness which affects an entry on a previous year's log, then the first entry will be lined out and a corrected entry made on that log. New entries for previously unrecorded cases that are discovered will also be documented. Log totals will also be modified to reflect these changes.

4.2.2 Enter each recordable injury and illness on the log and summary as early as practicable but no later than 6 working days after receiving information that a recordable injury or illness has occurred. For this purpose OSHA Form No. 300 or an equivalent document will be used. The log and summary will be completed in the detail provided in the form and instructions on form OSHA No. 300.

4.2.3 If the company elects to maintain the log of occupational injuries and illnesses at a place other than the main facility or by means of data-processing equipment, or both, it will meet the following criteria:

4.2.3.1 There will be available at the place where the log is maintained sufficient information to complete the log to a date within 6 working days after receiving information that a recordable case has occurred.

4.2.3.2 At each facility there will be available a copy of the log which reflects separately the injury and illness experience of that establishment complete and current to a date within 45 calendar days.

4.3 Supplementary Record (OSHA 301):

4.3.1 In addition to the log of occupational injuries and illnesses (OSHA 300) the company will have (within 6 working days after receiving information that a recordable case has occurred) a supplementary record for each occupational injury or illness for that establishment. The record will be completed in the detail prescribed in the instructions accompanying Occupational Safety and Health Administration OSHA Form No. 301. Workmen's compensation, insurance, or other alternative records (provided they contain the information required by OSHA Form No. 301) are acceptable substitutes.

4.4 Annual Summary:

4.4.1 The company will post an annual summary of occupational injuries and illnesses for each facility under our control. This summary will consist of a copy of the year's totals from the form OSHA No. 300 and the following information from that 300 form:

4.4.1.1 Calendar year covered.

4.4.1.2 Company name and establishment address.

4.4.1.3 Verification signature, title, and date.

4.4.1.4 A form OSHA No. 300-A will be used in presenting the summary. If no injuries or illnesses occurred in the year, zeros will be entered on the total line, and the form posted.

4.4.1.5 The summary will be completed by February 1 of each calendar year. Management, or the officer or employee of the employer who supervises the preparation of the log and summary of occupational injuries and illnesses, will verify that the annual summary of occupational injuries and illnesses is true and complete. The verification will be accomplished by affixing their signature, attesting that the summary is true and complete.

4.4.1.6 The company will post a copy of the establishment's summary (OSHA Form 300A) in each facility in a place accessible to employees and in a location where employees would normally look for such information. The summary covering the previous calendar year will be posted no later than February 1 and will remain in place until April 30. For employees who do not primarily report or work at a fixed site belonging to the company, or who do not report to any fixed site on a regular basis, we will satisfy this posting requirement by presenting or mailing a copy of the summary during the month of February of the following year to each such employee who receives pay during that month.

5. Safety Information.

5.1 Records Retention. Records maintained by the company will be retained for the following time periods following the end of the year to which they relate.

5.1.1 Log and summary of all recordable occupational injuries and illnesses (OSHA 300 and OSHA 300A or equivalent). Retained for 5 years.

5.1.2 Supplementary records (OSHA 301 or equivalent) for each occupational injury or illness for this facility. Retained for 5 years.

5.1.3 Employee exposure and medical records for company employees. Retained for the duration of employment plus an additional 30 years.

5.1.4 Noise exposure measurement records. Retained for the duration of employment plus an additional 30 years.

5.1.5 Audiometric test records. Retained for the duration of the affected employee's employment.

5.2 Access to Records. The company will provide, upon request, these established records, for inspection and copying by any representative of OSHA or the DOL (or state equivalent agencies) for the purpose of carrying out the provisions of the OSHA act, and for statistical compilation.

5.2.1 The log and summary of all recordable occupational injuries and illnesses (OSHA No. 300) will, upon request, be made available to any employee, former employee, and to their representatives for examination and copying in a reasonable manner and at reasonable times. The employee, former employee, and their representatives will have access to the log for any establishment in which the employee is or has been employed.

5.3 Reporting of Fatality or Multiple Hospitalization Accidents. Within 8 hours after the occurrence of a work related accident which is fatal to one or more employees or which results in hospitalization of 3 or more employees, the company will report the accident either orally or in writing. The reporting must be by telephone. The report will relate the circumstances of the accident, the number of fatalities, and the extent of any injuries. It is understood that the Area OSHA Director may require such additional reports, in writing or otherwise, as he deems necessary concerning the accident. This report is to be made to the nearest office of the Occupational Safety and Health Administration. You may also use the OSHA toll free central number 1-800-321-6742. A listing of the current offices can be accessed on the OSHA website (www.OSHA.gov), and a listing current to June, 2005 is included as a form with the OSHA Recordkeeping Safety Program.

5.3.1 CALIFORNIA – requires the reporting for one or more persons admitted to the hospital for treatment (not observation) for a period of more than 24 hours or if an employee loses any member of the body (finger, arm, leg, etc.) or suffers any serious permanent disfigurement. This does not include injuries, illnesses or deaths resulting from a criminal act or an accident on a public street or highway.

5.4 Change of Ownership. In the event a change of company ownership should occur, the company will notify the buyers of the requirement to preserve those records of the prior ownership, if any are required to be maintained.

5.5 Petitions for Recordkeeping Exceptions. In the event the company chooses to maintain records in a manner different from that required, the company will submit a petition containing the information specified by the Regional Commissioner of the Bureau of Labor Statistics in our region.

5.6 Employees Not In Fixed Establishments. Recording requirements for company employees engaged in physically dispersed operations (such as construction, installation, repair or service activities) who do not report to any fixed company establishment on a regular basis but are subject to common supervision will be satisfied by:

5.6.1 Maintaining the required records for each operation or group of operations which is subject to common supervision (field superintendent, field supervisor, etc.) in the main office of the company.

5.6.2 Having the address and telephone number of the main office available at each worksite.

5.6.3 Having personnel available at the main office during normal business hours to provide information from the records maintained there by telephone and by mail.

5.7 Statistical Safety Program. The company will comply with all requirements to maintain, provide, and use statistical summaries. Upon receipt of an Occupational Injury and Illnesses Survey Form, the company will promptly complete the form in accordance with the instructions contained therein, and return it in accordance with the instructions.

5.8 Recordable Classification:

5.8.1 Case analysis. The following decision logic will be followed:

5.8.1.1 Determine whether a case occurred (death, injury, illness).

5.8.1.2 Establish that the case was work related.

5.8.1.2.1 Case resulting from an event or exposure in the work environment. In addition to the physical location, equipment or materials used in the course of an employee's work are also considered part of the employee's work environment.

5.8.1.2.2 Case resulting from an event or exposure in other locations where employees are engaged in work-related activities or are present as a condition of their employment.

5.8.1.3 Establishing that the case was not work related.

5.8.1.3.1 The case will be considered not work related when an employee is off duty on our premises as a member of the general public and not as an employee.

5.8.1.3.2 The case will be considered not work related when an employee has symptoms that merely surface on company premises, but are the result of a non-work related event or exposure off the premises.

5.8.1.4 Determining if the case is an illness or injury.

5.8.1.4.1 Illness cases. Illnesses usually result from a long-term exposures or cases where the illness does not develop as the result of an instantaneous event. This concept of illness includes acute illnesses which result from exposures of relatively short duration.

5.8.1.4.2 Injury cases. Injuries are only required to be recorded when they require medical attention (other than first aid). Injuries are usually caused by instantaneous events in the work environment. Cases resulting from anything other than instantaneous events are considered illnesses.

5.8.1.4.3 Recordable case. If the case is an injury, decide if it is recordable. The following criteria will be used as a basis for recordability. The case will be recorded if the employee has:

5.8.1.4.3.1 A work related injury.

5.8.1.4.3.2 Medical treatment other than first aid.

5.8.1.4.3.3 Has a loss of consciousness.

5.8.1.4.3.4 Experiences restriction of work or motion.

5.8.1.4.3.5 Been transferred to another job.

5.8.1.4.4 Illness case. Generally, occupationally induced illness should be recorded as a separate entry on the OSHA 300 (or equivalent) log. However, certain illnesses, such as silicosis, may have prolonged effects which recur over time. The recurrence of these symptoms will not be recorded as new cases on the OSHA forms. The recurrence of symptoms of previous illness may require adjustments of entries on the log for previously recorded illnesses to reflect possible change in the extent or outcome of the particular case. Where it is unclear where an entry should be made, contact the company Safety Officer or the local OSHA office to obtain advice for proper annotation.

5.8.2 Categories for Evaluating the Extent of Recordable cases. Once the company decides that a recordable injury or illness has occurred, the case must be evaluated to determine its extent or outcome. There are three categories that OSHA recognizes as recordable cases. Every recordable case will be placed in only one of the following categories:

5.8.2.1 Fatalities. All work fatalities must be recorded, regardless of the time between the injury and the death, or the length of the illness.

5.8.2.2 Lost Workday cases. Lost workday cases will be determined to have occurred when the injured or ill employee experiences either days away from work, days of restricted work activity, or both, for days after the date of the incident. Record the actual number of days away or of restricted work after the date of injury. Note that if a physician requires a set number of days for the employee to be out of work, that number of days must be recorded on the log, even if the employee returns to work earlier than recommended by the physician. Include any weekends (or normally scheduled days off) in the count, if the employee was scheduled to work the next business day and does not report to work. No more than 180 days should be logged, regardless if the employee loses additional time.

5.8.2.3 Cases not resulting in death or lost workdays. These cases consist of the relatively less serious injuries and illnesses which satisfy the criteria for recordability but which do not result in death or require the affected employee to have days away from work or days of restricted work activity beyond the date of injury or onset of illness.

6. Training and Information.

6.1 None at this time.

7. Definitions.

- *DOL* – U.S. Department of Labor
- *Fatality* – an incident that results in death

- *Hospitalization* – admittance to a hospital or similar facility where employees are provided with medical care and treatment. Emergency room visits are not considered hospitalization

- *Incident* – an unintended event in the workplace

- *Injury* – an incident that results in a detrimental physical effect to an employee

- *Illness* – an incident that results in an acute or chronic health effect to an employee

- *Near-miss Incident* – an incident that could have resulted in an injury, illness or fatality, but did not

- *OSHA* – U.S. Occupational Safety and Health Administration

- *Property Damage* – an incident that results in damage to buildings, structures, equipment, tools or other tangible assets of the company

PROGRAM OVERVIEW

PERSONAL PROTECTIVE EQUIPMENT SAFETY PROGRAM

REGULATORY STANDARD: 29 CFR §1910.132-138.

INTRODUCTION: Personal protective equipment, when its use is required, must be provided or used by employees where engineering and work practice controls are not sufficient to prevent exposure to a hazard. The type of personal protective equipment and the reasons for its use must be documented. Where required, employees must be trained in how to use the equipment, reasons for its use, the care and maintenance of the equipment and disposal considerations.

TRAINING:

- General training and information is required for employees who use equipment
- Formal training is required for specific types and uses of equipment (respirators, hearing protection, etc.)

ACTIVITIES:

- Identify risk factors for employee exposures
- Provide protective equipment, as required
- Ensure employees are trained in the use, care and maintenance of the equipment
- Document requirements for Personal Protective Equipment

FORMS:

- Certification of Hazard Assessment
- Assessment
- Respirator - Dust Mask Use Sign-off
- Training Attendance Roster

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Personal Protective Equipment (PPE) Safety Program

1. Purpose. Personal Protective Equipment (PPE) shall be used in areas where there is potential exposure to hazards which cannot be adequately controlled by elimination, substitution, engineering methods or administrative controls. PPE is to be considered the last line of defense against exposure to chemical hazards, radiation hazards, biological agents, temperature extremes, noise, electrical energy, mechanical forces, irritants, or projectiles which can produce injury or illness. This defines the required elements for implementing a Personal Protective Equipment (PPE) program.

1.1 Exclusions: PPE requirements for hearing conservation, fall protection, cartridge type respiratory protection and eyebaths and safety shower programs are covered in separate, specific standards; PPE for electrical work is not fully covered within this document, but can be referenced within the Electrical Safety program. Back Belts and Wrist Braces used in mitigation of ergonomic disorders as part of an ergonomics evaluation are not considered PPE.

2. Scope. Applies to any area where specific control measures or Personal Protective Equipment is required or used by company employees. Job hazard analysis will be performed in areas where job or task activities may require an evaluation of hazard potential and a determination of protective controls prior to the implementation of Personal Protective Equipment Requirements.

3. Responsibilities.

3.1 Management:

3.1.1 Ensure that all jobs and tasks have been evaluated and hazards appropriately addressed. Where possible, hazards will be controlled before the use of PPE is implemented. Controls include:

3.1.1.1 Elimination of a product or process that generates the hazard,

3.1.1.2 Substitution of a non-hazardous or less-hazardous material or chemical,

3.1.1.3 Engineering methods such as ventilation or guarding, and

3.1.1.4 Administrative controls such as procedures or task rotation

3.1.2 Select the appropriate PPE to reduce or eliminate hazards, based on the types of tasks and activities performed at the company.

3.1.3 Write PPE use procedures for tasks or activities that require PPE, or include PPE requirements in existing work and task procedures.

3.1.4 Maintain PPE, or provide employees with the proper training and tools to maintain PPE used at the company.

3.1.5 Post signs, as required, to inform employees where PPE is required (e.g. aisles, machine shop areas, production areas or at entrances to buildings if entire facility requires use).

3.1.6 Provide appropriate protective equipment to visitors or other personnel, as needed or required.

3.1.7 If employee-owned equipment is being used it must be maintained and sanitized by the company.

3.1.8 At least annually, assess the needs for continued (or additional) PPE use and requirements. These assessments should be documented as proof that PPE is or is not required for certain tasks or activities. Documentation in the procedure is adequate to fulfill this need, however any specific testing or monitoring results will need to be documented and maintained separately.

3.2 Employees:

3.2.1 Follow established procedures

3.2.2 Maintain PPE, as required by this program

3.2.3 Assist in providing assessment and documentation of PPE requirements

3.2.4 Report concerns, issues or violations of this program to Supervisors or management.

3.3 Safety Officer (as needed or required):

3.3.1 Assist in hazard evaluation

3.3.2 Assist in the selection of PPE based on the hazards presented

3.3.3 Assist in the writing of PPE procedures, or in the inclusion of PPE requirements into existing procedures

3.3.4 Assist in the assessment and documentation of PPE needs for the company

4. Procedure.

4.1 Hazard Evaluation and Determination:

4.1.1 Ensure hazard assessments, proper selection of controls and equipment, and certifications of hazard assessments have been completed and documented. This hazard assessment ***must*** be documented on the *Certification of Hazard Assessment* Form, or an equivalent document.

4.1.1.1 PPE requirements must be documented. Although specific areas may have general PPE requirements (such as safety glasses or hard hats), it is recommended that you evaluate specific job tasks for hazards that may require additional or more stringent PPE use, and maintain the documentation associated with the assessment.

4.1.1.2 Hazard assessments shall be performed in all areas to identify hazards that require the use of PPE and specify the appropriate type and style of PPE for the job.

4.1.1.3 A hazard assessment must be completed before any non-routine task (task not evaluated as part of the current hazard assessments) is started and before changes are made to operating procedures and when incidents result from inadequate controls or PPE.

4.2 PPE Selection:

4.2.1 Obtain the appropriate PPE. Selected PPE may include: Eye and Face Protection; Hand and Arm Protection; Foot Protection; Head Protection; and Torso and Body Protection.

4.2.1.1 The type of PPE must protect against the hazards identified.

4.2.1.2 Selection decisions must be communicated to each affected employee.

4.2.1.3 Selected PPE must fit each affected employee.

4.3 Written Procedures:

4.3.1 PPE or control measures must be incorporated into the written standard operating procedures for the task or process. Where appropriate, include precautions to be taken when working around moving machinery (i.e. items such as long hair, neckties, jewelry, and loose or flowing clothing shall be appropriately restrained, confined, or removed to avoid entanglement)

4.4 Signs:

4.4.1 Signs will be posted, as needed or required to warn employees and other personnel when protective equipment is required.

4.4.2 Signs may read “Safety Glasses Required”; “DANGER – Eye/Face Hazard area – Do Not Enter Without Protective Equipment”; or “DANGER – Hard Hat Required Area” or similar language may be used.

4.5 Training:

4.5.1 Ensure employees have documented training in the requirements including: when needed, use, fit, care, maintenance, useful life, disposal, and limitations of PPE.

4.5.1.1 Employees must demonstrate their understanding of the training and ability to properly use PPE before performing work. This can be done at the time of training (quizzes, classroom discussion, etc.) or through demonstration of work practices in the workplace.

4.5.1.2 Retraining will be performed when changes to the workplace necessitate different equipment or when changes to the type/design of the PPE are made which require a new skill or knowledge for its successful use. Retraining will also be done when an employee exhibits a lack of understanding or skill to use the equipment properly. Retraining may also be required if an incident occurs involving PPE.

4.6 Documentation practices are maintained for the following items:

4.6.1 Training records must be maintained so that records exist to indicate:

4.6.1.1 What tasks or activities require training

4.6.1.2 Who has had training

4.6.2 Certification of Hazard Assessment:

4.6.2.1 A Certification of Hazard Assessment shall be completed as verification that a hazard assessment was performed for the facility. The "certification document" may be completed by job task or operation, for buildings, or for organizations. Supervisors or area management must verify that the required documentation is completed. If you do not use the provided form for this purpose, your documentation must specifically be identified as a "Certification of Hazard Assessment", and contain all the required elements (person certifying, date, location evaluated)

4.6.2.1.1 This document shall be maintained in a designated location.

4.6.2.1.2 This document shall be updated for changes to operating procedures, when the method of performing the job changes and/or when incident investigations determine those PPE modifications are necessary.

4.6.2.1.3 Other documentation is acceptable as certification (e.g., confined space permits or job health and safety programs written specifically for the task/operation that specifies the necessary PPE) provided they contain the required elements.

4.7 Access to and Maintenance of PPE:

4.7.1 Ensure adequate supplies, storage, and employee access to PPE when required for a specific work area or operation.

4.7.2 PPE must be maintained in a sanitary and reliable condition. Ensure that damaged or defective PPE is taken out of service and not used, and that contaminated clothing and PPE are disposed of or cleaned properly.

4.8 Change Management:

4.8.1 Notify management or safety representatives of changes or modifications to procedures which may require a reassessment of PPE use.

4.9 Annual Assessment:

4.9.1 Review and assess PPE needs and effectiveness, using the provided form or an equivalent assessment tool.

5. Safety Information.

5.1 PPE Selection Process:

5.1.1 Review sample, manufacturer information and pricing information. MSDS's and/or chemical permeation data may also be required during committee review.

5.1.2 Determine if other appropriate information needs to be reviewed.

5.1.3 Determine if a pilot study is needed. This will be done to obtain user feedback on the item to determine potential concerns.

5.1.4 Review item after pilot study for final determination to use or not.

5.1.5 Submit manufacturer and pricing information to purchasing agent, or management, if use is approved.

5.1.6 For chemical protective clothing, manufacturer information is maintained by the company. For suits, gloves, apron, eyewear/goggles -- generic chemical permeation data (what the item is resistant to or not resistant to for general groupings of chemicals) will be maintained).

5.2 Types of PPE and Their Use(s):

5.2.1 Eye Protection:

5.2.1.1 General Application:

5.2.1.1.1 Only safety glasses and face protection meeting ANSI Z87 requirements shall be worn.

5.2.1.1.2 An optometrist or ophthalmologist may be required to conduct eye examinations and may issue prescription (or specialized fit prescription) safety glasses as appropriate to the needs of the employee. When side shields are required to be worn with prescription glasses, the employee is responsible for notifying the eye-care professional to ensure that the side shields are provided for specific frames.

5.2.1.1.3 While waiting for new prescription glasses, employees shall be provided "cover-all" safety eyewear that fits over prescription eyewear or be placed on a job which does not require eye protection.

5.2.1.1.4 Visitor-type safety glasses are for "visitors" or temporary use and should NOT be used for every-day eye protection.

5.2.1.2 Specialized Application

5.2.1.2.1 Tinted safety-glasses or lenses may be supplied for special circumstances (e.g. tinting for certain precision jobs in glare areas and outdoor work).

5.2.1.2.2 In special applications, such as welding or laser operations, helpers shall be protected to the same level as the operator.

5.2.1.2.3 Temporary personnel (those who enter an eye-protection area infrequently or for short periods of time) shall be supplied with non-prescription type safety glasses if they do not require prescription lenses or be supplied with cover-all eyewear to be worn over prescription glasses if necessary.

5.2.1.2.4 Individuals, who work on or near exposed electrically energized circuit parts, at 50 volts and above, shall wear non-conductive eyewear. Non-conductive eyewear is also necessary for individuals exposed to electrical burn hazards (e.g.: working on systems less than 50 volts, but with high current levels such as electroplating systems, large capacity batteries, etc.). Metal frame glasses are not permitted for these activities.

5.2.1.2.5 Where contact lenses are permitted, they shall be worn with required PPE appropriate to the exposure (e.g.: respiratory protection, welding helmets, etc.). As warranted, specific assessments of the work environment may be conducted by safety service providers to resolve concerns or questions. Safety non-prescription glasses shall be available to all wearers of contact lenses.

5.2.1.2.6 Employees shall wear appropriate eye or face protection (e.g.: goggles, face shields) when splash or other eye injury hazards exist. Hazards requiring such protection include, but are not limited to:

5.2.1.2.6.1 flying particles

5.2.1.2.6.2 molten metals

5.2.1.2.6.3 liquid chemicals

5.2.1.2.6.4 acids or caustic fumes or liquids

5.2.1.2.6.5 chemical gases or vapors

5.2.1.2.6.6 light radiation sources (e.g.: lasers, welding operations, ultraviolet light)

5.2.1.2.7 Eye and Face protection shall be cleaned and maintained in accordance with manufacturer's instructions.

5.2.2 Gloves and Hand Protection:

5.2.2.1 General:

5.2.2.1.1 Gloves, gauntlets, and protective sleeves are designed to protect the hands and arms of individuals who may be exposed to skin contact and/or absorption of chemical or biological agents, cuts or lacerations, abrasions, punctures, chemical burns, thermal burns, or harmful temperature extremes. Materials used in the manufacture of clothing must be resistant to the chemicals or materials being handled.

5.2.2.1.2 Safety or Industrial Hygiene representatives may arrange for chemical resistance tests when appropriate, provide for consultation on the types of protection available, and assist in determining appropriate protection.

5.2.2.1.3 Barrier creams shall not be used as protection against chemical contact, unless specifically approved by a medical professional.

5.2.2.1.4 Laundering of gloves used for chemical or biological protection is prohibited.

5.2.2.1.5 Jewelry should be removed before wearing gloves and washing hands.

5.2.2.1.6 Gloves shall be removed properly so as not to exposed an unprotected hand or part of the arm.

5.2.2.1.7 After removing gloves, hands should be thoroughly washed with soap and water.

5.2.2.1.8 When sharing gloves, such as when using a glove box, disposable gloves should be used as a liner.

5.2.2.1.9 Cuff the ends of gloves when feasible.

5.2.2.1.10 Disposable style gloves used for splash protection shall be disposed of at the end of each working day, at a minimum. Chemical contact, signs of physical wear, or loss of glove integrity shall require more frequent disposal.

5.2.2.1.11 Gloves should be properly stored, away from sunlight, direct artificial light, and electrical equipment.

5.2.2.1.12 Lay the gloves flat and avoid temperature and humidity extremes during glove storage.

5.2.2.2 Latex Gloves:

5.2.2.2.1 Due to the increasing concerns with latex gloves and associated skin reactions, latex gloves may be selected based on latex content, protein content (usually <50ug/g) or other requirements based on employee needs. Gloves may be required to be powdered or powder-free, depending upon the needs of the business activities.

5.2.3 Foot Protection:

5.2.3.1 Where safety shoes and additional foot protection is required (over and above that provided by "normal footwear") only foot protection meeting ANSI Z41 requirements shall be worn.

5.2.3.2 Waterproof, static dissipative (SD), electrostatic dissipative (ESD), electric hazard (EH), metatarsal protection, and rubber footwear where required will be available for purchase through designated company sources.

5.2.3.3 Where dissipation is required, such as in areas where quantities of flammable materials are handled, shoes should be SD rated. Non-conductive insoles may void the static dissipation properties. Safety shoe providers will verify SD properties.

5.2.3.4 Electricians should select EH rated shoes and/or use insulating mats when working on or near energized equipment.

5.2.3.5 Metatarsal Guards: Protectors for the metatarsal (top of foot) area are designed to provide additional protection against injury when handling heavy objects subject to falling or rolling.

5.2.3.6 Rubber footwear may be mandated by the nature of some operations.

5.2.3.6.1 Rubber shoe covers and boots, including boots with built-in steel toes.

5.2.3.6.2 Conductive rubbers must be used with SD rated shoes to maintain the static dissipating property.

5.2.3.6.3 Rubber overshoe footwear may be required.

5.2.3.7 Foot protection shall be cleaned and maintained in accordance with manufacturer's instructions.

5.2.3.8 Safety shoe conductivity meters need to be annually calibrated. Calibration is needed because the meters are powered by batteries which can display false values when the battery strength is low.

5.2.4 Head Protection (shall comply with ANSI Z89):

5.2.4.1 General:

5.2.4.1.1 Hard Hats are designed to provide protection against impact and penetration from falling objects. They also may provide protection against electrical shock and burns caused when coming in contact with energized parts. There are two types and three classes of hard hats. They type and class used or required at the facility or site will be documented based on the hazards.

5.2.4.1.2 Head protection shall be cleaned and maintained in accordance with manufacturer's instructions.

5.2.4.2 Other Types of Head Protection:

5.2.4.2.1 Bump Caps -- Provide protection from impact against stationary objects but do NOT protect against impact or penetration from falling objects or electrical shock hazards.

5.2.4.2.2 Welding Helmets -- Provide protection against ultraviolet, infrared, and visible radiation sources during welding operations.

5.2.4.2.3 Fire Fighting Helmets -- Provide protection from extreme heat encountered during a fire or similar conditions.

5.2.4.2.4 Hair Nets/Hats -- Protect employees from entanglement hazards (e.g. equipment with moving parts, etc.) This can be done with the use of hair restraining devices, such as hair nets, hats, etc.

5.2.5 Protective Clothing:

5.2.5.1 General:

5.2.5.1.1 Clothing such as suits, aprons, coveralls, coats, and pants are available to protect the torso and body of individuals who may be exposed to skin absorption of chemical or biological agents, cuts or lacerations, abrasions, punctures, chemical burns, thermal burns, or harmful temperature extremes. Materials used in the manufacture of such clothing must be matched in resistance to the chemicals or materials being handled.

5.2.5.1.2 Safety/Industrial Hygiene will arrange for chemical resistance tests when appropriate, provide for consultation on the types of protection available, and assist in determining appropriate protection.

5.2.5.1.3 See other documentation within this procedure for company policy on laundering of contaminated clothing.

5.2.5.2 Company provided clothing:

5.2.5.1.1 Laundering of company-issued work clothing shall be provided by the company to avoid the need for employees to launder clothing at home whenever there is a potential for chemical contamination such as asbestos, lead, cadmium, arsenic, sensitizers, etc.

5.2.6 Respiratory (Dust Mask) Protection: This section applies to employees at any company facility or job-site where the use of respiratory protective equipment (a dust mask) is utilized, either by requirement or voluntary use by employees.

5.2.6.1 Selection of respirator protective capabilities will be made according to the specific hazard involved. The company will provide NIOSH certified dust mask respirators.

5.2.6.2 Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations is required. Training must be provided before exposure or use of the equipment and when changes occur in the workplace. Training records must include the date of training, employee's name, and the trainer signature or initials.

5.2.6.3 Training of employees in the proper use (including putting them on and removing them), limitations and maintenance of respirators is required. Respirators will be inspected by the user before each use to ensure the face mask is intact and the head straps are snug fitting.

5.2.6.4 Procedures and schedules for storing, inspecting, repairing, and discarding respirators should be maintained. The company will provide each

respirator user with a respirator that is initially clean, sanitary, and in good working order. Dust mask type respirators will be packed or stored to prevent deformation of the face piece and/or exhalation valve. Respirators that fail an inspection or are otherwise found to be defective will be removed from service, and discarded.

5.2.6.5 Face-piece seal protection. Facial hair or other conditions that interfere with the contact of the face to the face-piece of the respirator is prohibited.

5.2.6.6 Surveillance of conditions of use. Appropriate surveillance and evaluations of the working conditions will be performed to assess the degree of employee exposure and stress associated with respirator use, and the effectiveness of the respirators.

5.2.6.7 Employees must leave the respirator use area when they detect vapor or gas breakthrough, changes in breathing resistance or leakage of the face-piece. In these situations, respirators must be replaced prior to the employee returning to the work area.

5.2.6.8 Recordkeeping: The company will establish and retain written information regarding the respirator use. An appropriate Information for Voluntary Respirator Use form or equivalent Appendix D from the OSHA standard will be maintained for each respirator user.

6. Training and Information.

6.1 Employees must be trained in the limitations, proper use, cleaning, storage and disposal practices for any PPE used in the workplace

7. Definitions.

- *Emergency situation* - Any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

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

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

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

- *Personal Protective Equipment (PPE)* - Devices worn to protect employees from potential hazards encountered in the workplace.

- *Hazard Assessment* - An evaluation of the workplace to determine if hazards are present (or are likely to be present) which necessitate the use of PPE.

- *Certification of Hazard Assessment* - Certification that the Hazard Assessment has been conducted. This document must contain:
  - Identification of the workplace evaluated
  - Name of person(s) verifying that the evaluation has been performed
  - Date of assessment

- *Documentation of Training* - Documentation that the affected employee has received and understood the required training, and containing:
  - Name of the trained employee
  - Date of training
  - Identification of the type of personal protective equipment

PROGRAM OVERVIEW

PORTABLE LADDER SAFETY PROGRAM

REGULATORY STANDARD: OSHA - 29 CFR 1910.25 Portable Wood Ladders
- 29 CFR 1910.26 Portable Metal Ladders
- 29 CFR 1926.1050-1060

INTRODUCTION: Details minimum requirements for the construction, care, and use of the common types of portable ladders ensuring safety use under normal conditions. The program has provisions for wood, fiberglass and metal ladders and describes procurement and disposal methods.

TRAINING:

Employers must train all employees to recognize hazards of ladder use, the inspection of ladders and in the limitations of ladders to minimize the risk exposure.

ACTIVITIES:

- Ensure the appropriate type of ladder is selected based on the nature of the project
- Ensure employees are trained in the inspection techniques used to inspect ladders, and in the safe use of ladders
- Ensure ladder inspections are performed
- Ensure ladders are properly repaired and maintained in accordance with regulatory standards or are properly disposed of when they are found to be defective (and or are removed from service)
- Ladders will be selected based on the type of work anticipated to be performed, and in accordance with applicable OSHA regulatory standards

FORMS:

- Ladder Safety Checklist
- Training attendance roster

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Portable Ladder Safety Program

1. Purpose. Effective implementation for the safe use of ladders requires a written safety program fully endorsed and advocated by the highest level of management within our company. This safety program is designed to establish safe use and handling requirements and will be communicated to all required personnel. It encompasses the total workplace regardless of the number of workers employed or the number of work shifts. The company will review and evaluate this safety program:

1.1 On an annual basis

1.2 When changes occur to the governing regulatory standards

1.3 When facility operational changes occur that require a revision of this document

2. Scope. This program applies to the total workplace, regardless of the number of workers, work shifts or numbers and types of ladders used.

3. Responsibilities.

3.1 Management and Supervisors:

3.1.1 Procure the appropriate type of portable ladders

3.1.2 Ensure employees are trained (as needed or required) in the inspection techniques used to inspect ladders and in the safe use of ladders (proper pitch, angle and hazard awareness)

3.1.3 Ensure ladder inspections are performed (daily or pre-use checklist, and thorough periodic inspection)

3.1.4 Ensure ladders are properly repaired in accordance with regulatory standards or properly disposed of when they are found to be defective or are removed from service

3.2 Employees:

3.2.1 Inspect ladders daily or before each use if ladders are not used daily

3.2.2 DO NOT USE ladders that have not passed inspection

3.2.3 Notify management or Supervisors if ladders are found to be defective and promptly tag them with a DO NOT USE sign and remove them from service

3.3 Safety Officer (as needed or required):

3.3.1 Train employees in ladder inspection techniques

3.3.2 Provide recommendations for procurement, repair and disposal of ladders.

4. Procedure.

4.1 General Requirements. All facilities and equipment owned by the company will be maintained in a safe and healthful manner. Certain work conditions may contain a reasonable probability of injury that can be prevented by proper maintenance and supervision. The company will do all possible to ensure the safety of our employees. No employee will knowingly be subjected to a hazardous condition without all possible protective measures first being implemented.

4.2 Fiberglass/Wooden Ladders Safety Policy. To insure safety and serviceability the following precautions concerning the care and use of fiberglass/wooden ladders will be observed:

4.2.1 Fiberglass/wooden ladder care. The following safety precautions will be observed in connection with the care of fiberglass/wooden ladders:

4.2.1.1 Ladders will be maintained in good condition at all times, the joint between the steps and side rails will be tight, all hardware and fittings securely attached, and the movable parts will operate freely without binding or undue play.

4.2.1.2 Metal bearings of locks, wheels, pulleys, etc., will be frequently lubricated.

4.2.1.3 Frayed or badly worn rope will be replaced.

4.2.1.4 Safety feet and other auxiliary equipment will be kept in good condition to ensure proper performance.

4.2.1.5 Ladders will be inspected frequently and those which have developed defects will be withdrawn from service for repair or destruction and tagged or marked as "Dangerous, Do Not Use."

4.2.1.6 Rungs should be kept free of grease and oil.

4.2.2 Fiberglass/wooden ladder use. The following safety precautions will be observed in connection with the use of fiberglass/wooden ladders:

4.2.2.1 Portable rung and cleat ladders will, where possible, be used at such a pitch that the horizontal distance from the top support to the foot of the ladder is one-quarter of the working length of the ladder (the length along the ladder between the foot and the top support). The ladder will be so placed as to prevent slipping, or it will be lashed, or held in position. Ladders will not be used in a horizontal position as platforms, runways, or scaffolds.

4.2.2.2 Ladders for which dimensions are specified should not be used by more than one person at a time or with ladder jacks and scaffold planks where use by more than one person is anticipated. In such cases, specially designed ladders with larger dimensions of the parts should be procured.

4.2.2.3 Portable ladders will be so placed that the side rails have a secure footing. The top rest for portable rung and cleat ladders will be reasonably rigid and will have ample strength to support the applied load.

4.2.2.4 Ladders will not be placed in front of doors opening toward the ladder unless the door is blocked, locked, or guarded.

4.2.2.5 Ladders will not be placed on boxes, barrels, or other unstable bases to obtain additional height.

4.2.2.6 Ladders with broken or missing steps, rungs, or cleats, broken side rails, or other faulty equipment will not be used, ladders having any of these conditions present will be destroyed and disposed of. Improvised repairs will not be made.

4.2.2.7 Short ladders will not be spliced together to provide long sections.

4.2.2.8 Ladders made by fastening cleats across a single rail will not be used.

4.2.2.9 Ladders will not be used as guys, braces, or skids, or for other than their intended purposes.

4.2.2.10 Tops of ordinary stepladders will not be used as steps.

4.2.2.11 On two-section extension ladders the minimum overlap for the two sections in use will be as follows:

Size of Ladder (in Feet)	Overlap (in Feet)
Up to and including 36	3
Over 36 up to and including 48	4
Over 48 up to and including 60	5

4.2.2.12 Portable rung ladders with reinforced rails will only be used with the metal reinforcement on the under side.

4.2.2.13 No ladder should be used to gain access to a roof or elevated work area unless the top of the ladder is extended at least 3 feet above the point of support.

4.2.2.14 All portable rung ladders will be equipped with non-slip bases when there is a hazard of slipping. Non-slip bases are not intended as a substitute for

care in safely placing, lashing, or holding a ladder that is being used upon oily, metal, concrete, or slippery surfaces.

4.2.2.15 The bracing on the back legs of step ladders is designed solely for increasing stability and not for climbing.

4.3 Portable Fiberglass/Wooden Ladders. In order to ensure safety under normal conditions of usage, the company will purchase and maintain portable fiberglass/wooden ladders that conform to the following minimum requirements for the construction, care, and use of common types of portable fiberglass/wooden ladders.

4.3.1 General requirements.

4.3.1.1 Materials. All fiberglass/wooden parts will be maintained free from sharp edges and splinters; sound and free from accepted visual inspection from shake, wane, compression failures, decay, or other irregularities.

4.3.1.2 Step spacing. Must not be more than 12 inches. Steps will be parallel and level when the ladder is in position for use.

4.3.1.3 Side rail width. The minimum width between side rails at the top, inside to inside, must not be less than 11 1/2 inches. From top to bottom, the side rails must spread at least 1 inch for each foot of length of stepladder.

4.3.1.4 Metal spreaders/locking devices. A metal spreader or locking device of sufficient size and strength to securely hold the front and back sections in open positions must be properly maintained for each stepladder. The spreader must have all sharp points covered or removed to protect the user.

4.3.2 Portable stepladders. Stepladders longer than 20 feet will not be used. Stepladders of one of the following types specified will be used:

4.3.2.1 Type I--Industrial stepladder, 3 to 20 feet for heavy duty, such as utilities, contractors, and industrial use.

4.3.2.2 Type II--Commercial stepladder, 3 to 12 feet for medium duty, such as painters, offices, and light industrial use.

4.3.2.3 Type III--Household stepladder, 3 to 6 feet for light duty, such as light household use.

4.3.3 Portable rung ladders.

4.3.3.1 Single ladder. Single ladders longer than 30 feet will not be used.

4.3.3.2 Two-section ladder. Two-section extension ladders longer than 60 feet will not be used.

4.3.3.3 Trestle and extension trestle ladder. Trestle ladders, or extension sections or base sections of extension trestle ladders longer than 20 feet will not be used.

4.3.4 Special-purpose ladders.

4.3.4.1 Painter's stepladder. Painter's stepladders longer than 12 feet will not be used.

4.3.4.2 Mason's ladder. A mason's ladder is defined as a special type of single ladder intended for use in heavy construction work. Mason's ladders longer than 40 feet will not be used.

4.4 Metal Ladders.

4.4.1 General Requirements. The company will purchase only ladders without structural defects or potential accident hazards such as sharp edges, burrs, etc. The company will purchase ladders meeting industrial grade specifications. Homemade or in-house constructed ladders will not be used.

4.4.2 Metal ladder care. The following safety precautions will be observed in connection with the care of metal ladders:

4.4.2.1 Ladders must be maintained in good usable condition at all times.

4.4.2.2 If a ladder is involved in any of the following, immediate inspection is necessary:

4.4.2.2.1 If ladders tip over, inspect ladder for side rails dents or bends, or excessively dented rungs; check all rung-to-side-rail connections; check hardware connections; check rivets for shear.

4.4.2.2.2 If ladders are exposed to oil and grease, equipment should be cleaned of oil, grease, or slippery materials. This can easily be done with a solvent or steam cleaning.

4.4.2.3 Ladders having defects are to be marked and taken out of service until repaired by either maintenance department or the manufacturer.

4.4.3 Metal ladder use. The following safety precautions will be observed in connection with the use/care of metal ladders:

4.4.3.1 A simple rule for setting up a ladder at the proper angle is to place the base a distance from the vertical wall equal to one-fourth the working length of the ladder.

4.4.3.2 Portable ladders are designed as a one-man working ladder based on a 200-pound load.

4.4.3.3 The ladder base section must be placed with a secure footing.

4.4.3.4 The top of the ladder must be placed with the two rails supported, unless equipped with a single support attachment.

4.4.3.5 When ascending or descending, the climber must face the ladder.

4.4.3.6 Ladders must not be tied or fastened together to provide longer sections. They must be equipped with the hardware fittings necessary if the manufacturer endorses extended uses.

4.4.3.7 Ladders should not be used as a brace, skid, guy or gin pole, gangway, or for other uses than that for which they were intended, unless specifically recommended for use by the manufacturer.

4.4.3.8 Metal ladders will not be used when work is performed on or near electric circuits. See 29 CFR 1910.333.

4.4.3.9 No new metal ladders will be purchased. All metal ladders removed from service for any reason will be replaced with fiberglass ladders.

5. Safety Information.

5.1 Procurement and Disposal of Ladders. All procurement and disposal of ladders will be performed through or with the knowledge of the Safety Officer or other designated person. Ladders will be destroyed beyond use prior to disposal to prevent further use by anyone. Procurement of ladders will be accomplished based on the type of work anticipated to be performed and in accordance with this safety program and applicable OSHA regulatory standards.

6. Training and Information.

6.1 Employees will be trained, as needed or required, in the inspection techniques related to daily or pre-use ladder inspections.

6.2 Employees will be trained in the safe use requirements of ladders (pitch, angle, etc.) and in their limitations of use (not near electrical current, not placed on top of other materials to increase height, etc.).

7. Definitions.

- *None at this time*

PROGRAM OVERVIEW

RESPIRATORY PROTECTION SAFETY PROGRAM

REGULATORY STANDARD: *OSHA - 29 CFR 1910.134*
- 29 CFR 1926.103
ANSI - Z88.2

INTRODUCTION: This safety program addresses the evaluation of potential respiratory hazards, communicating information concerning these hazards, and establishing appropriate engineering, work practice, or respiratory protective measures for employees. This program applies to employees at any company facility or job-site where the use of filter cartridges or supplied air respiratory protective equipment is utilized (either by requirement or voluntary use by employees). It outlines procedures for respirator selection, use and care. The program details the required training, fit testing, and medical evaluation procedures.

TRAINING:

- Training will be conducted before initial assignment, on an annual basis, and as needed
- Retraining is required if exposures change and as needed

ACTIVITIES:

- Evaluate the need for respiratory protection
- Establish and maintain the written program and documentation required
- Appoint a respiratory protection coordinator to oversee the implementation of this program
- Ensure respirator users are medically fit to use the equipment and perform the duties required
- Provide NIOSH-approved respirators, suitable to the hazard
- Offer at least two types of respirators for employees to select from, in appropriate sizes
- Train and fit-test employees who use respirators
- Ensure respiratory equipment is properly stored in a convenient, clean, and sanitary location
- Evaluate the facility and program at least annually to ensure it is effective and appropriate

FORMS:

- Respirator Cleaning and Inspection Record
- Respirator Filter Change Out Schedule
- Respirator Medical Appraisal Response
- Respirator Medical Evaluation Questionnaire
- Respirator Seal Check Procedure
- Respirator Selection and Fit Testing Record
- Respirator Wallet Card for fit Test Certification
- Respiratory Protection Assigned Protection Factors
- Respiratory Protection Fit Test Procedure
- Respiratory Protection Program Assessment
- Respiratory Protection Text of the Regulatory Standard
- Training Attendance Roster

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Respiratory Protection Safety Program

1. Purpose. The purpose of this program is to provide protective equipment that will control and/or minimize the threat of occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors. The primary objective is to prevent atmospheric contamination through accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators will be used, as required. The company will review and evaluate this safety program:

1.1 On an annual basis.

1.2 When changes occur to governing regulatory sources that require revision.

1.3 When changes occur to related company procedures that require a revision.

1.4 When facility operational changes occur that requires a revision.

1.5 When there is an accident or close-call that relates to this area of safety.

1.6 Anytime the procedures fail.

2. Scope. This program applies to employees at any company facility or job-site where the use of respiratory protective equipment is utilized (either by requirement or voluntary use by employees). The only exception to this requirement is the *voluntary* use of filtering dust masks by employees when the company does not require the use of dust-masks, but the employee chooses to wear one.

3. Responsibilities.

3.1 Management/Supervisors:

3.1.1 Evaluate the need for respiratory protection.

3.1.2 Provide NIOSH-approved respirators when they are necessary to protect employee health. Other respiratory equipment may be utilized only when NIOSH approved equipment is inappropriate for the situation. This equipment will be provided to the employees at no cost.

3.1.3 Ensure the respirator provided is suitable for the intended use and appropriate to the type of hazard.

3.1.4 Offer at least two types of respirators for employees to select from, in appropriate sizes.

3.1.5 Establish and maintain the written program and documentation required.

3.1.6 Appoint a respiratory protection coordinator to oversee the development and implementation of this program.

3.1.7 Ensure all employees are appropriately trained in the use, care, maintenance, storage and disposal of respirators.

3.1.8 Ensure respirator fit testing is performed.

3.1.9 Ensure respirator users are medically fit to use the equipment and perform the duties required.

3.1.10 Ensure respiratory equipment is properly stored in a convenient, clean, and sanitary location.

3.1.11 Evaluate the facility and program at least annually to ensure it is effective and appropriate.

3.2 Employees:

3.2.1 Attend appropriate training.

3.2.2 Use the respiratory protection in accordance with instructions and training received.

3.2.3 Guard against damage to the respirator, and immediately replace suspect respirators.

3.2.4 Clean and disinfect respiratory equipment before and after each use.

3.2.5 Inspect respirators prior to use to ensure they are in good condition, defective parts or equipment will be immediately removed from service until repaired or replaced. SCBA equipment must be inspected at least monthly and before each use, regardless of the frequency used.

3.2.6 Report any trouble with or malfunction of the respirator to your supervisor immediately.

3.3 Safety Officer (as needed or required):

3.3.1 Assist in the development and implementation of this program.

3.4 Respiratory Protection Coordinator:

3.4.1 Attend the appropriate training to ensure that the knowledge and capabilities are established to oversee the Respiratory Protection Safety Program.

3.4.2 Maintain records for the respirator program including fit testing, training and medical records.

3.4.3 Assist in hazard evaluations for the facility, site or work area, as needed.

3.4.4 Ensure availability of proper equipment based on the hazards encountered in the workplace and the requirements of this program.

3.4.5 Ensure equipment is properly used, stored, maintained, inspected and disposed of, as needed or required.

3.4.6 Provide for fit testing and other required training for respirator users.

3.4.7 Regularly evaluate the effectiveness of the program.

4. Procedure.

4.1 Program Requirements:

4.1.1 Procedures for selecting respirators for use in the workplace.

4.1.2 Documentation on the types of cartridges, canisters, filters and other respiratory equipment selected for use in the workplace.

4.1.3 Documentation on the types of breathing air or equipment selected for use in the workplace. Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators

4.1.4 Respirator use requirements, including procedures for proper use of respirators in foreseeable emergency situations.

4.1.5 Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators.

4.1.6 Fit testing procedures for tight-fitting respirators.

4.1.7 Medical evaluations of employees required to use respirators.

4.1.8 Regular evaluation of the effectiveness of the program.

4.1.9 Maintenance of records and documentation.

4.1.10 Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations.

4.1.11 Training of employees in the proper use (including putting them on and removing them), limitations and maintenance of respirators.

4.2 Respiratory Selection Policy:

4.2.1 Selection type. The company will provide a selection of NIOSH certified respirators from at least two (2) different types of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.

4.2.2 Protective Capabilities. Selection of respirator protective capabilities will be made according to the specific hazard involved. Where a determination can not be made as to the hazard, the worst case will be assumed and appropriate respiratory equipment will be supplied.

4.2.3 Specific regulatory standards and hazards. "OSHA has specific definitions and requirements for Assigned Protection Factors (APFs) and Maximum Use Concentrations (MUCs). Proper respirator selection using APFs is an important component of an effective respiratory protection program. Accordingly, OSHA concludes that the use of APFs is necessary to protect employees who must use respirators and to protect the employees from airborne contaminants. These APFs and supersede any previous provisions for respirator selection for all substances (except for those in the 1,3-Butadiene Standard). Please refer to the form on APFs within this manual for more information.

4.2.4 IDLH Atmospheres. The company will supply either NIOSH certified full face-piece pressure demand 30-minute SCBA respirators, or a combination full face-piece pressure demand SAR with auxiliary self-contained air supply respirators. Escape only equipment will be capable of performing in the atmosphere and be appropriate to the hazard.

4.2.5 Oxygen Deficient Atmospheres. All oxygen deficient atmospheres are considered IDLH unless it can be demonstrated that oxygen levels can be maintained within acceptable ranges. In these cases, any atmosphere supplied respirator may be used. In situations where companies are located in higher altitudes, the effectiveness of the respirator may be reduced and additional measures may need to be taken.

4.2.6 Gases and Vapors. Atmosphere supplying respirators may be used. Air purifying respirators may be used if they are either equipped with an NIOSH approved end-of-service-life (ESLI) indicator or there is a written and enforced canister/cartridge change schedule that ensures the cartridges are changed out before their end of service life. The written procedures must describe the information and data relied upon to make this determination.

4.2.7 Particulates. Atmosphere supplying respirators may be used. Air purifying respirators that are equipped with a HEPA filters or equipped with filters certified by NIOSH for the specific particulate size.

4.3 Silica

4.3.1 Exposure to silica has been shown to cause silicosis, lung cancer, pulmonary tuberculosis and other airway diseases.

4.3.2 Full shift personal samples shall be representative of the employee’s regular, daily exposure to silica.

4.3.3 Engineering controls such as ventilation or wet methods must be used to control silica-containing dusts.

4.3.4 Respirators must be selected based upon measured exposure levels and the assigned protection factor of respirators.

4.3.5 Personal protective equipment such as gloves, coveralls and eye protection should be used to control silica exposures.

4.3.6 Training is required prior to using silica-containing materials or working in an environment known to contain airborne concentrations of Silica. Periodic refresher training is also performed.

4.4 Identification of filters, cartridges, and canisters:

4.4.1 The company will ensure that all filters, cartridges and canisters used in the workplace are labeled and color coded with the NIOSH approved label and that the label is not removed and remains legible.

4.5 Breathing Air Quality and Use:

4.5.1 Compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration will be of high purity.

4.5.1.1 Oxygen will meet the requirements of the United States Pharmacopoeia for medical or breathing oxygen.

4.5.1.2 Breathing air will meet at least the requirements for Type 1-Grade D breathing air described in ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-1989, to include:

4.5.1.2.1 Oxygen content (v/v) of 19.5-23.5%

4.5.1.2.2 Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less

4.5.1.2.3 Carbon monoxide (CO) content of 10 ppm or less

4.5.1.2.4 Carbon dioxide content of 1,000 ppm or less

4.5.1.2.5 Lack of noticeable odor

4.5.1.3 Oxygen must never be used with air line respirators.

4.5.1.4 Breathing air may be supplied to respirators from cylinders or air compressors.

4.5.1.5 Compressed oxygen will not be used in atmosphere-supplying respirators, supplied-air respirators or in open circuit self-contained breathing apparatus that have previously used compressed oxygen.

4.5.2 Cylinders used to supply breathing air to respirators must meet the following requirements:

4.5.2.1 Tested and maintained (per DOT- 49 CFR Part 173 and 178 requirements).

4.5.2.2 Cylinders of purchased breathing air have a certificate of analysis from the supplier that the breathing air meets the requirements for Type 1--Grade D breathing air.

4.5.2.3 The moisture content in the cylinder does not exceed a dew point of -50 deg.F (-45.6 deg.C) at 1 atmosphere pressure.

4.5.3 Compressors for Supplied Air must be constructed and situated to:

4.5.3.1 Prevent entry of contaminated air into the air-supply system.

4.5.3.2 Minimize moisture content to 10^{o} below ambient temperature at 1 atm pressure.

4.5.3.3 Have suitable sorbent beds and filters to ensure air quality. Beds and filter must be maintained and replaced or refurbished per manufacturer's instructions.

4.5.3.4 Have a tag or other documentation indicating the change date and signature of the person who changed it.

4.5.3.5 Ensure that Carbon-Monoxide levels do not exceed 10 ppm.

4.5.3.6 Ensure that couplings are incompatible with non-respirable gas system valves and outlets.

4.5.3.7 Ensure that markings and labels are maintained in legible and readable condition. Breathing gas containers will be marked in accordance with the NIOSH requirements (42 CFR Part 84 and 29 CFR 1910.101)

4.5.3.8 Have, for oil-lubricated compressor equipment, high temperature alarms and carbon-monoxide detection equipment to ensure levels do not exceed 10 ppm.

4.6 Use of Respirators:

4.6.1 Face-piece seal protection. Facial hair or other conditions that interfere with the contact of the face to the face-piece of the respirator or with the functioning of valves is prohibited. In such cases tight-fitting face-piece respirators may not be used, or the conditions that interfere with the respirator effectiveness must be changed (i.e. the user must keep facial hair shaved).

4.6.2 Corrective eyewear. Corrective eyewear must be worn in a manner that does not interfere with the seal or the effectiveness of the respirator.

4.6.3 Seal Checks. Seal checks must be performed each time a user puts on the respirator for use.

4.6.4 Surveillance of conditions of use. Appropriate surveillance and evaluations of the working conditions will be performed to assess the degree of employee exposure and stress associated with respirator use, and the effectiveness of the respirators.

4.6.5 Respirator Use Limitations.

4.6.5.1 Employees must leave the respirator use area when:

4.6.5.1.1 They detect vapor or gas breakthrough, changes in breathing resistance or leakage of the face-piece. In these situations, respirators must be repaired or replaced prior to the employee returning to the work area.

4.6.5.1.2 Replacement of the filter, cartridges, canister, or the respirator itself is required.

4.6.5.1.3 Washing of the face or respirator components is required to prevent eye or skin irritation.

4.6.5.2 IDLH limitations.

4.6.5.2.1 At least one employee (attendant) must be located outside the IDLH atmosphere. This person must be trained to contact or provide emergency rescue, and provided with:

4.6.5.2.1.1 Either pressure demand or other positive pressure SCBA respirator or SAR with auxiliary SCBA

4.6.5.2.1.2 Either appropriate retrieval equipment to facilitate rescue or equivalent means for providing rescue.

4.6.5.2.2 Visual, voice or signal communications must be maintained at all times between the attendant and the respirator user inside the IDLH atmosphere.

4.6.5.2.3 Mangers, supervisors or another designate person must be made aware that entry is taking place when entering the IDLH atmosphere.

4.6.5.2.4 Provisions for emergency rescue must be made before entry.

4.6.5.3 Interior Structural Firefighting.

4.6.5.3.1 All of the elements for IDLH limitations must be met (attendant or incident commander, equipment, communications, emergency rescue and notification).

4.6.5.3.2 At least two employees must work together inside the IDLH and remain in visual or voice contact with one another at all times.

4.6.5.3.3 At least two attendants or designated persons must remain outside the IDLH area. One of these may be the incident commander.

4.6.5.3.4 SCBA respiratory protection is required for all persons engaged in interior structural firefighting.

5. Safety Information.

5.1 Inspection, Maintenance, and Care of Respiratory Equipment:

5.1.1 The company will provide for the cleaning and disinfecting, storage, inspection, and repair of respirators used by our employees. Equipment will be properly maintained to retain its original state of effectiveness.

5.1.2 Cleaning and disinfecting. The company will provide each respirator user with a respirator that is clean, sanitary, and in good working order. Respirators will be cleaned and disinfected using OSHA approved procedures or equally effective procedures recommended by the respirator manufacturer. The respirators will be cleaned and disinfected at the following intervals:

5.1.2.1 Exclusive use respirators - as often as necessary to be maintained in a sanitary condition.

5.1.2.2 Respirators issued to more than one employee - before being worn by different individuals.

5.1.2.3 Respirators maintained for emergency use only - after each use.

5.1.2.4 Respirators used in fit testing- after each use.

5.1.3 Storage of respirators.

5.1.3.1 All respirators will be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals, and they will be packed or stored to prevent deformation of the face piece and exhalation valve.

5.1.4 Emergency respirators will be:

5.1.4.1 Kept accessible to the work area.

5.1.4.2 Stored in compartments or in covers that are clearly marked as containing emergency respirators.

5.1.4.3 Stored in accordance with any applicable manufacturer instructions.

5.1.5 Inspection. Respirators will be inspected as follows:

5.1.5.1 Routine use respirators - before each use and during cleaning in accordance with manufacturer specifications.

5.1.5.2 Emergency use respirators - at least monthly and after each use. Inspection will be in accordance with the manufacturer recommendations, and equipment will be checked for proper function before and after each use. Monthly inspections will be documented and this documentation will be retained with the equipment. Documentation is retained until superseded or the equipment is permanently removed from service. Documentation includes the date of the inspection, the name or signature of the inspector, the findings, required corrective actions and a serial number or other means of identifying the equipment.

5.1.5.3 Emergency escape-only respirators - before being carried into the workplace for use.

5.1.5.4 Self-contained breathing apparatus - monthly. Air and oxygen cylinders will be maintained in a fully charged state and will be recharged when the pressure falls to 90% of the manufacturer recommended pressure level. Regulator and warning devices will be monitored for proper function.

5.1.6 Repairs. Respirators that fail an inspection or are otherwise found to be defective will be removed from service, and discarded, repaired or adjusted only by persons appropriately trained to perform such operations and will use only the respirator manufacturer NIOSH-approved parts designed for the respirator.

5.2 Respirator Fit Testing:

5.2.1 General. The company will conduct fit testing before an employee is required to use any respirator.

5.2.1.1 The employee must be fit tested with the same make, model, style, and size of respirator that will be used.

5.2.1.2 Fit testing is performed at least annually, and when changes to the type, make, or model of the respirator occur and when facial features of the user change (scarring, dental changes, cosmetic surgery or obvious changes in body weight).

5.2.1.3 In all cases the respirator should be reasonably comfortable for the user, or a different selection of respirators will be offered (and any associated fit testing or other evaluations performed).

5.2.1.4 Fit testing must be administered using OSHA accepted protocols.

5.2.2 Fit Factor, Qualitative (QLFT) and Quantitative (QNFT) fit testing.

5.2.2.1 Negative pressure air-purifying respirators that must achieve a factor of 100 or less must use qualitative testing.

5.2.2.2 Tight-fitting half face-piece respirators must achieve a fit factor of 100 or greater.

5.2.2.3 Tight-fitting full face-piece respirators must achieve a fit factor of 500 or greater.

5.2.2.4 Tight-fitting atmosphere supplied respirators must be tested in negative pressure mode. If the respirator must be converted from positive to negative pressure for the test through the use of filters, the testing must occur in the breathing zone of the user (between the nose and mouth) using a sampling adapter, and any modifications for the conversions must be completely removed and the face-piece restored to its NIOSH-approved configuration before use.

5.3 Respirator Seal and Seal-Check:

5.3.1 Fit instructions. Every respirator wearer will receive fitting instructions including demonstrations and practice in how the respirator should be worn, how to adjust it, and how to determine if it fits properly. The face piece fit will be checked by the wearer each time they put on the respirator.

5.3.2 Hair/apparel. If hair growth or apparel interferes with a satisfactory fit, then the employee will be requested to alter or remove them so as to eliminate interference and allow a satisfactory fit. If a satisfactory fit is still not attained, the employee must use a positive-pressure respirator such as powered air-purifying respirators, supplied air respirator, or self-contained breathing apparatus.

5.3.3 User seal check procedures. An adequate seal must be attained each time the respirator is worn. Face-piece Positive and/or Negative Pressure Checks.

5.3.3.1 Positive pressure check. Close off the exhalation valve and exhale gently into the face piece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the face piece without any evidence of outward leakage of air at the seal. For most respirators this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.

5.3.3.2 Negative pressure check. Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the face piece collapses slightly, and hold the breath for ten seconds. The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove. If the face piece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

5.4 Medical Evaluation:

5.4.1 General. Using a respirator may place a physical burden on employees that varies with the type of respirator worn, the job and workplace conditions in which the respirator is used, and the medical status of the employee. The company will provide for a medical evaluation to determine the employee's ability to use a respirator before the employee is fit tested or required to use the respirator in the workplace. Medical evaluations for respirator use will discontinue when the employee is no longer required to use a respirator.

5.4.2 Medical evaluation procedures. The company will identify a Physician or other Licensed Health Care Professional (PLHCP) to perform medical evaluations using a medical questionnaire or an initial medical examination that obtains the same information as the medical questionnaire.

5.4.3 Follow-up medical examination. The company will ensure that a follow-up medical examination is provided for an employee who gives a positive response to any question among questions 1 through 8 in the medical evaluation questionnaire and/or demonstrates the need for a follow-up medical examination. The follow-up medical examination will include any medical tests, consultations, or diagnostic procedures that the PLHCP deems necessary to make a final determination.

5.4.4 Administration of the medical questionnaire and examinations. The medical questionnaire and examinations will be administered confidentially during the employee's normal working hours or at a time and place convenient to the employee. The medical questionnaire will be administered in a manner that ensures that the employee understands its content. An opportunity to discuss the questionnaire and examination results with the PLHCP will be provided to the employee.

5.4.5 Information to be provided to the PLHCP. The following information will be provided to the PLHCP before a recommendation is made concerning an employee's ability to use a respirator:

5.4.5.1 The type and weight of the respiratory equipment to be used.

5.4.5.2 The duration and frequency of expected use.

5.4.5.3 The expected physical work effort.

5.4.5.4 Additional protective clothing and equipment to be worn.

5.4.5.5 Temperature and humidity extremes that may be encountered.

5.4.5.6 The type and weight of the respirator to be used by the employee.

5.4.5.7 The duration and frequency of respirator use (including use for rescue and escape).

5.4.5.8 Any supplemental information provided previously to the PLHCP regarding an employee need not be provided for a subsequent medical evaluation if the information and the PLHCP remain the same.

5.4.5.9 Copy of the written Respiratory Protection Safety Program.

5.4.5.10 Copy of the 29 CFR 1910.134 plus Appendices.

5.4.5.11 Note: When a new PLHCP is used, the information and documents will be transferred, as appropriate. Re-evaluations are not required solely because a new PLHCP has been selected.

5.4.6 Medical determination.

5.4.6.1 Obtain a written recommendation from the PLHCP.

5.4.6.2 Determine any limitations on respirator use including whether or not the employee is medically able to use the respirator, or restrictions required by the PLHCP.

5.4.6.3 Determine the need, if any, for follow-up medical evaluations.

5.4.6.4 Ensure that the employee has received a written copy of the PLHCP recommendation.

5.4.6.5 Powered Air Pressure Respirators (PAPR) may be used, if approved by the PLHCP, when the medical condition of the employee prohibits the use of a negative pressure respirator.

5.4.7 Additional medical evaluations. As a minimum, the company will provide additional medical evaluations based on the following conditions:

5.4.7.1 If an employee reports medical signs or symptoms that are related to his or her ability to use a respirator.

5.4.7.2 If a PLHCP, supervisor, or the respirator program administrator determines that re-evaluation is needed.

5.4.7.3 When the program requires, or fit testing determines the necessity for reevaluation.

5.4.7.4 If changes occur in workplace conditions (e.g., increased physical work effort, additional protective clothing, temperature extremes, or types of hazard).

5.4.8 Medical evaluation. Records of medical evaluations will be retained and made available to employees, their legal representatives and OSHA for the duration of employment plus and additional 30 years. If the company ceases to do business or is sold, records will be transferred to the new owner or OSHA will be contacted to determine retention.

5.5 Program Evaluation:

5.5.1 Workplace evaluations will be conducted at least annually, or more often as necessary, to ensure that the program is effectively implemented.

5.5.2 Employees required to use respiratory protection will be consulted during this evaluation to determine or identify problems or concerns with the program or equipment.

5.5.3 Program evaluation and assessment includes the fit, selection, conditions of use and maintenance of respirators and respiratory protective equipment.

5.6 Recordkeeping:

5.6.1 The company will establish and retain written information regarding medical evaluations, fit testing, and the Respiratory Protection Safety Program.

5.6.2 Fit Testing Records. Records of the qualitative (QLFT) and quantitative (QNFT) fit tests administered to an employee will be maintained. These records include:

5.6.2.1 Date of test

5.6.2.2 Type of fit test performed

5.6.2.3 The name or identification of the employee tested

5.6.2.4 Specific make, model, style, and size of respirator tested

5.6.2.5 Fit test records will be retained for respirator users until the next fit test is administered

5.6.2.6 The pass/fail results for QLFT or the fit factor and strip chart recording or other recording of the test results for QNFT

5.6.3 Medical Records. Records of medical evaluations will be retained and made available to employees, their legal representatives and OSHA for the duration of employment plus and additional 30 years. If the company ceases to do business or is sold, records will be transferred to the new owner or OSHA will be contacted to determine retention.

5.6.4 Training Records. The company will document that the required respiratory training has been accomplished. Documentation includes the employee's name, the signature or initials of the trainer, and the dates of training.

5.7 Voluntary Use of Respirators, where not required in the workplace:

5.7.1 Employees who choose to wear cartridge or supplied air respiratory protection when it is not required in the workplace must be informed and trained in respiratory protection.

5.7.2 The company is required to have a full program if there is mandatory or voluntary use of any respiratory protective equipment other than dust-masks.

5.7.3 For filtering facepiece (dust-mask) programs, required use is covered in the Personal Protective Equipment section of this safety manual. Voluntary use of filtering facepieces does not require any program or documentation.

6. Training and Information.

6.1 The company will develop a standardized training format to meet the requirement for a Respiratory Protection Training program. The training will be conducted on an annual basis, or more frequently as needed, in a comprehensive and understandable format.

6.2 Training will be provided to each affected employee:

6.2.1 Before the employee is first assigned duties that require respiratory protection.

6.2.2 Before there is a change in assigned duties.

6.2.3 Whenever there is a change in operations that present a hazard for which an employee has not previously been trained.

6.2.4 Whenever there is reason to believe that there are deviations from established respiratory procedures or inadequacies in the employee's knowledge or use of these procedures.

6.3 Training includes and knowledge must be demonstrated by the trainee, in the following items, at a minimum:

6.3.1 The reasons for respiratory protection and the hazards encountered that require respirators, including any limitations on their use.

6.3.2 The proper fit, use, inspection, maintenance and storage of respirators.

6.3.3 Putting on and removing respirators (donning and doffing), including seal checks.

6.3.4 Emergency situation respirator use, including situations where respirator malfunctions may occur.

6.3.5 Procedures for regularly evaluating the effectiveness of the program and how to recognize the signs or symptoms that may be caused by ineffective respiratory equipment.

6.3.6 Where respirator use is not required.

6.3.7 The general requirements of OSHA’s Respirator Standard 29 CFR 1910.134.

6.4 Training Records. The company will document that the required respiratory training has been accomplished. Documentation includes the employee's name, the signature or initials of the trainer, and the dates of training.

7. Definitions.

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

- *Assigned Protection Factor* - the level of protection that a properly functioning respirator would be expected to provide to a properly fitted and trained user. For example, an APF of 10 for a respirator means that a user could expect to inhale no more than one tenth of the airborne contaminant present.

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

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

- *Demand respirator* means: An atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

- *Emergency situation* - Any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

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

- *End-of-service-life indicator (ESLI)* - A system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

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

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

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

- *Fit factor* - A quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

- *Fit test* - The use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual. (See also Qualitative fit test QLFT and Quantitative fit test QNFT.)

- *Helmet* means*:* A rigid respiratory inlet covering that also provides head protection against impact and penetration.

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

- *Hood* - A respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

- *Immediately dangerous to life or health (IDLH)* - An atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

- *Interior structural firefighting* - The physical activity of fire suppression, rescue or both, inside of buildings or enclosed structures which are involved in a fire situation beyond the incipient stage. (See 29 CFR 1910.155)

- *Loose-fitting facepiece* - A respiratory inlet covering that is designed to form a partial seal with the face.

- *Negative pressure respirator (tight fitting)* - A respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

- *Oxygen deficient atmosphere* - An atmosphere with oxygen content below 19.5% by volume.

- *Physician or other licensed health care professional (PLHCP)* - An individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required by the respiratory protection standard.

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

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

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

- *Qualitative fit test (QLFT)* - A pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

- *Quantitative fit test (QNFT)* - An assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

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

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

- *Service life* - The period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

- *Supplied-air respirator (SAR) or airline respirator* - An atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

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

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

PROGRAM OVERVIEW

SAFE DRIVING AND VEHICLE/FLEET SAFETY PROGRAM

REGULATORY STANDARD: OSHA General Duty Clause

INTRODUCTION: Company owned or leased vehicles must be maintained in proper condition, and drivers appropriately licensed to operate the type of vehicle. This program outlines the basic inspection techniques for using a company owned or leased vehicle as well as forklifts. This program also outlines the basic safety requirements for operating both company owned and leased equipment and for personal vehicles used for company business purposes.

TRAINING:

- Appropriate driver's licenses for the type of vehicle are required.
- Basic driver safety is recommended for employees who use vehicles for company business.

ACTIVITIES:

- Inspect vehicles / equipment prior to operation

FORMS:

- Motor Vehicle Accident Report
- Safe Driving Vehicle Inspection
- Training Attendance Roster

Table of Contents

1. Purpose. This program outlines the recommendations for managing and inspecting automobiles, trucks and forklifts used by company employees for business reasons.

2. Scope. This program applies to vehicles owned or leased by the company and to employee owned vehicles used for company business.

3. Responsibilities.

3.1 Management:

3.1.1 Ensure drivers are licensed and certified for the type of vehicle driven, without restrictions on their licenses.

3.1.1.1 Where MVR reports are required annually or for pre-employment, ensure an adequate process to obtain and confidentially maintain this information is in place.

3.1.2 Ensure any vehicles are properly inspected, registered and maintained.

3.1.3 Ensure seat belts, safety chains for snow and other equipment is available and functional, as needed or required.

3.1.4 Ensure vehicle insurance is in place for any owned or leased vehicles.

3.1.5 Revoke the driving privileges for employees driving company owned or leased vehicles where the driving record or ability of the employee may be in question.

3.2 Employees or Drivers:

3.2.1 Ensure your driver's license is current.

3.2.2 Only trained, certified employees will be allowed to operate vehicles / equipment (forklifts).

3.2.3 Ensure your driver's license is the appropriate type for the vehicle or equipment being used.

3.2.4 Inspect all vehicles before driving.

3.2.5 Inspect all equipment before operating (forklifts).

3.2.6 Ensure you are capable of driving safely (physical, emotional and mental health)

3.2.7 When unloading trailers must be chocked and secure before loading or unloading.

3.3 Safety Officer:

3.3.1 Assist in the development and implementation of the written program, as needed.

3.3.2 Ensure that every operator is re-evaluated every 3 years.

4. Procedure.

4.1 General Requirements:

4.1.1 Only authorized personnel may drive company vehicles.

4.1.2 Driving while under the influence of alcohol, inhalants or illegal drugs, or after taking any medications that may impair your driving ability is prohibited.

4.1.3 Drivers must obey all traffic signals and devices, and obey traffic laws at all times.

4.1.4 Seatbelts must be worn at all times while the vehicle is in motion.

4.1.5 Only company authorized persons may ride as a passenger in a company owned or leased vehicle, based on company policy.

4.1.6 Drivers may only use "hands-free" style phone systems when the vehicle is in motion, based on state requirements.

4.2 Break Downs Involving Company Vehicles:

4.2.1 Drivers must notify the company as soon as possible after any accident or incident with a company vehicle, regardless of how minor the incident may have been.

4.2.2 Contact your supervisor or manager immediately for assistance obtaining towing or repair.

4.2.3 If the company subscribes to a vehicle service agency (like AAA or other road-service provider), follow the established procedure for contacting that agency.

4.3 Vehicular Accidents. In the event of an accident, remain calm. Our first priority is the health and safety of our employees. Employees involved in a work-related vehicular accident must:

4.3.1.1 Contact the appropriate local law enforcement agency. Even if the incident is minor, a police report is required for all vehicular accidents involving a company owned vehicle or for those occurring while the employee is performing company business.

4.3.1.2 Notify company management or Supervisors as soon as possible.

4.3.1.3 If possible, leave vehicles in their positions until the police arrive.

4.3.1.4 Do not discuss the accident with others involved. Share your observations only with the police.

4.3.1.5 Exchange, if possible, the following information with all other drivers involved:

4.3.1.5.1 The driver's name

4.3.1.5.2 The names of all other passengers (per involved vehicle)

4.3.1.5.3 The driver's/auto insurance information

4.3.1.5.4 The other vehicle information: make, model, year, color, and license plate number

4.3.1.5.5 The name of the driver's employer if the driver was traveling for business

4.3.1.6 If property damage occurred to a vehicle of an unknown owner (e.g. a parked car) or other property (e.g. a fence), do NOT leave the scene until a full police report is completed.

5. Safety Information.

5.1 Notification of Driver Suspension, Accidents or similar issues

5.1.1 Employees must notify their supervisor or manager within 24 hours of any citation of traffic or driving violation, if the violation occurred while using a company vehicle.

5.1.2 Employees who may be expected to drive for company business must notify their supervisor or manager if their license is suspended, revoked or restricted for any reason.

5.2 Companies will maintain owned or leased vehicles in a safe manner.

5.2.1 Employees who find defects or repair needs with any company vehicle must notify their supervisor or manager immediately.

5.2.2 Employees may not drive company vehicles that are in an unsafe condition.

5.3 Daily Pre-Driving Inspection:

5.3.1 Tire condition and, if necessary, pressure

5.3.2 Spare tire available

5.3.3 Lights and turn signals operational

5.3.4 Windshield wipers functional

5.3.5 Windshield intact (no cracks or breaks)

5.3.6 Defroster operational

5.3.7 Oil and fluids (windshield cleaner, transmission, brake fluid) present at required levels.

5.3.8 Brakes functional

5.3.9 Mirrors are present, properly adjusted and clean.

5.3.10 Vehicle loads are secure

5.3.11 Emergency materials and equipment (fire extinguishers, accident reporting kit, vehicle registration, etc.) are present, as needed.

5.3.12 General vehicle condition is appropriate. Scrapes, scratches, dents or other damage should be reported before taking the vehicle on the road.

6. Training and Information.

6.1 It is recommended that employees undergo defensive driving or general safe driving training when they are required to operate company owned or leased vehicles and equipment by a qualified instructor.

6.1.1 Training will include formal education includes lecture, discussion, learning, videos, and written materials. Practical training involves instructor demonstrations, by a qualified instructor and trainee exercises.

6.2 This instruction will also address load capacity, distances, refueling, ramps, visibility and balances, when operating a forklift.

6.3 Re-training for vehicles and equipment will be conducted when unsafe operations are observed, after an accident or if operating a different vehicle type. If no incidence occur, re-training will be conducted every three years.

7. Definitions.

- *Driving Responsibilities* – An employee who drives a vehicle (company owned or leased, or a personal vehicle) for company business purposes.

- *Vehicle* – a company owned or leased automobile, truck or motorcycle which requires a valid driver's license to operate on public roadways.

PROGRAM OVERVIEW

SCAFFOLDING SAFETY PROGRAM

REGULATORY STANDARD: *OSHA - 29 CFR 1910.28 Safety Requirements for Scaffolding*
- 29 CFR 1910.29 Manually Propelled Mobile Scaffolds
- 29 CFR 1926.450-454

INTRODUCTION: Scaffolds are a major source of injuries and fatalities; this poses a serious problem for exposed workers and their employer. This safety program addresses the issues of evaluating and identifying potential deficiencies, evaluating the associated potential hazards, communicating information concerning these hazards, and establishing appropriate procedures and protective measures for employees.

TRAINING:

- Employees must be trained prior to job assignment, by competent personnel
- Refresher training will be conducted on an as needed basis

ACTIVITIES:

- Ensure only trained and qualified individuals erect or dismantle scaffolding
- Communicate, implement, and enforce scaffolding safety policies
- Ensure scaffolding meets the minimum requirements for loading, strength, position and use for the job, task or activity
- Provide the needed equipment and materials for scaffolding
- Ensure only certified professional engineers design scaffolds where scaffolding is built or erected for a specific purpose
- Ensure inspections are performed and documented
- Enforce the use of guardrail systems and/or fall protection equipment

FORMS:

- Training Attendance Roster

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Scaffolding Safety Program

1. Purpose. This safety program is designed to establish clear company goals with regard to the safe use, erection and dismantling of scaffolds. The goals and objectives will be communicated to all required personnel. The company will review and evaluate this safety program:

1.1 On an annual basis, or more frequently as needed.

1.2 When changes occur to the governing regulatory standards that prompt revision of this document.

1.3 When facility operational changes occur that require a revision of this document.

2. Scope. This program applies only to work areas where scaffolding is used, regardless of the number of workers employed or the number of work shifts.

3. Responsibilities.

3.1 Management and Supervisors:

3.1.1 Ensure only trained and qualified individuals erect or dismantle scaffolding.

3.1.2 Ensure scaffolding meets the minimum requirements for loading, strength, position and use for the job, task or activity.

3.1.3 Ensure only certified professional engineers design scaffolds where scaffolding is built or erected for a specific purpose (i.e. scaffolding is designed, engineered and built on-site and not pre-manufactured by a vendor).

3.1.4 Ensure inspections are performed by a competent person and documented.

3.1.5 Ensure guardrail systems and/or fall protection equipment is provided and used.

3.2 Employees:

3.2.1 Attend training as needed or required.

3.2.2 Erect and dismantle scaffolding only by manufacturer's directions or under the supervision of a professional engineer.

3.2.3 Inspect scaffolds, throughout the shift or as needed or required.

3.2.4 Immediately report hazards or hazardous conditions to your supervisor.

3.2.5 Utilize fall protection equipment, as needed or required.

3.3 Safety Officer (as needed or required):

3.3.1 Assist in the development and implementation of this program.

4. Procedure.

4.1 Company Fixed Scaffolding Safety Policy. To insure safety and serviceability the following general precautions concerning the care and use of scaffolding will be observed:

4.1.1 Footing and anchorages for scaffolds will be sound, rigid, and capable of carrying the maximum intended load without settling or displacement. Unstable objects such as barrels, boxes, loose brick, or concrete blocks will not be used to support scaffolds or planks.

4.1.2 Scaffolds and their components will be capable of supporting without failure at least four times the maximum intended load.

4.1.3 Scaffolds will be maintained in a safe condition at all times in accordance with the manufacturer's recommendations. Fixed scaffolds will not be altered or moved horizontally while they are in use or occupied.

4.1.4 Any scaffold damaged or weakened from any cause will be immediately repaired and will not be used until repairs have been completed.

4.1.5 Scaffolds will not be loaded in excess of the working load for which they are intended.

4.1.6 All load-carrying timber members of scaffold framing will be a minimum of 1,500 f. (Stress Grade) construction grade lumber.

4.1.7 All planking will be Scaffold Grade as recognized by grading rules for the type of wood used. The scaffold manufacturer's recommendations will be followed.

4.1.8 Nails or bolts used in the construction of scaffolds will be of adequate size and in sufficient numbers at each connection to develop the designed strength of the scaffold. Nails will not be subjected to a straight pull and will be driven full length.

4.1.9 All planking or platforms will be overlapped (minimum 12 inches) or secured from movement.

4.1.10 An access Scaffold or equivalent safe access will be provided.

4.1.11 Scaffold planks will extend over their end supports not less than 6 inches or more than 18 inches.

4.1.12 The poles, legs, or uprights of scaffolds will be plumb, and securely and rigidly braced to prevent swaying and displacement.

4.1.13 Materials being hoisted onto a scaffold will have a tag line.

4.1.14 Overhead protection will be provided for men on a scaffold exposed to overhead hazards.

4.1.15 Scaffolds will be provided with a screen between the toe-board and the guardrail, extending along the entire opening, consisting of No. 18 gauge U.S. Standard Wire one-half-inch mesh or the equivalent, where persons are required to work or pass under the scaffolds.

4.1.16 Employees will not work on scaffolds which are covered with ice or snow, unless all ice or snow is removed and planking sanded to prevent slipping.

4.1.17 Tools, materials, and debris will not be allowed to accumulate in quantities to cause a hazard.

4.1.18 Only treated or protected fiber rope will be used for or near any work involving the use of corrosive substances or chemicals.

4.1.19 Wire or fiber rope used for scaffold suspension will be capable of supporting at least six times the intended load.

4.1.20 The use of shore scaffolds or lean-to scaffolds will not be used.

4.1.21 Lumber sizes refer to nominal sizes except where otherwise stated.

4.1.22 Scaffolds will be secured to permanent structures, through use of anchor bolts, reveal bolts, or other equivalent means. Window cleaners' anchor bolts will not be used.

4.1.23 Special precautions will be taken to protect scaffold members, including any wire or fiber ropes, when using a heat-producing process.

4.2 Company Mobile (Rolling) Scaffolding Safety Policy. To insure safety and serviceability the following general precautions concerning the care and use of scaffolding will be observed:

4.2.1 Working loads. Work platforms and scaffolds will be capable of carrying the design load under varying circumstances depending upon the conditions of use.

4.2.1.1 The design load of all scaffolds will be calculated on the basis of:

4.2.1.1.1 Light - Designed and constructed to carry a working load of 25 pounds per square foot.

4.2.1.1.2 Medium - Designed and constructed to carry a working load of 50 pounds per square foot.

4.2.1.1.3 Heavy - Designed and constructed to carry a working load of 75 pounds per square foot.

4.2.2 Work levels. The maximum work level height will not exceed four (4) times the minimum or least base dimensions of any mobile scaffold. Where the basic mobile unit does not meet this requirement, suitable outrigger frames will be employed to achieve this least base dimension, or provisions will be made to guy or brace the unit against tipping.

4.2.2.1 The minimum platform width for any work level will not be less than 20 inches for mobile scaffolds (towers). Ladder stands will have a minimum step width of 16 inches.

4.2.2.2 The supporting structure for the work level will be rigidly braced, using adequate cross bracing or diagonal bracing with rigid platforms at each work level.

4.2.2.3 The work level platform of scaffolds (towers) will be of wood, aluminum, or plywood planking, steel or expanded metal, for the full width of the scaffold except for necessary openings. Work platforms will be secured in place. All planking will be 2-inch (nominal) scaffold grade minimum 1,500 f. (stress grade) construction-grade lumber or equivalent.

4.2.2.4 All scaffold work levels 10 feet or higher above the ground or floor will have a standard (4-inch nominal) toe-board.

4.2.2.5 All work levels 10 feet or higher above the ground or floor will have a guardrail of 2- by 4-inch nominal or the equivalent installed no less than 36 inches or more than 42 inches high, with a mid-rail, when required, of 1- by 4-inch nominal lumber or equivalent.

4.2.3 Wheels or casters. Wheels or casters will be inspected to ensure that they are provided with strength and dimensions to support four (4) times the design working load.

4.2.3.1 All scaffold casters will be inspected to ensure that they are provided with a positive wheel and/or swivel lock to prevent movement.

4.2.4 Nails, bolts, or other fasteners. Nails, bolts and other fasteners used in the construction of ladders, scaffolds, and towers will be of adequate size and in sufficient numbers at each connection to develop the designed strength of the unit. Nails will be driven full length. (All nails should be immediately withdrawn from dismantled lumber.)

4.2.4.1 All exposed surfaces will be free from sharp edges, burrs or other safety hazards.

4.2.4.2 Where leveling of the elevated work platform is required, screw jacks or other suitable means for adjusting the height will be used.

4.2.4.3 Adjusting screws may not be extended more than 12 inches.

4.2.5 Movement of Scaffolds. Employees are not permitted to ride rolling scaffolds during relocation.

4.2.5.1 Before moving the platform, secure all equipment and material.

4.2.5.2 Casters or wheels must have a serviceable locking device.

4.2.5.3 Be aware of overhead obstructions when moving scaffolds.

4.2.5.4 Never run over electrical cords.

4.2.6 Never pull scaffolds from the top, always push at base level.

4.2.7 Work only from the platform area; never extend work beyond guard railing.

4.3 Erecting of Scaffolding. Only trained and authorized employees of the company or its contractors will supervise the erection of scaffolding. Pertinent OSHA regulatory standards and information plus guidance provided by the manufacturer of the particular type of scaffolding will be used. The following apply:

4.3.1 Manufacturer's erection instructions will be followed.

4.3.2 Advance planning considerations will be followed during the erection process.

4.3.3 Only trained and authorized employees will supervise the erection of scaffolding.

4.3.4 Each component will be visually inspected before use.

4.3.5 Defective or unserviceable materials will be tagged and not be used.

4.3.6 Only approved lumber will be used.

4.3.7 Consult with the project manager where any instructions are unclear.

5. Safety Information.

5.1 Manufacturer Recommendations for Safety. To insure safety and serviceability the manufacturer general precautions concerning the care and use of wooden scaffolding will be observed.

5.2 Pre-Inspection of Erected Scaffolding. The three main areas of inspection are for rust, straightness of members, and welds. Only trained employees of the company or its contractors will conduct the pre-inspection. Pertinent OSHA regulatory standards and information plus guidance provided by the manufacturer of the particular type of scaffolding will be used. The following as a minimum apply:

5.2.1 Rust. Heavily rusted scaffolding equipment is a possible sign of abuse or neglect. Severely rusted components should be thoroughly inspected and cleaned before approved for use.

5.2.2 Straightness of members. Mishandling, trucking and storing may cause damage to scaffolding equipment. All members or parts of all steel scaffolding components should be straight and free from bends, kinks or dents.

5.2.3 Welds. Scaffolding equipment should be checked before use for damaged welds and any piece of equipment showing damaged welds or rewelding beyond the original factory weld should not be used. The factory weld reference pertains to location and quality of re-welds.

5.2.4 Check serviceability of locking devices.

5.2.5 Check alignment of coupling pins and braces.

5.2.6 Check serviceability of caster brakes (rolling scaffolds).

5.3 Final Inspection of Erected Scaffolding. Only trained and authorized employees of the company or its contractors will conduct the final inspection of erected scaffolding. Pertinent OSHA regulatory standards and information plus guidance provided by the manufacturer of the particular type of scaffolding will be used. The following as a minimum apply:

5.3.1 Check for proper support under every leg of every frame.

5.3.2 Check for wash out (if outside) due to rain.

5.3.3 Check to ensure all base plates or adjustment screws are in firm contact with supports.

5.3.4 Check frames for plumb and square in both directions.

5.3.5 Check serviceability and correctness of all cross braces.

5.3.6 Check to ensure that all planking and accessories are properly installed.

5.3.7 Check to ensure that all guard rails are in place.

5.3.8 Recheck periodically to ensure conditions remain safe.

5.4 Dismantling of Scaffolding. Only trained and authorized employees of the company or its contractors will supervise the dismantling of scaffolding. Pertinent OSHA regulatory standards and information plus guidance provided by the manufacturer of the particular type of scaffolding will be used. The following apply:

5.4.1 Manufacturers dismantling instructions will be followed.

5.4.2 Relocation planning considerations will be considered during the dismantling process.

5.4.3 Dismantling will be supervised by a competent employee.

5.4.4 Each component will be visually inspected after use.

5.4.5 Defective or unserviceable materials will not be stored with serviceable materials.

5.4.6 Avoid dropping or throwing the components as this could result in damage to the equipment.

5.4.7 Consult with the project manager where any instructions are unclear.

6. Training and Information.

6.1 General. A training program will be provided for all employees who will be using scaffolding in the course of their duties. The training will be conducted by competent personnel. The program will include but will not be limited to:

6.1.1 A description of fall hazards in the work area or job site

6.1.2 Procedures for using fall prevention and protection systems

6.1.3 Scaffolding access and egress procedures

6.1.4 Scaffolding equipment limitations

6.1.5 Inspection and storage procedures for the equipment

6.2 Initial training. Training will be conducted prior to job assignment. The company will provide training to ensure that the purpose, function, and proper use of scaffolding is understood by employees and that the knowledge and skills required for the safe application and usage is acquired by employees. This safety program will be provided to and read by all employees receiving training. The training will include, as a minimum the following:

6.2.1 Types of scaffolding used.

6.2.2 Recognition of applicable fall hazards associated with the work to be completed and the locations of such.

6.2.3 Load determination and balancing requirements.

6.2.4 Safety precautions in the use of scaffolds.

6.2.5 All other employees, whose work operations are or may be in an area where scaffolding may be utilized, will be instructed to an awareness level concerning the associated hazards.

6.2.6 Equipment maintenance and inspection requirements.

6.2.7 Equipment strengths and limitations.

6.2.8 Verification. The company will verify that employee training has been accomplished and is being kept up to date. The documentation will contain each employee's name and dates of training. Training will be accomplished by competent personnel.

6.3 Refresher training. This safety program will be provided to and read by all employees receiving refresher training. The training content will be identical to initial training. Refresher training will be conducted on an as needed basis or when the following conditions are met, whichever event occurs sooner.

6.3.1 Whenever (and prior to) a change in their job assignments, a change in the type of scaffolding equipment used, or when a known hazard is added to the work environment which affects this safety program.

6.3.2 Additional retraining will also be conducted whenever a periodic inspection reveals, or whenever there is reason to believe, that there are deviations from or inadequacies in the employee's knowledge or use of scaffolding equipment or procedures.

6.3.3 Whenever a scaffolding safety procedure fails.

6.3.4 The retraining will reestablish employee proficiency and introduce new or revised methods and procedures, as necessary.

6.3.5 Verification. The company will verify that employee training has been accomplished and is being kept up to date. The documentation will contain each employee's name and dates of training. Training will be accomplished by competent personnel.

7. Definitions.

- *Lumber size* - Refers to nominal sizes except where otherwise stated

PROGRAM OVERVIEW

SCISSORS LIFT PROGRAM

REGULATORY STANDARD: OSHA 29CFR1910.29 and 1926.452

INTRODUCTION: A scissors lift is a type of mobile or moveable scaffold that is power driven and able to lift a platform vertically (up and down). Scissors Lifts must be inspected before use and operators must understand the controls and safety functions of the lift. Guardrail systems are usually required, and should operators remove any part of the guardrail or step out of the lift, a personal fall arrest system is required to be utilized when working at height.

TRAINING:

- Employees trained prior to use, in both a classroom component and an evaluation of the operator performance with the equipment

ACTIVITIES:

- Identify the tasks that require a scissors lift
- Maintain manufacturer's requirements, limits and documentation
- Conduct daily inspections prior to use, recommended to document inspections
- Ensure only trained operators use lift equipment
- Implement, maintain, and inspect fall arrest systems as required

FORMS:

- Scissors Lift Operator Daily Checklist
- Scissors Lift Operator Evaluation Assessment
- Scissors Lift Training Wallet Cards
- Training Attendance Roster

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General Safety Awareness Program

1. Purpose. This document provides a written safety program outlining the rules and requirements for the design, construction, and use of mobile work platforms (scissors lifts) and similar mobile towers.

2. Scope. Applies to any use of scissors lift equipment by company employees.

3. Responsibilities.

3.1 Area Management:

3.1.1 Ensures equipment is maintained in a safe condition for use.

3.1.2 Ensures operators are appropriately trained in the use of the equipment, and protective systems, based on manufacturer's recommendations.

3.2 Employees who use scissors lifts:

3.2.1 Completes operator safety training (classroom and practical).

3.2.2 Uses the equipment in a safe manner, in accordance with manufacturer and company requirements.

3.2.3 Inspects equipment before use. Reports unsafe conditions or equipment defects immediately upon discovery.

3.2.4 Utilizes fall protection systems, as required.

3.3 Safety Representative must (as needed):

3.3.1 Assist in the implementation of this program.

4. Procedure.

4.1 Employees must remain in the lift, with both feet on the floor system, unless a fall protection harness is used. If the lift is equipped with a platform that extends outside the wheelbase of the lift, fall protection must be worn when working from the extended portion, even if a guardrail system is in place.

4.2 Before a scissor lift is moved, each employee on the lift shall be made aware of the move.

4.3 Safe Operation:

4.3.1 Operators must understand the controls and function of the lift.

4.3.2 Maintain safe distances from power lines. Be aware of external utility lines (power, cable, etc) when using near the outside walls of the structure.

4.3.3 Maintain safe clearances from internal fixtures (lights, sprinkler heads and pipes)

4.4 Fall Protection Systems:

4.4.1 Fall Protection (body harness and lanyard) is required if the operator or worker will:

4.4.1.1 Step off the lift onto another surface area (with a fall hazard of 6 feet or more) that is not protected by a guardrail.

4.4.1.2 Step onto the toe-board, mid-rail or top rail for any reason.

4.4.1.3 Lean out over the guardrail for any reason.

4.4.1.4 Step out onto an extendable platform (as part of the scissors lift), that extends outside the wheelbase of the lift.

4.4.1.5 Work in a scissors lift where the guardrail does not meet regulatory height or strength requirements.

4.4.2 From a scissors lift, it is allowable to secure your personal fall arrest system (lanyard attached to a full body harness) to an adjacent pole, structure, or equipment while working, but **only** if that practice does not present a hazard **and** other means of tie-off or fall protection means are not feasible.

5. Safety Information.

5.1 General Safety Requirements: Scissors lifts are considered to be a form of scaffolding and as such, are required to comply with the requirements for "mobile scaffolds" as follows:

5.1.1 They must be braced or have brake controls to hold the basket in place and to prevent collapse.

5.1.2 No movement when lift is in the up position. The lift must be totally folded into its lowest position for movement. When the lift is in the

up position, the brakes or stability outriggers (as applicable) must be applied to prevent the base from moving.

5.1.3 Platforms that extend beyond the wheel base may not be used unless outrigger frames or equivalent stability devices are used.

5.1.4 Before a lift is moved, each employee on the lift shall be made aware of the move, and the basket lowered to its bottom most position before moving.

5.2 Equipment Specifications: Scissors lifts must conform and be maintained to original manufacturer requirements and meet ANSI requirements.

5.2.1 They must be capable of withstanding 4 times their intended load, under varying conditions of use. Platform capabilities must be strong enough to withstand 1000 lbs for every 2.5 square foot of standing area.

5.2.2 All working and moving parts must be integral to the design of the equipment. All parts and materials must be protected against corrosion or deterioration.

5.2.3 All exposed surfaces must be free from sharp edges, burrs or other safety hazards.

5.2.4 Wheels must be maintained in good operating condition, lock in place and not be capable of movement unless the operator controls are engaged for movement.

5.3 Guardrail Systems:

5.3.1 All sides must be protected by a standard guardrail system (top rail at approximately 42” height, mid-rail approximately 21” from standing surface) which meets the requirements for guardrail system height and strength requirements.

5.3.2 Toe-boards are required if the lift goes 10 feet or higher from the ground or floor surface.

5.4 Entry and exit area: must be provided on one end of the lift.

5.4.1 The opening must be provided with a movable gate, or safety chains which meet equivalent strength requirements for guardrail systems. If chains are used, they must have both a top and mid-rail chain.

5.4.2 Safe access to the lift must be provided by a ladder or steps. These ladder steps are normally built into the scissors lift and must be used to safely enter and exit the lift.

5.4.3 Jumping from the lift to the ground to dismount is prohibited.

5.4.4 Climbing the cross-braces to access the lift is prohibited.

5.5 Safe Use Requirements:

5.5.1 Lifts must be stable when stationary, in either the folded or extended mode, and be prevented from tipping during movement.

5.5.2 Lifts shall be plumb, level, and squared. All brace connections shall be secured.

5.5.3 Manual force used to move the lift shall be applied as close to the base as practicable, but not more than 5 feet (1.5 m) above the supporting surface.

5.5.4 Platforms must be maintained within 3 degrees of level during use. Where leveling of the lift is necessary, screw jacks or equivalent means shall be used.

5.5.5 Platforms must be free from holes, pits or deformities through which materials may fall, or where these deformities may contribute to the collapse of the system or similar hazards.

5.5.6 Speed must be limited to 3 feet per second or less.

6. Training and Information

6.1 Operators must be trained in the safe use requirements of each type of lift used per manufacturer's recommendations, and in fall protection where its use would be required.

7. Definitions.

- *Scissors Lift* - a type of mobile or moveable scaffold that is power driven and able to lift a platform vertically (up and down). Scissors lifts may have a platform that extends outward, but the basket of the lift does not rotate or move outside the wheelbase of the lift (like a cherry picker, fire truck or utility truck).

PROGRAM OVERVIEW

TRENCHING AND SHORING SAFETY PROGRAM

REGULATORY STANDARD: 29 CFR 1926.650 - 653

INTRODUCTION: This program addresses the evaluation of hazards associated with the creation of trenches, the shoring requirements, and minimizing any risks to employees who perform work or enter trenches. It provides information for underground installations, access and egress, vehicle traffic, hazardous atmospheres and adjacent structures. It defines requirements for site inspections, sloping and benching systems, support systems and shield systems and highlights employee training requirements.

TRAINING:

- Entrants must be trained in the hazards of working in a trench or excavation
- Entrants and job area supervisors must be trained in the protective system used
- Only qualified persons may set up or build shoring systems or other protective systems. Systems must be designed by a professional engineer, familiar with the hazards encountered in a trench or excavation. In some cases, the engineer or similar competent person must be on-site during installation or set up.

ACTIVITIES:

- Determine the type of protective system to be used
- Ensure a competent person supervises the installation of the system
- Ensure employees who enter trenches and excavations are trained
- Ensure trenches and excavations are inspected daily and after any weather events that may impact the safety of the excavation
- Ensure soils-testing is performed daily by a competent person.
- Ensure trenches and excavations are protected if left unattended

FORMS:

- Training Attendance Roster
- Decision Flow Charts and Options

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Trenching and Shoring Safety Program

1. Purpose. This program is designed to address the hazards associated with trenching and shoring operations. The primary hazard to which employees may be exposed during excavation work is a cave-in which occurs when the soil forming the side of the excavation can no longer resist the forces applied to it. The company will review and evaluate this safety program:

1.1 On an annual basis and more frequently as needed.

1.2 When regulatory changes occur that prompt revision of this document.

1.3 When facility operational changes or job site changes occur that require a revision of this document.

1.4 When there is an accident or close-call that relates to this topic.

2. Scope. This program applies to all trenching and shoring operations at company facilities or at company job sites.

3. Responsibilities.

3.1 Management/Supervisors:

3.1.1 Ensure a professional engineer or other certified "competent" person is available and on-site as needed, or required.

3.1.2 Ensure surface encumbrances (bushes, trees, poles, utility lines, etc.) are removed or safeguarded during trenching operations.

3.1.3 Provide adequate access and egress, at the required intervals and locations.

3.1.4 Ensure employees who may be exposed to vehicle traffic have the appropriate equipment and training.

3.1.5 Provide appropriate barricades or warning devices for equipment operated near or in trenches.

3.1.6 Ensure confined space procedures are utilized properly for any trench greater than 4 feet (1.22m) deep.

3.1.7 Provide adequate protection for any water accumulation that may occur.

3.1.8 Provide for the underpinning or stabilizing of structures (large trees, buildings, etc.), as needed or required.

3.1.9 Ensure berms, scaling, or other restraining systems are used to prevent materials, equipment and loose rock or

3.1.10 from falling into trenches.

3.1.11 Provide for the performance of site inspections by the engineer or other competent person.

3.1.12 Ensure the professional engineer or other competent person approves the design and slope of trenches and shoring.

3.1.13 Provide for the materials and design of support systems, shield system and other required protective measures.

3.1.14 Ensure the installation and remove of support systems and shields are performed in accordance with the requirements. The professional engineer or other competent person may be designated to oversee this provision.

3.1.15 Ensure employees are adequately trained and knowledgeable about their duties and responsibilities with regard to safe working practices at the job site(s).

3.2 Employees:

3.2.1 Attend appropriate training.

3.2.2 Utilize protective equipment, as required.

3.2.3 Maintain safe distances from equipment and materials, as needed or required.

3.2.4 Follow established procedures and safe work practices.

3.3 Safety Officer (as needed or required):

3.3.1 Assist in the development and implementation of this program.

3.4 Professional Engineer (or Other Certified "Competent" Person):

3.4.1 Remain on-site or on-call as needed or required based on the type and magnitude of the job. At least daily visits and duties are required.

3.4.2 Design structural ramps for access to, egress from or crossovers for equipment and personnel.

3.4.3 At least daily, inspect the excavation site, adjacent areas and protective systems used to ensure their adequacy.

3.4.4 Inspect the excavation site, adjacent areas and protective systems after any rainfall or other occurrence that may produce water or run-off into the trench.

3.4.5 Ensure the trench has adequate protection from cave-in.

3.4.6 Design sloping and benching systems, as needed or required.

3.4.7 Design support systems, shield systems and other protective systems, as needed or required.

3.4.8 Inspect materials and equipment used for protective systems, upon request, to determine if the material is adequate for use.

4. Procedure.

4.1 Surface Encumbrances and Underground Installations:

4.1.1 All surface encumbrances (trees, poles, utilities, etc.) that could create a hazard will be removed (or supported as necessary) to safeguard employees and the structure of the trench.

4.1.2 The estimated location of utility installations such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, will be determined prior to opening an excavation.

4.1.3 Contact will be made with all utility and service companies (also to include municipal owned) to advise them prior to the start of all actual excavation, without exception. A listing of these utility firms and contact numbers will be maintained by the job site supervisor or project manager for the site.

4.1.4 Appropriate time will be allotted to utility companies to locate and mark their installations prior to the beginning of excavation.

4.1.5 Utility lines and installations will be protected to the extent possible during excavation work.

4.2 Soil Classification and testing:

4.2.1 The classification of the soil deposits shall be made based on the results of at least one visual and at least one manual analysis. Such analyses shall be conducted by a competent person using tests described in paragraph (d) below, or in other recognized methods of soil classification and testing such as those adopted by the American Society for Testing Materials, or the U.S. Department of Agriculture textural classification system.

4.2.2 Acceptable visual and manual tests.

4.2.2.1 Visual tests. Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated material.

4.2.2.2 Manual tests. Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly.

4.3 Access and Egress:

4.3.1 Structural ramps used for access or egress of equipment (or to cross over an excavation) will be designed by a competent person qualified in structural design and will be constructed in accordance with the design. Ramps used for employee access will be of sufficient strength and design to accommodate the use. Standard guardrail systems will be used when falls greater than 6 feet may occur.

4.3.2 Trenches that are 4 feet (1.22m) or more deep must have a stairway, ladder, ramp, or other safe means of egress located so there is never more than 25 feet (7.62m) of travel lateral distance to reach it. Platforms must be provided every 20 feet on stairs, ladders or other means of egress.

4.4 Vehicle Traffic:

4.4.1 Employees exposed to public vehicular traffic will be provided with, and will wear warning vests or other suitable garments marked with or made of reflective or high-visibility material.

4.5 Falling Loads:

4.5.1 No employee will be permitted underneath loads handled by lifting or digging equipment.

4.5.2 Employees will be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials.

4.5.3 Operators may only remain in the cabs of vehicles being loaded or unloaded if the cab provides adequate protection during loading and unloading operations.

4.6 Warning Systems for Mobile Equipment:

4.6.1 When mobile equipment is operated near the edge of an excavation and the operator does not have a clear and direct view of the edge, a warning system will be utilized such as barricades, hand or mechanical signals, or stop logs. If possible the grade should be away from the excavation.

4.7 Hazardous Atmospheres:

4.7.1 Testing and controls.

4.7.2 Confined space entry procedures will be adhered to for any trench greater than 4 feet in depth. The company's Confined Space Entry Safety Program will be utilized.

4.7.3 Atmospheric testing includes oxygen deficiency (less than 19.5 % Oxygen) and the presence of flammable gases. Testing will be performed as often as necessary to ensure the atmosphere remains safe.

4.7.4 Emergency rescue equipment.

4.7.5 Emergency rescue equipment appropriate to the safe evacuation of the trench will be present and available for use at all times. Employees or rescue teams trained to use this equipment will remain outside the trench and on-call at all times.

4.7.6 Harness and lifeline will be used for any person entering deep excavations (i.e., bell bottom pier hose or confined footing excavations). Lifelines will be separate from any material handling lines and must be individually attended at all times when in use.

4.8 Protection from Water Accumulation Hazards:

4.8.1 Employees will not work in excavations in which there is accumulated water or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed. The precautions necessary may include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline system.

4.8.2 All excavations will be inspected by the site engineer or "competent person" after any rainfall (or other occurrence that may produce water or water run-off) to determine if any change to the soil resistance capacity has occurred.

4.8.3 If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, or dikes, or other suitable means will be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation.

4.9 Adjacent Structure Stability (trees, buildings, etc.):

4.9.1 Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning will be provided to ensure their stability.

4.9.2 Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees will not be permitted unless the structure is stabilized, the excavation is into stable rock or unless a registered professional engineer has approved the determination that the structure will be unaffected by the excavation activity so that the work will not pose a hazard to employees.

4.9.3 Sidewalks, pavements and appurtenant structures will not be undermined without a support system to protect employees from their possible collapse.

4.10 Loose Rock or Soil Protection:

4.10.1 Adequate protection will be provided to protect employees from loose rock or soil that could pose a hazard. Scaling to remove loose materials, barricades, retaining devices or other equivalent protection must be provided. Materials and equipment must be kept at least 2 feet (.61m) from the edge of any excavation to provide adequate levels of protection.

5. Safety Information.

5.1 Site Inspections:

5.1.1 Daily inspections of excavations, the adjacent areas, and protective systems will be made by a professional engineer or other certified "competent" person when employee exposures are present.

5.1.2 Inspections will look for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. These inspections are only required when employee exposure can be reasonably anticipated.

5.1.3 Inspections may be required more frequently throughout the work shift, depending upon work progression, rain or wind storms, of observation of changing conditions at the site.

5.1.4 Where sites or protective systems fail inspection, employees will be prohibited from continuing work until the necessary precautions have been taken to ensure their safety.

5.2 Protection of Employees in Excavations:

5.2.1 Each employee in an excavation will be protected from cave-ins by an adequately designed protective system unless the depth is less than 5 feet and the engineer or other certified and competent person indicates there is no potential for cave-in or unless the excavation is made entirely in stable rock. Protective systems must resist all loads that could reasonably be expected to be applied to them without fail.

5.3 Design of Sloping and Benching Systems:

5.3.1 Option 1 - Allowable configurations and slopes. Excavations will be sloped at an angle not steeper than one and one-half horizontal to one vertical (34 degrees measured from the horizontal).

5.3.2 Option 2 - Determination of slopes and configurations uses 29CFR1926.652 Appendices A and B.

5.3.3 Option 3 - Designs using other tabulated data. Designs of sloping or benching systems will be selected from and in accordance with tabulated data, such as approved tables and charts. At least one copy of the tabulated data which identifies the registered professional engineer who approved the data, will be maintained at the job site during construction of the protective system. After that time the data may be stored off the job site, but a copy of the data will be made available to OSHA upon request. The tabulated data will be in written form and will include:

5.3.3.1 Identification of the parameters that affect the selection of a sloping or benching system drawn from such data.

5.3.3.2 Identification of the limits of use of the data, to include the magnitude and configuration of slopes determined to be safe.

5.3.3.3 Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data.

5.3.4 Option 4 - Design by a registered professional engineer. At least one copy of the design will be maintained at the job site while the slope is being constructed. After that time the design need not be at the job site, but a copy will be made available to OSHA upon request. Designs will be in written form and will include at least the following:

5.3.4.1 The magnitude of the slopes that were determined safe for the particular project.

5.3.4.2 The configurations that were determined to be safe for the particular project.

5.3.4.3 The identity of the registered professional engineer approving the design.

5.4 Design of Support Systems, Shield Systems, and Other Protective Systems:

5.4.1 Option 1 - Designs using Appendices A, C and D of 29CFR1926.652. Designs for timber shoring in trenches will be determined in accordance with the conditions and requirements set forth in appendices A and C. Designs for aluminum hydraulic shoring will be in accordance with appendix D and/or manufacturer's tabulated data.

5.4.2 Option 2 - Designs using Manufacturer's Tabulated Data. Design of support systems, shield systems, or other protective systems that are drawn from manufacturer's tabulated data will be in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer. Deviations must have written approval from the manufacturer and be maintained at the job site during construction of the system. After that time this data may be stored off the job site, but a copy will be made available to OSHA upon request.

5.4.3 Option 3 - Designs using other Tabulated Data. Designs of support systems, shield systems, or other protective systems will be selected from and be in accordance with tabulated data, such as tables and charts. At least one copy of the tabulated data, which identifies the registered professional engineer who approved the data, will be maintained at the job site during construction of the protective system. After that time the data may be stored off the job site, but a copy of the data will be made available to the OSHA upon request. The tabulated data will be in written form and include all of the following:

5.4.3.1 Identification of the parameters that affect the selection of a protective system drawn from such data.

5.4.3.2 Identification of the limits of use of the data.

5.4.3.3 Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data.

5.4.4 Option 4 - Design by a Registered Professional Engineer. Support systems, shield systems, and other protective systems not utilizing Option 1, Option 2 or Option 3, above, will be approved by a registered professional engineer. Designs will be in written form and will include the following:

5.4.4.1 A plan indicating the sizes, types, and configurations of the materials to be used in the protective system.

5.4.4.2 The identity of the registered professional engineer approving the design.

5.5 Materials and Equipment used for Protective Systems:

5.5.1 Materials and equipment will be free from damage or defects that might impair their proper function. When damage is evident, the professional engineer or certified "competent" person will determine its suitability for use.

5.5.2 Manufactured materials and equipment will be used and maintained in a manner that is consistent with the recommendations of the manufacturer, and in a manner that will prevent employee exposure to hazards.

5.6 Installation and Removal of Support Systems and Shields:

5.6.1 Members of support systems and shields will be securely connected together to prevent sliding, falling, kick outs, lateral movement or other predictable failure.

5.6.2 Support systems and shields will be installed and removed in a manner that protects employees from cave-ins, structural collapses, or from being struck by its components.

5.6.3 Individual components will not be subjected to loads exceeding those which they are designed.

5.6.4 Before temporary removal of components, additional precautions will be taken to ensure the safety of employees, such as installing other components to carry the loads imposed on the support system.

5.6.5 Removal will begin at, and progress from, the bottom of the excavation. Structural members and components will be released slowly so as to note any indication of possible failure of the remaining members or possible cave-in of the sides of the excavation.

5.6.6 Backfilling will progress together with the removal of support systems from excavations.

5.6.7 Excavation of material to a level no greater than 2 feet (.61 m) below the bottom of the members of a support system will be permitted, but only if the system or shield is designed to resist the forces calculated for the full depth of the trench, and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the support system.

5.6.8 Installation of a support system will be closely coordinated with the excavation of trenches.

5.6.9 Employees will not be allowed in shields when shields are being installed, removed, or moved vertically.

5.7 Sloping and Benching Systems:

5.7.1 Employees will not be permitted to work on the faces of sloped or benched excavations at levels above other employees except when employees at the lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment.

5.7.2 Portable trench boxes or sliding trench boxes used in place of shoring and sloping shall be designed by a professional engineer, constructed, and maintained to provide protection at least equal to the required sheeting and shoring.

6. Training and Information.

6.1 Employees at job sites where excavations occur will be provided with the knowledge and skills required to maintain safe trenching and shoring operations. Training must establish employee proficiency and introduce operational methods and procedures, as necessary.

6.2 Training includes the recognition of applicable hazards associated with trenching and excavation operations. Employees will be retrained when:

6.2.1 There is a change in their job assignments

6.2.2 A change in equipment or processes presents a new hazard

6.2.3 There is a change in these procedures

6.2.4 There is a "close-call" or these procedures fail

6.2.5 A periodic inspection reveals, or whenever there is reason to believe, that there are deviations from or inadequacies in the employee's knowledge or use of these procedures.

6.3 Verification. The company shall verify that employee training has been accomplished and is being kept up to date. The documentation shall contain each employee's name and dates of training.

7. Definitions.

- *Accepted Engineering Practices* - Those requirements which are compatible with standards of practice required by a registered professional engineer.

- *Aluminum Hydraulic Shoring* - A pre-engineered shoring system comprised of aluminum hydraulic cylinders (cross braces) used in conjunction with vertical rails (uprights) or horizontal rails (wales). Such system is designed specifically to support the sidewalls of an excavation and prevent cave-ins.

- *Bell-Bottom Pier Hole* - A type of shaft or footing excavation, the bottom of which is made larger than the cross section above to form a bell shape.

- *Benching (Benching System)* - A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

- *Cave-In* - The separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or other wise injure and immobilize a person.

- *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.

- *Cross Braces* - The horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against either uprights or wales.

- *Egress* – Any method or way of exit or entrance.

- *Excavation* - Any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

- *Faces or Sides* - The vertical or inclined earth surfaces formed as a result of excavation work.

- *Failure* - The breakage, displacement, or permanent deformation of a structural member or connection so as to reduce its structural integrity and its supportive capabilities.

- *Hazardous Atmosphere* - An atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.

- *Kickout* - means the accidental release or failure of a cross brace.

- *Professional Engineer* - A person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer, registered in any state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce.

- *Protective System* - A method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

- *Ramp* - An inclined walking or working surface that is used to gain access to one point from another, and is constructed from earth or from structural materials such as steel or wood.

- *Sheeting* - The members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

- *Shield (Shield System)* - A structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either pre-manufactured or job-built in accordance with 1926.652. Shields used in trenches are usually referred to as "trench boxes" or "trench shields."

- *Shoring (Shoring System)* - A structure such as a metal hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

- *Sides* - See "Faces."

- *Sloping (Sloping System)* - A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

- *Stable Rock* - Natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

- *Structural Ramp* - A ramp built of steel or wood, usually used for vehicle access. Ramps made of soil or rock are not considered structural ramps.

- *Support System* - A structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

- *Tabulated Data* - Tables and charts approved by a registered professional engineer and used to design and construct a protective system.

- *Trench (Trench Excavation)* - A narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m) or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

- *Trench Box* - See "Shield."

- *Trench Shield* - See "Shield."

- *Uprights* - The vertical members of a trench shoring system placed in contact with the earth and usually positioned so that individual members do not contact each other. Uprights placed so that individual members are closely spaced, in contact with or interconnected to each other, are often called "sheeting."

- *Wales* - Horizontal members of a shoring system placed parallel to the excavation face whose sides bear against the vertical members of the shoring system or earth.

PROGRAM OVERVIEW

WALKING/WORKING SURFACE INDUSTRIAL SAFETY PROGRAM

REGULATORY STANDARD: *OSHA - 29 CFR 1910.21 - 23*

INTRODUCTION: General requirements for aisles and passageways, housekeeping, and stairs and guard-rails. It also addresses floor-loading protection and protecting open sided floors and platforms. This program targets renovation and construction areas where walking and working surface hazards are more likely to be present.

TRAINING:

- Employees, supervisors and staff members should informed of the proper materials handling and storage procedures to ensure that such materials do not cause hazardous situations to occur
- Employees providing construction, repair and renovation work should be trained in the proper use of coverings, guardrail system and other requirements to ensure the appropriate level of protection and safety

ACTIVITIES:

- Ensure aisles and passageways are of the proper width and appropriately maintained
- Provide covers and guardrails for floor, wall openings
- Ensure hazardous areas (open pits, vats or trenches) have appropriate guardrail systems
- Provide guardrail systems for any open-sided platform, floor or runway
- Ensure floors are not overloaded, and that load limits are indicated
- Ensure stairways have appropriate railings
- Enforce housekeeping rules
- Ensure materials are properly stored and not obstructing aisles, passageways, stairways or other areas where they could cause a hazard
- Encourage employees to report unsafe conditions

FORMS:

- Program Assessment
- Training Attendance Roster

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Walking/Working Surface Industrial Safety Program

1. Purpose. This safety program is designed to establish clear company goals and objectives with regard to walking and working surfaces and will be communicated to all required personnel. Walking and working surfaces include stairways, aisles, platforms, runways and areas where floor or wall openings could present a hazard to employees. The company will review and evaluate this safety program:

1.1 On an annual basis, or more frequently as needed.

1.2 When changes occur to 29 CFR 1910.21 - 23 that prompt revision of this document

1.3 When facility operational changes occur that require a revision of this document

2. Scope. This program encompasses the total workplace or job site regardless of the number of workers employed or the number of work shifts.

3. Responsibilities.

3.1 Management/Supervisors:

3.1.1 Ensure aisles and passageways are of the proper width and appropriately maintained.

3.1.2 Provide covers and guardrails for floor, wall openings.

3.1.3 Ensure hazardous areas (open pits, vats or trenches) have appropriate guardrail systems.

3.1.4 Provide guardrail systems for any open-sided platform, floor or runway.

3.1.5 Ensure floors are not overloaded.

3.1.6 Ensure stairways have appropriate railings.

3.1.7 Enforce housekeeping rules.

3.1.8 Ensure materials are properly stored and not obstructing aisles, passageways, stairways or other areas where they could cause a hazard.

3.1.9 Encourage employees to report unsafe conditions.

3.2 Employees:

3.2.1 Report unsafe conditions to your supervisor immediately.

3.2.2 Maintain safe storage requirements

3.2.3 Maintain housekeeping in work areas.

3.3 Safety Officer (as needed or required):

3.3.1 Assist in the development and implementation of this program.

4. Procedure.

4.1 Aisles and Passageways

4.1.1 Where mechanical handling equipment is used sufficient safe clearances will be maintained for aisles, at loading docks, through doorways, and wherever turns or passage must be made. Aisles and passageways shall be kept clear and in good repair with no obstruction across or in aisles that could create a hazard.

4.1.2 Permanent aisles and passageways shall be appropriately marked.

4.2 Covers and Guardrails

4.2.1 Covers and/or guardrails shall be provided to protect personnel from the hazards of open pits, tanks, vats, ditches, etc. Work areas will be properly guarded, covered, cordoned off, or marked to prevent injury, including:

4.2.1.1 Stairways unguarded/containing holes.

4.2.1.2 Ladder way floor openings unguarded.

4.2.1.3 Hatchway and chute floor opening unguarded.

4.2.1.4 Skylight floor openings unguarded.

4.2.1.5 Pit and trapdoor floor openings unguarded.

4.2.1.6 Manhole floor openings unguarded.

4.2.1.7 Temporary floor openings unguarded.

4.2.1.8 Floor holes/openings unguarded.

4.2.1.9 Chute wall openings unprotected.

4.2.1.10 Window wall openings unprotected.

4.2.1.11 Temporary wall openings unprotected.

4.2.1.12 Open-sided floor or platforms unguarded.

4.2.1.13 Runways unprotected.

4.2.1.14 Stairways unprotected.

4.3 Floor Loading Protection

4.3.1 Whenever loads or single items exceeding 350lbs are to be placed on floor areas or roofing structures, employees will determine the safe load capacity before taking this action.

4.3.2 Safe floor loading capacities will be marked on plates of approved design which shall be supplied and securely affixed in a conspicuous place in each space to which they relate.

4.3.3 Such plates will not be removed or defaced. If lost, removed, or defaced, they will be reported to the Safety Officer and replaced immediately.

4.3.4 All employees must note that it is unlawful to place, or cause, or permit to be placed on any floor or roof of a building or other structure a load greater than that for which such floor or roof is approved by the building official.

4.4 Guarding Floor/Wall Openings and Holes

4.4.1 Protection for floor openings.

4.4.1.1 Stairway floor openings. Stairway floor openings shall be guarded by a standard railing constructed in accordance with 29 CFR 1910.23, paragraph (e). The railing shall be provided on all exposed sides (except at entrances to stairways). For infrequently used stairways where traffic across the opening prevents the use of a fixed standard railing (as when located in aisle spaces, etc.), the guard shall consist of a hinged floor opening cover of standard strength and construction and removable standard railings on all exposed sides (except at entrance to stairway).

4.4.1.2 Ladder-way floor openings. Ladder-way floor openings or platforms shall be guarded by a standard railing with standard toe-board on all exposed sides (except at entrance to opening) with the passage through the railing either provided with a swinging gate or so offset that a person cannot walk directly into the opening.

4.4.1.3 Hatchway and chute floor openings. Hatchway and chute floor opening shall be guarded by one of the following:

4.4.1.3.1 Hinged floor opening cover of standard strength and construction equipped with standard railings or permanently attached thereto so as to leave only one exposed side. When the opening is not in use the cover shall be closed or the exposed side shall be guarded at both top and intermediate positions by removable standard railings.

4.4.1.3.2 A removable railing with toe-board on not more than two sides of the opening and fixed standard railings with toe-boards on all other exposed sides. The removable railings shall be kept in place when the opening is not in use. Where operating conditions necessitate the feeding of material into any hatchway or chute opening protection shall be provided to prevent a person from falling through the opening.

4.4.1.4 Skylight floor openings. Skylight floor openings and holes shall be guarded by a standard skylight screen or a fixed standard railing on all exposed sides.

4.4.1.4.1 Skylight screens shall be of such construction and mounting that they are capable of withstanding a load of at least 200 pounds applied perpendicularly at any one area on the screen. They shall also be of such construction and mounting that under ordinary loads or impacts, they will not deflect downward sufficiently to break the glass below them. The construction shall be of grillwork with openings not exceeding 4 inches long or of slat-work with openings not more than 2 inches wide with length unrestricted.

4.4.1.5 Pit and trapdoor floor openings. Pit and trapdoor floor openings, infrequently used, shall be guarded by a floor opening cover of standard strength and construction. While the cover is not in place, the pit or trap opening shall be constantly attended by someone or shall be protected on all exposed sides by removable standard railings.

4.4.1.6 Manhole floor openings. Manhole floor openings shall be guarded by a standard manhole cover which need not be hinged in place. While the cover is not in place, the manhole opening shall be constantly attended by someone or shall be protected by removable standard railings.

4.4.1.7 Temporary floor openings. Temporary floor openings shall have standard railings, or shall be constantly attended by someone.

4.4.1.8 Floor holes. Floor holes into which persons can accidentally walk shall be guarded by either:

4.4.1.8.1 A standard railing with standard toe-board on all exposed sides

4.4.1.8.2 A floor-hole cover of standard strength and construction. While the cover is not in place, the floor hole shall be constantly attended by someone or shall be protected by a removable standard railing

4.4.1.8.3 Every floor hole into which persons cannot accidentally walk (on account of fixed machinery, equipment, or walls) shall be protected by a cover that leaves no openings more than 1 inch wide. The cover shall be securely held in place to prevent tools or materials from falling through

4.4.1.9 Floor hole covers. Floor opening covers may be of any material that meets the following strength requirements:

4.4.1.9.1 Trench or conduit covers and their supports, when located in roadways, shall be designed to carry a truck rear-axle load of at least 20,000 pounds.

4.4.1.9.2 Manhole covers and their supports, when located in roadways, shall comply with local standard highway requirements, if any; otherwise they shall be designed to carry a truck rear-axle load of at least 20,000 pounds.

4.4.1.9.3 The construction of floor opening covers may be of any material that meets the strength requirements. Covers projecting not more than 1 inch above the floor level may be used providing all edges are chamfered to an angle with the horizontal of not over 30 degrees. All hinges, handles, bolts, or other parts shall set flush with the floor or cover surface.

4.4.1.10 Stairway doors. Where doors or gates open directly on a stairway a platform shall be provided and the swing of the door shall not reduce the effective width to less than 20 inches.

4.4.2 Protection for wall openings and holes.

4.4.2.1 Wall openings. Wall openings from which there is a drop of more than 4 feet shall be guarded by one of the following:

4.4.2.1.1 Rail, roller, picket fence, half door, or equivalent barriers. Where there is exposure below to falling materials, a removable toe board or the equivalent shall also be provided. When the opening is not in use for handling materials, the guard shall be kept in position regardless of a door on the opening. In addition, a grab handle shall be provided on each side of the opening with its center approximately 4 feet above floor level and of standard strength and mounting.

4.4.2.1.2 Extension platforms onto which materials can be hoisted for handling will have side rails or equivalent guards of standard specifications.

4.4.2.1.3 Wall opening barriers (rails, rollers, picket fences, and half doors) shall be of such construction and mounting that, when in place at the opening, the barrier is capable of withstanding a load of at least 200 pounds applied in any direction (except upward) at any point on the top rail or corresponding member.

4.4.2.1.4 Wall opening grab handles shall be not less than 12 inches in length and shall be so mounted as to give 3 inches clearance from the side framing of the wall opening. The size, material, and anchoring of the grab handle shall be such that the completed structure is capable of withstanding a load of at least 200 pounds applied in any direction at any point of the handle.

4.4.2.1.5 Wall opening screens shall be of such construction and mounting that they are capable of withstanding a load of at least 200 pounds applied horizontally at any point on the near side of the screen. They may be of solid construction, of grillwork with openings not exceeding 8 inches long, or of slat-work with openings not more than 4 inches wide with length unrestricted.

4.4.2.2 Chute wall openings. Chute wall openings from which there is a drop of more than 4 feet shall be guarded by one or more barriers or as required by the conditions.

4.4.2.3 Window wall openings. Window wall openings at a stairway landing, floor, platform, or balcony from which there is a drop of more than 4 feet and where the bottom of the opening is less than 3 feet above the platform or landing shall be guarded by standard slats, standard grill work, or standard railing. Where the window opening is below the landing or platform, a standard toe board shall be provided.

4.4.2.4 Temporary wall openings. Temporary wall openings shall have adequate guards but these need not be of standard construction.

4.4.2.4.1 Where there is a hazard of materials falling through a wall hole, and the lower edge of the near side of the hole is less than 4 inches above the floor, and the far side of the hole more than 5 feet above the next lower level, the hole shall be protected by a standard toe-board, or an enclosing screen either of solid construction.

4.5 Protection of Open-Sided Floors, Platforms, and Runways.

4.5.1 Open-sided floors or platforms. Open-sided floors or platforms 4 feet or more above adjacent floor or ground level shall be guarded by a standard railing on all open sides except where there is entrance to a ramp, stairway, or fixed ladder. The railing shall be provided with a toe-board beneath the open sides where:

4.5.1.1 Persons can pass.

4.5.1.2 There is moving machinery.

4.5.1.3 There is equipment with which falling materials could create a hazard.

4.5.2 Runways. Runways shall be guarded by a standard railing on all open sides 4 feet or more above floor or ground level. Wherever tools, machine parts, or materials are likely to be used on the runway, a toe-board shall also be provided on each exposed side. Runways used exclusively for special purposes (such as oiling, shafting, or filling tank cars) may have the railing on one side omitted where operating conditions necessitate such omission, providing the falling hazard is minimized by using a runway of not less than 18 inches wide.

4.5.3 Open-sided access ways. Regardless of height, open-sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment, pickling or galvanizing tanks, degreasing units, and similar hazards shall be guarded with a standard railing and toe board.

5. Safety Information.

5.1 Stairs, Railings, and Guards.

5.1.1 Stairs.

5.1.1.1 Flights of stairs having four or more risers shall be equipped with standard stair railings or standard handrails. The width to be measured clear of all obstructions except handrails:

5.1.1.1.1 On stairways less than 44 inches wide having both sides enclosed, at least one handrail, preferably on the right side descending.

5.1.1.1.2 On stairways less than 44 inches wide having one side open, at least one stair railing on open side.

5.1.1.1.3 On stairways less than 44 inches wide having both sides open, one stair railing on each side.

5.1.1.1.4 On stairways more than 44 inches wide but less than 88 inches wide, one handrail on each enclosed side and one stair railing on each open side.

5.1.1.1.5 On stairways 88 or more inches wide, one handrail on each enclosed side, one stair railing on each open side, and one intermediate stair railing located approximately midway of the width.

5.1.2 Winding stairs.

5.1.2.1 Winding stairs shall be equipped with a handrail offset to prevent walking on all portions of the treads having width less than 6 inches.

5.1.3 Railings.

5.1.3.1 Standard railings. A standard railing shall consist of top rail, intermediate rail, and posts, and shall have a vertical height of 42 inches nominal from upper surface of top rail to floor, platform, runway, or ramp level. The top rail shall be smooth-surfaced throughout the length of the railing. The intermediate rail shall be approximately halfway between the top rail and the floor, platform, runway, or ramp. The ends of the rails shall not overhang the terminal posts except where such overhang does not constitute a projection hazard.

5.1.3.2 Stair railings. A stair railing shall be of construction similar to a standard railing but the vertical height shall be not more than 34 inches or less than 30 inches from upper surface of top rail to surface of tread in line with face of riser at forward edge of tread.

5.1.3.3 Wood railings. Wood railings, the posts shall be of at least 2 inch by 4 inch stock spaced not to exceed 6 feet; the top and intermediate rails shall be of at least 2 inch by 4 inch stock. If top rail is made of two right-angle pieces of 1 inch by 4 inch stock, posts may be spaced on 8 foot centers, with 2 inch by 4 inch intermediate rail.

5.1.3.4 Pipe railings. Pipe railings, posts and top and intermediate railings shall be at least 1 1/2 inches nominal diameter with posts spaced not more than 8 feet on centers.

5.1.3.5 Structural steel railings. Structural steel railings, posts and top and intermediate rails shall be of 2 inch by 2 inch by 3/8 inch angles or other metal shapes of equivalent bending strength with posts spaced not more than 8 feet on centers.

5.2 Housekeeping

5.2.1 General Company Policy. All offices, work stations, work areas, passageways, storerooms, restrooms, and service rooms shall be kept clean, orderly, sanitary, and free of known hazards.

5.2.1.1 The floor of every workroom shall be maintained in a clean and, so far as possible, a dry condition. Where wet processes are used drainage shall be

maintained and false floors, platforms, mats, or other dry standing places will be provided where practicable.

5.2.1.2 To facilitate cleaning every floor, work place, and passageway shall be kept free from protruding nails, splinters, holes, or loose boards or other hindrances that would prevent efficient maintenance.

5.2.1.3 Sufficient illumination will be provided in all areas at all times. Employees discovering lighting deficiencies will report them to the Safety Officer for correction.

5.2.2 Work areas. All employees are responsible for maintaining their immediate work areas in a clean, orderly manner and for notifying maintenance of conditions beyond their control.

5.2.3 Machines and equipment. Supervisors will ensure that machines and equipment under their control are maintained in a clean, orderly manner. Crowding should be avoided where ever possible.

5.2.4 Aisles. All employees are responsible to ensure that aisles are kept clean, free of material, finished parts, scrap, or any type of debris.

5.2.5 Floors. Maintenance will ensure that all floor spaces are maintained in a clean, orderly manner.

5.2.6 Walls and ceilings. Maintenance will ensure that all wall spaces are properly painted and maintained in a clean, orderly manner. Postings will be confined to bulletin boards and other appropriate areas.

5.2.7 Storage facilities. Appropriate procedures will be followed based on the type of storage facility.

5.2.8 Employee facilities. Lockers will be used to protect personal belongings from theft. Locker areas will be kept in a clean, orderly manner. Belongings found insecure will be turned over to the Safety Officer or area supervisor for disposition.

5.2.9 Emergency exit doors. Will be kept free of any obstacles at all times. Any employee finding an emergency door blocked should immediately report the condition to Safety Officer for correction. Exit lights and signs will also be maintained in proper condition at all times and immediately reported if deficient.

5.2.10 Spills (trained personnel). Spills will be contained immediately by any employee trained in spill containment and immediately reported to the Safety Officer or area supervisor.

5.2.11 Spills (untrained personnel). Spills will be immediately reported to the Safety Officer or area supervisor by any employee discovering the spill not having training in containment measures.

6. Training and Information.

6.1 Employees, supervisors and staff members should informed of the proper materials handling and storage procedures to ensure that such materials do not cause hazardous situations to occur.

6.2 Employees providing construction, repair and renovation work should be trained in the proper use of coverings, guardrail system and other requirements to ensure the appropriate level of protection and safety.

7. Definitions.

- *Floor hole* - An opening measuring less than 12 inches but more than 1 inch in its least dimension, in any floor, platform, pavement, or yard, through which materials but not persons may fall; such as a belt hole, pipe opening, or slot opening.

- *Floor opening* - An opening measuring 12 inches or more in its least dimension, in any floor, platform, pavement, or yard through which persons may fall; such as a hatchway, stair or ladder opening, pit, or large manhole. Floor openings occupied by elevators, dumb waiters, conveyors, machinery, or containers are excluded.

- *Handrail* - A single bar or pipe supported on brackets from a wall or partition, as on a stairway or ramp, to furnish persons with a handhold in case of tripping.

- *Platform* - A working space for persons, elevated above the surrounding floor or ground; such as a balcony or platform for the operation of machinery and equipment.

- *Runway* - A passageway for persons elevated above the surrounding floor or ground level, such as a footwalk along shafting or a walkway between buildings.

- *Standard railing* - A vertical barrier erected along exposed edges of a floor opening, wall opening, ramp, platform, or runway to prevent falls of persons.

- *Standard strength and construction* - Any construction of railings, covers, or other guards that meets the requirements of 29 CFR 1910.23.

- *Stair railing* - A vertical barrier erected along exposed sides of a stairway to prevent falls of persons.

- *Toe-board* - A vertical barrier at floor level erected along exposed edges of a floor opening, wall opening, platform, runway, or ramp to prevent falls of materials.

- *Wall hole* - An opening less than 30 inches but more than 1 inch high, of unrestricted width, in any wall or partition; such as a ventilation hole or drainage scupper.

- *Wall opening* - An opening at least 30 inches high and 18 inches wide, in any wall or partition, through which persons may fall; such as a yard-arm doorway or chute opening.

PROGRAM OVERVIEW

WELDING, CUTTING, AND BRAZING SAFETY PROGRAM

REGULATORY STANDARD - OSHA - 29 CFR 1910.251 - 252
NFPA - Standard 51B, 1962

INTRODUCTION: The welding, cutting, and brazing processes expose workers to a variety of hazards including burns, fire, eye damage, possible lung irritation and damage, electric shock, slips and falls. This safety program is intended to evaluate and identify the specific hazards where hot work is performed, communicating information concerning these hazards, and establishing appropriate procedures and protective measures for our employees.

TRAINING:

- Fire Watchers must attend fire extinguisher use training, or equivalent fire protection methods
- LOTO, compressed gas handling are required, as needed
- Provide training on the hot work permit program, if applicable

ACTIVITIES:

- Recognize the responsibility for the safe usage of cutting and welding equipment on company property
- Based on fire potentials of plant facilities, establish areas for cutting and welding, and establish procedures for cutting and welding
- Develop, implement, and communicate Hot Work Permit program, as applicable
- Train cutters or welders and their supervisors in the safe operation of their equipment and the safe use of the process
- Advise all contractors about flammable materials or hazardous conditions, as applicable
- Provide resources (fire watchers, equipment, barriers, etc.) as needed or required
- Determine the combustible materials and hazardous areas present or likely to be present in the work location, and protective methods to be used
- Ensure adequate ventilation

FORMS:

- Hot Work Permit, as applicable
- Supplemental Arc Welding and Cutting Information
- Supplemental Oxygen-Fuel Gas Welding and Cutting Information
- Supplemental Resistance Welding Information
- Program Assessment
- Training Attendance Roster

Table of Contents

1. Purpose.

2. Scope. The following operations are **NOT** covered within this standard: Lead pots; Thermogrip tongs; Thermite welding; Burning bars; Electric or furnace-heated soldering irons; Soft soldering and brazing of Copper Water Tube (CWT); Abrasive wheel metal cutting; Tar kettles; Electric cables; and Flameless heat guns. These operations should be covered by specific local procedures where these operations take place.

3. Responsibilities.

3.1 Management/Supervisors:

3.1.1 Recognize the responsibility for the safe usage of cutting and welding equipment on company property.

3.1.2 Based on fire potentials of plant facilities, establish areas for cutting and welding, and establish procedures for cutting and welding, in other areas.

3.1.3 Designate an individual responsible for authorizing cutting and welding operations in areas not specifically designed for such processes.

3.1.4 Train cutters or welders and their supervisors in the safe operation of their equipment and the safe use of the process.

3.1.5 Advise all contractors about flammable materials or hazardous conditions of which they may not be aware.

3.1.6 Provide resources (fire watchers, equipment, barriers, etc.) as needed or required.

3.2 Employees:

3.2.1 Be aware of welding hazards, as needed or required.

3.2.2 Follow appropriate safety precautions when welding is performed.

3.3 Safety Officer (as needed or required):

3.3.1 Act as the designated person responsible for authorizing cutting and welding operations in areas not specifically designed for such purposes.

3.3.2 Assist in the development and implementation of this program.

3.4 Welders:

3.4.1 Be responsible for the safe handling of the cutting or welding equipment and the safe use of the cutting or welding process.

3.4.2 Determine the combustible materials and hazardous areas present or likely to be present in the work location.

3.4.3 Protect combustibles from ignition by the following:

3.4.3.1 Have the work moved to a location free from dangerous combustibles.

3.4.3.2 Have the combustibles moved to a safe distance from the work or have the combustibles properly shielded against ignition if it cannot be moved to a location free from dangerous combustibles.

3.4.3.3 Ensure that cutting and welding operations are so scheduled that plant operations that might expose combustibles to ignition are not started during cutting or welding.

3.4.3.4 Secure authorization for the cutting or welding operations from the designated management representative.

3.4.3.5 Determine that the cutter or welder secures his approval that conditions are safe before going ahead.

3.4.3.6 Determine that fire protection and extinguishing equipment are properly located at the site.

3.4.3.7 Ensure the availability of Fire Watches when required.

3.5 Fire Watcher (as needed or required):

3.5.1 Be familiar with facilities for sounding an alarm in the event of a fire.

3.5.2 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.

3.5.3 A fire watch shall be maintained for at least a half hour after completion of welding or cutting.

3.5.4 Attend fire extinguisher use training, or training in equivalent fire protection methods.

4. Procedure.

4.1 Fire Prevention and Protection:

4.1.1 For elaboration of these basic precautions, the special precautions and the delineation of the fire protection and prevention responsibilities of welders and cutters, their supervisors (including outside contractors) and those in management on whose property cutting and welding is to be performed, see, Standard for Fire Prevention in Use of Cutting and Welding Processes, NFPA Standard 51B. The basic precautions for fire prevention in welding or cutting work are:

4.1.1.1 If the object to be welded or cut cannot readily be moved, all movable fire hazards in the vicinity shall be taken to a safe place.

4.1.1.2 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, or equivalent precautions taken.

4.1.1.2.1 Wherever there are floor openings or cracks in the flooring that cannot be closed, precautions shall be taken so that no readily combustible materials on the floor below will be exposed to sparks that may drop through the floor.

4.1.1.2.2 The same precautions shall be observed with regard to cracks or holes in walls, open doorways and open or broken windows.

4.1.1.2.3 If the above requirements cannot be followed then welding and cutting will not be performed.

4.1.1.3 Suitable fire extinguishing equipment shall be maintained in a state of readiness for instant use. Such equipment may consist of pails of water, buckets of sand, hoses or portable extinguishers depending upon the nature and quantity of the combustible material exposed.

4.1.2 Fire watch shall be required whenever welding or cutting is performed in locations where other than a minor fire might develop, or any of the following conditions exist:

4.1.2.1 Appreciable combustible material, in building construction or contents, closer than 35 feet (10.7 m) to the point of operation.

4.1.2.2 Appreciable combustibles are more than 35 feet (10.7 m) away but are easily ignited by sparks.

4.1.2.3 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.

4.1.2.4 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.

4.1.3 Fire watchers shall have fire extinguishing equipment readily available and be trained in its use.

4.1.4 Before cutting or welding is permitted, the area shall be inspected by the individual responsible for authorizing cutting and welding operations. This individual shall designate precautions to be followed in granting authorization to proceed preferably in the form of a written permit.

4.1.5 Where combustible materials such as paper clippings, wood shavings, or textile fibers are on the floor, the floor shall be swept clean for a radius of 35 feet (10.7 m).

4.1.5.1 Combustible floors shall be kept wet, covered with damp sand, or protected by fire-resistant shields. Where floors have been wet down, personnel operating arc welding or cutting equipment shall be protected from possible shock.

4.1.6 Cutting or welding shall not be permitted in the following situations:

4.1.6.1 In areas not authorized by management.

4.1.6.2 In sprinkler-protected buildings while such protection is impaired.

4.1.6.3 In the presence of explosive atmospheres (mixtures of flammable gases, vapors, liquids, or dusts with air), or explosive atmospheres that may develop inside unclean or improperly prepared tanks or equipment which have previously contained such materials, or that may develop in areas with an accumulation of combustible dusts.

4.1.6.4 In areas near the storage of large quantities of exposed, readily ignitable materials such as bulk sulfur, baled paper, or cotton.

4.1.7 Where practicable, all combustibles shall be relocated at least 35 feet (10.7 m) from the work site. Where relocation is impracticable, combustibles shall be protected with flameproof covers or otherwise shielded with metal or asbestos guards or curtains.

4.1.8 Ducts and conveyor systems that might carry sparks to distant combustibles shall be suitably protected or shut down.

4.1.9 Where cutting or welding is done near walls, partitions, ceiling or roof of combustible construction, fire-resistant shields or guards shall be provided to prevent ignition.

4.1.10 If welding is to be done on a metal wall, partition, ceiling or roof, precautions shall be taken to prevent ignition of combustibles on the other side, due to conduction or radiation, preferably by relocating combustibles. Where combustibles are not relocated, a fire watch on the opposite side from the work shall be provided.

4.1.11 Welding shall not be attempted on a metal partition, wall, ceiling or roof having a combustible covering or on walls or partitions of combustible sandwich-type panel construction.

4.1.12 Cutting or welding on pipes or other metal in contact with combustible walls, partitions, ceilings or roofs shall not be undertaken if the work is close enough to cause ignition by conduction.

4.2 Fire prevention precautions:

4.2.1 Cutting or welding shall be permitted only in areas that are or have been made fire safe.

4.2.2 When work cannot be moved practically, as in most construction work, the area shall be made safe by removing combustibles or protecting combustibles from ignition sources.

4.3 Welding or Cutting Containers:

4.3.1 No welding, cutting, or other hot work shall be performed on used drums, barrels, tanks or other containers until they have been cleaned so thoroughly as to make absolutely certain that there are no flammable materials present or any substances such as greases, tars, acids, or other materials which when subjected to heat, might produce flammable or toxic vapors.

4.3.1.1 Any pipe lines or connections to the drum or vessel shall be disconnected or blanked.

4.3.2 All hollow spaces, cavities or containers shall be vented to permit the escape of air or gases before preheating, cutting or welding.

4.3.2.1 Purging with inert gas is recommended.

4.4 Confined Spaces:

4.4.1 For the purposes of this program, a confined space is intended to mean a relatively small or restricted space such as a tank, boiler, pressure vessel, or small compartment of a ship.

4.4.2 Ventilation is a prerequisite to work in confined spaces.

4.4.3 When welding or cutting is being performed in any confined spaces the gas cylinders and welding machines shall be left on the outside.

4.4.4 Before operations are started, heavy portable equipment mounted on wheels shall be securely blocked to prevent accidental movement.

4.4.5 Where a welder must enter a confined space through a manhole or other small opening, means shall be provided for quickly removing the welder in case of emergency.

4.4.5.1 When safety belts and lifelines are used for this purpose they shall be so attached to the welder's body that his body cannot be jammed in a small exit opening.

4.4.5.2 An attendant with a preplanned rescue procedure shall be stationed outside to observe the welder at all times and be capable of putting rescue operations into effect.

4.4.6 When arc welding is to be suspended for any substantial period of time, such as during lunch or overnight, all electrodes shall be removed from the holders and the holders carefully located so that accidental contact cannot occur and the machine disconnected from the power source.

4.4.7 During gas welding or cutting operations, to eliminate the possibility of gas escaping through leaks of improperly closed valves, the torch valves shall be closed and the fuel-gas and oxygen supply to the torch positively shut off at some point outside the confined area whenever the torch is not to be used for a substantial period of time, such as during lunch hour or overnight.

4.4.7.1 Where practicable the torch and hose shall also be removed from the confined space.

4.4.8 After welding operations are completed, the welder shall mark the hot metal or provide some other means of warning other workers.

5. Safety Information.

5.1 Protection of personnel:

5.1.1 General

5.1.1.1 A welder or helper working on platforms, scaffolds, or runways shall be protected against falling. This may be accomplished by the use of railings, safety belts, life lines, or some other equally effective safeguards.

5.1.1.2 Welders shall place welding cable and other equipment so that it is clear of passageways, ladders, and stairways.

5.1.2 Head Protection

5.1.2.1 Helmets or hand shields shall be used during all arc welding or arc cutting operations, excluding submerged arc welding.

5.1.2.2 Helmets and hand shields shall be made of a material which is an insulator for heat and electricity.

5.1.2.3 Helmets, shields and goggles shall be not readily flammable and shall be capable of withstanding sterilization.

5.1.2.4 Helmets and hand shields shall be arranged to protect the face, neck and ears from direct radiant energy from the arc.

5.1.2.5 Helmets shall be provided with filter plates and cover plates designed for easy removal.

5.1.2.6 All parts shall be constructed of a material which will not readily corrode or discolor the skin.

5.1.3 Eye Protection

5.1.3.1 Goggles or other suitable eye protection shall be used during all gas welding or oxygen cutting operations. Helpers or attendants shall be provided with proper eye protection.

5.1.3.2 Spectacles without side shields, with suitable filter lenses are permitted for use during gas welding operations on light work, for torch brazing or for inspection.

5.1.3.3 All operators and attendants of resistance welding or resistance brazing equipment shall use transparent face shields or goggles, depending on the particular job, to protect their faces or eyes, as required.

5.1.3.4 Eye protection in the form of suitable goggles shall be provided where needed for brazing operations.

5.1.3.5 Goggles shall be ventilated to prevent fogging of the lenses as much as practicable.

5.1.3.6 All glass for lenses shall be tempered, substantially free from striae, air bubbles, waves and other flaws.

5.1.3.7 Except when a lens is ground to provide proper optical correction for defective vision, the front and rear surfaces of lenses and windows shall be smooth and parallel.

5.1.3.8 Lenses shall bear some permanent distinctive marking by which the source and shade may be readily identified.

5.1.3.9 The following is a guide for the selection of the proper shade numbers. These recommendations may be varied to suit the individual's needs.

WELDING OPERATION		SHADE #
Shielded metal-arc welding:	1/16-, 3/32-, 1/8-, 5/32-inch electrodes	10
Gas-shielded arc welding-nonferrous:	1/16-, 3/32-, 1/8-, 5/32-inch electrodes	11
Gas-shielded arc welding-ferrous	1/16-, 3/32-, 1/8-, 5/32-inch electrodes	12
Shielded metal-arc welding:	3/16-, 7/32-, 1/4-inch electrodes 5/16-, 3/8-inch electrodes	12 14
Atomic hydrogen welding:		10-14
Carbon arc welding:		14
Soldering:		2
Torch brazing:		3 or 4
Light cutting:	up to 1 inch	3 or 4
Medium cutting,	1 inch to 6 inches	4 or 5
Heavy cutting:	6 inches and over	5 or 6
Gas welding (light):	up to 1/8 inch	4 or 5
Gas welding (medium):	1/8 inch to 1/2 inch:	5 or 6
Gas welding (heavy):	1/2 inch and over:	6 or 8

- Note: In gas welding or oxygen cutting where the torch produces a high yellow light, it is desirable to use a filter or lens that absorbs the yellow or sodium line in the visible light of the operation.

5.1.3.10 All filter lenses and plates shall meet the test for transmission of radiant energy prescribed in ANSI Z87.1 - American National Standard Practice for Occupational and Educational Eye and Face Protection.

5.1.3.11 For protection from arc welding rays, where the work permits, the welder should be enclosed in an individual booth painted with a finish of low reflectivity such as zinc oxide (an important factor for absorbing ultraviolet radiations) and lamp black, or shall be enclosed with noncombustible screens similarly painted.

5.1.3.11.1 Booths and screens shall permit circulation of air at floor level.

5.1.3.11.2 Workers or other persons adjacent to the welding areas shall be protected from the rays by noncombustible or flameproof screens or shields or shall be required to wear appropriate goggles.

5.1.4 Protective Clothing - General Requirements

5.1.4.1 Employees exposed to the hazards created by welding, cutting, or brazing operations shall be protected by personal protective equipment.

5.1.4.1.1 Appropriate protective clothing required for any welding operation will vary with the size, nature and location of the work to be performed.

5.2 Health Protection and Ventilation:

5.2.1 General

5.2.1.1 The requirements for health protection and ventilation have been established on the basis of the following three factors in arc and gas welding which govern the amount of contamination to which welders may be exposed:

5.2.1.1.1 Dimensions of space in which welding is to be done (with special regard to height of ceiling).

5.2.1.1.2 Number of welders.

5.2.1.1.3 Possible evolution of hazardous fumes, gases, or dust according to the metals involved.

5.2.1.2 When performing welding in a space entirely screened on all sides, the screens shall be so arranged that no serious restriction of ventilation exists. It is desirable to have the screens so mounted that they are about 2 feet (0.61 m) above the floor unless the work is performed at so low a level that the screen must be extended nearer to the floor to protect nearby workers from the glare of welding.

5.2.1.3 Local exhaust or general ventilating systems shall be provided and arranged to keep the amount of toxic fumes, gases, or dusts below the maximum allowable concentration as specified in 29 CFR 1910.1000 – Air Contaminants.

5.2.1.4 A number of potentially hazardous materials are employed in fluxes, coatings, coverings, and filler metals used in welding and cutting or are released to the atmosphere during welding and cutting.

5.2.1.4.1 The suppliers of welding materials shall determine the hazard, if any, associated with the use of their materials in welding, cutting, etc.

5.2.1.4.2 All filler metals and fusible granular materials shall carry the following notice, as a minimum, on tags, boxes, or other containers:

5.2.1.4.2.1 CAUTION

5.2.1.4.2.2 Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. Use adequate ventilation. See ANSI Z49.1 Safety in Welding and Cutting published by the American Welding Society.

5.2.1.4.3 Brazing (welding) filler metals containing cadmium in significant amounts shall carry the following notice on tags, boxes, or other containers:

5.2.1.4.3.1 WARNING
CONTAINS CADMIUM - POISONOUS FUMES MAY BE FORMED ON HEATING

5.2.1.4.3.2 Do not breathe fumes. Use only with adequate ventilation such as fume collectors, exhaust ventilators, or air-supplied respirators. See ANSI Z49.1

5.2.1.4.3.3 If chest pain, cough, or fever develops after use call physician immediately.

5.2.1.4.4 Brazing and gas welding fluxes containing fluorine compounds shall have a cautionary wording to indicate that they contain fluorine compounds. One such cautionary wording recommended by the American Welding Society for brazing and gas welding fluxes reads as follows:

5.2.1.4.4.1 CAUTION
CONTAINS FLUORIDES

5.2.1.4.4.2 This flux when heated gives off fumes that may irritate eyes, nose and throat.

5.2.1.4.4.3 Avoid fumes - use only in well-ventilated spaces.

5.2.1.4.4.4 Avoid contact of flux with eyes or skin.

5.2.1.4.4.5 Do not take internally.

5.2.2 Ventilation for General Welding and Cutting

5.2.2.1 Mechanical ventilation shall be provided when welding or cutting is done on specific metals.

5.2.2.1.1 In a space of less than 10,000 cubic feet (284 m (3)) per welder.

5.2.2.1.2 In a room having a ceiling height of less than 16 feet (5 m).

5.2.2.1.3 In confined spaces or where the welding space contains partitions, balconies, or other structural barriers to the extent that they significantly obstruct cross ventilation.

5.2.2.2 Such ventilation shall be at the minimum rate of 2,000 cubic feet (57 m(3)) per minute per welder, except where local exhaust hoods and booths as defined by 6.3, or airline respirators approved by the U.S. Bureau of Mines for such purposes are provided.

5.2.2.2.1 Natural ventilation is considered sufficient for welding or cutting operations where regulatory restrictions are not present.

5.2.3 Local Exhaust Hoods and Booth

5.2.3.1 Mechanical local exhaust ventilation may be by means of either of the following:

5.2.3.1.1 Freely movable hoods intended to be placed by the welder as near as practicable to the work being welded and provided with a rate of air-flow sufficient to maintain a velocity in the direction of the hood of 100 linear feet (30 m) per minute in the zone of welding when the hood is at its most remote distance from the point of welding. The rates of ventilation required to accomplish this control velocity using a 3-inch (7.6 cm) wide flanged suction opening are shown in the following table:

Welding zone	Minimum air flow *(1) cubic feet/minute	Duct Diameter
4 to 6 inches from arc or torch	150	3
6 to 8 inches from arc or torch	275	3 ½
8 to 10 inches from arc or torch	425	4 ½
10 to 12 inches from arc or torch	600	5 ½

- {Footnote}*(1) When brazing with cadmium bearing materials or when cutting on such materials increased rates of ventilation may be required.
- {Footnote}*(2) Nearest half-inch duct diameter based on 4,000 feet per minute velocity in pipe.

5.2.3.1.2 A fixed enclosure with a top and not less than two sides which surround the welding or cutting operations and with a rate of airflow sufficient to maintain a velocity away from the welder of not less than 100 linear feet (30 m) per minute.

5.2.4 Ventilation in Confined Spaces

5.2.4.1 All welding and cutting operations carried on in confined spaces shall be adequately ventilated to prevent the accumulation of toxic materials or possible oxygen deficiency.

5.2.4.1.1 This applies not only to the welder but also to helpers and other personnel in the immediate vicinity.

5.2.4.1.2 All air replacing that withdrawn shall be clean and respirable.

5.2.4.2 In circumstances for which it is impossible to provide such ventilation, NIOSH approved airline respirators or hose masks must be used.

5.2.4.3 In areas immediately hazardous to life, a full-facepiece, pressure-demand, self-contained breathing apparatus or a combination full-facepiece, pressure-demand supplied-air respirator with an auxiliary, self-contained air supply approved by NIOSH must be used.

5.2.4.4 Where welding operations are carried on in confined spaces and where welders and helpers are provided with hose masks, hose masks with blowers or self-contained breathing equipment approved by MSHA or NIOSH, a worker shall be stationed on the outside to insure the safety of those working within.

5.2.4.5 Oxygen shall never be used for ventilation.

5.2.5 Fluorine Compounds

5.2.5.1 A fluorine compound is one that contains fluorine, as an element in chemical combination, not as a free gas.

5.2.5.2 In confined spaces, welding or cutting involving fluxes, coverings, or other materials which contain fluorine compounds, additional ventilation shall be provided.

5.2.5.3 The need for local exhaust ventilation or airline respirators for welding or cutting in other than confined spaces will depend upon the individual circumstances. However, experience has shown such protection to be desirable for fixed-location production welding and for all production welding on stainless steels.

5.2.5.3.1 Where air samples taken at the welding location indicate that the fluorides liberated are below the maximum allowable concentration, such protection is not necessary.

5.2.6 Zinc

5.2.6.1 In confined spaces welding or cutting involving zinc-bearing base or filler metals or metals coated with zinc-bearing materials, additional ventilation shall be provided.

5.2.6.2 Indoors, welding or cutting involving zinc-bearing base or filler metals coated with zinc-bearing materials shall be done under a hood or in an equivalent exhaust system.

5.2.7 Lead

5.2.7.1 In confined spaces, welding involving lead-base metals (erroneously called lead-burning), additional ventilation shall be provided.

5.2.7.2 Indoors, welding involving lead-base metals shall be done under a hood or in an equivalent exhaust system.

5.2.7.3 In confined spaces or indoors, welding or cutting operations involving metals containing lead, other than as an impurity, or metals coated with lead-bearing materials, including paint, must be done using local exhaust ventilation or airline respirators.

5.2.7.3.1 Such operations, when done outdoors, must be done using a NIOSH approved respirators.

5.2.7.3.2 In all cases, workers in the immediate vicinity of the cutting operation must be protected by local exhaust ventilation or airline respirators.

5.2.8 Beryllium

5.2.8.1 Welding or cutting indoors, outdoors, or in confined spaces involving beryllium-containing base or filler metals shall be done using local exhaust ventilation and airline respirators.

5.2.8.1.1 Local exhaust ventilation and airline respirators are not required when atmospheric tests under the most adverse conditions have established that the workers' exposure is within the acceptable concentrations.

5.2.8.1.2 In all cases, workers in the immediate vicinity of the welding or cutting operations shall be protected as necessary by local exhaust ventilation or airline respirators.

5.2.9 Cadmium

5.2.9.1 In confined spaces or indoors, welding or cutting operations involving cadmium-bearing or cadmium-coated base metals must be done using local exhaust ventilation or airline respirators.

5.2.9.1.1 Local exhaust ventilation and airline respirators are not required when atmospheric tests under the most adverse conditions show that employee exposure is within the acceptable concentrations.

5.2.9.1.2 Such operations, when done outdoors, must be done using a NIOSH approved respirators, such as fume respirators.

5.2.9.2 Welding (brazing) involving cadmium-bearing filler metals shall be done using adequate ventilation.

5.2.10 Mercury

5.2.10.1 In confined spaces or indoors, welding or cutting operations involving metals coated with mercury-bearing materials, including paint, must be done using local exhaust ventilation or airline respirators.

5.2.10.1.1 Local exhaust ventilation and airline respirators are not required when atmospheric tests under the most adverse conditions show that employee exposure is within the acceptable concentrations.

5.2.10.1.2 Such operations, when done outdoors, must be done using NIOSH approved respirators.

5.2.11 Cleaning Compounds

5.2.11.1 In the use of cleaning materials, because of their possible toxicity or flammability, appropriate precautions such as manufacturer’s instructions shall be followed.

5.2.11.2 Degreasing and other cleaning operations involving chlorinated hydrocarbons shall be so located that no vapors from these operations will reach or be drawn into the atmosphere surrounding any welding operation.

5.2.11.2.1 In addition, trichloroethylene and perchlorethylene should be kept out of atmospheres penetrated by the ultraviolet radiation of gas-shielded welding operations.

5.2.12 Cutting of Stainless Steel(s)

5.2.12.1 Oxygen cutting, using either a chemical flux or iron powder or gas-shielded arc cutting of stainless steel, shall be done using mechanical ventilation adequate to remove the fumes generated.

5.2.13 First-aid and Equipment

5.2.13.1 First-aid equipment shall be available at all times.

5.2.13.2 All injuries shall be reported as soon as possible for medical attention.

5.2.13.3 First aid shall be rendered until medical attention can be provided.

5.3 Industrial applications.

5.3.1 Transmission pipeline.

5.3.1.1 Where field shop operations are involved for fabrication of fittings, river crossings, road crossings, and pumping and compressor stations the requirements set in this program for fire prevention and protection, protection of personnel, health protection and ventilation, oxygen-fuel gas welding and cutting, and arc welding and cutting shall be observed.

5.3.1.2 When arc welding is performed in wet conditions, or under conditions of high humidity, special protection against electric shock shall be supplied.

5.3.1.3 In pressure testing of pipelines, the workers and the public shall be protected against injury by the blowing out of closures or other pressure restraining devices.

5.3.1.3.1 Protection shall be provided against expulsion of loose dirt that may have become trapped in the pipe.

5.3.1.4 The welded construction of transmission pipelines shall be conducted in accordance with the Standard for Welding Pipe Lines and Related Facilities, API Std. 1104.

5.3.1.5 The connection, by welding, of branches to pipelines carrying flammable substances shall be performed in accordance with Welding or Hot Tapping on Equipment Containing Flammables, API Std. PSD No. 2201.

5.3.1.6 The use of X-rays and radioactive isotopes for the inspection of welded pipeline joints shall conform with the American National Standard Safety Standard for Non-Medical X-ray and Sealed Gamma-Ray Sources, ANSI Z54.1.

5.3.2 Mechanical piping systems.

5.3.2.1 The requirements in this program for fire prevention and protection, protection of personnel, health protection and ventilation, oxygen-fuel gas welding and cutting, and arc welding and cutting shall be observed.

5.3.2.2 The use of X-rays and radioactive isotopes for the inspection of welded piping joints shall be in conformance with the American National Standard Safety Standard for Non-Medical X-ray and Sealed Gamma-Ray Sources, ANSI Z54.1.

6. Training and Information.

6.3 Fire Watchers must attend fire extinguisher use training, or training in equivalent fire protection methods.

7. Definitions.

- *Welder and welding operator* - Any operator of electric or gas welding and cutting equipment.
- *Approved* - Listed or approved by a nationally recognized testing laboratory. Refer to 29 CFR 1910.155(C) (3) – Scope, application and definitions applicable to Subpart L – Fire Protection for definitions of listed and approved, and 29 CFR 1910.7 – Definition and requirements for nationally recognized testing laboratory.
- *All other welding terms* - are used in accordance with American Welding Society

PROGRAM OVERVIEW

WORKING IN EXTREME TEMPERATURES SAFETY PROGRAM

OSHA Act Paragraph 5, A, 1 (General Duty Clause)

INTRODUCTION: Exposure to extreme heat or cold stress in the workplace must be controlled. This safety program is intended to address issues and identify the specific temperature hazards where work is performed, communicating information concerning these hazards, and establishing appropriate procedures and protective measures for employees. Control or protective measures must be implemented at ranges above 90^{o}F or below 62^{o}F, and short duration exposures to temperatures $<45^{o}$F or $>100^{o}$F (including wind chill factors).

TRAINING:

- When working in extreme temperatures, employees will be provided with hazard information and/or training, upon initial assignment and as needed. This training may be required in some states.

ACTIVITIES:

- Monitor workplace temperatures
- Ensure employees and supervisors are able to recognize early signs and symptoms of cold and heat intolerance
- Provide engineering controls, work practices and protective equipment to reduce exposure levels to the lowest achievable level
- Ensure the availability of water or other appropriate beverages to employees
- Provide appropriate medical care to employees who have symptoms of a temperature-related condition
- Perform periodic inspections to identify any recognized risk factors, situations where actions may be needed to reduce employee exposures, and any deficiencies in the procedures or protective equipment requirements of the area

FORMS:

- Cold Related Injuries and Illnesses
- Heat Illness Prevention Plan
- Training Attendance Roster

Table of Contents

Working in Extreme Temperatures

1. Purpose. This program outlines some of the safety requirements and precautions needed to protect employees who work in temperature extremes. Extreme heat or cold presents unique hazards to employee health and safety, including reduced awareness of their surroundings and reduced dexterity and ability for the human body to function normally.

2. Scope. Applies to any work area where employees must work for more than an hour in an area where the temperature range is above 90^{o}F or below 62^{o}F, or short-duration (15 minutes or less) exposures to $<45^{o}$F or $>100^{o}$F (including wind chill factors).

3. Responsibilities.

3.1 Management and Supervisors:

3.1.1 Monitor workplace temperatures.

3.1.2 Ensure employees and supervisors are able to recognize early signs and symptoms of cold intolerance such as weakness, shivering, inability to do complex motor functions, lethargy, and mild confusion.

3.1.3 Provide engineering controls, work practices and protective equipment to reduce exposure levels to the lowest achievable level.

3.1.4 Ensure the availability of water or other appropriate beverages to employees.

3.1.5 Ensure employees that are new to the work area are provided with an appropriate acclimation or conditioning period. Integrate employees into a full work load as appropriate. Supervisors should closely monitor these employees during the acclimation timing.

3.1.6 Ensure that employees who have had time off (thereby reducing their ability to more easily acclimate to the environment) are reminded of this reduction in tolerance. (Time off includes weekends, holidays, etc.)

3.1.7 Ensure that employees who have symptoms of a temperature-related condition have access to a health care provider, should they wish to seek medical treatment.

3.1.8 Perform periodic inspections (recommended frequency is monthly). Inspections should identify any recognized risk factors, situations where actions may be needed to reduce employee exposures, and any deficiencies in the procedures or protective equipment requirements of the area.

3.1.9 Perform periodic surveys to measure employee exposures. Surveys should be anonymous to increase employee participation.

3.1.10 Post appropriate warning signs at entrances to work areas, buildings or enclosures where temperature extremes are present or likely to be present.

3.2 Employees:

3.2.1 Follow proper work practices and procedures to help protect their health and safety.

3.2.2 Be aware of the signs and symptoms of cold/heat related illness and injuries (frostbite or other cold related injuries; heat stroke or other heat related injuries) and report such symptoms to your supervisor immediately.

3.2.3 Be aware of the signs and symptoms of cold/heat related illness that may occur in fellow employees and report such symptoms to your supervisor immediately.

3.2.4 Notify your supervisor before beginning work of any personal factors that could impact the effects of cold/heat stress (i.e. medications or alcohol can significantly effect the body's ability to manage cold/heat tolerance and may increase the risk of injury.

3.2.5 Wear appropriate clothing and attire, and use provided protective equipment as needed or required to assist the body in managing the effects of extreme temperatures.

3.3 Safety Officer (as needed or required):

3.3.1 Assist in the development, and implementation of this program.

4. Procedure.

4.1 Control Measures:

4.1.1 Engineering controls will be implemented to reduce exposures to the lowest level achievable. Where controls insufficient, they will be supplemented by the use of safe work practices. Protective clothing or equipment should be added only if engineering controls and work practices are insufficient to reduce exposures to acceptable levels.

4.1.1.1 Engineering controls may include temperature regulators, spaces for warm-up or cool-down to acclimate employees to temperature extremes, protective enclosures or specialized tools to reduce the demands of activity on the body.

4.1.1.2 When the temperature of surrounding solid objects are cold enough to cause skin damage the hazard will be reduced by insulating or shielding either the object or the skin whenever possible, or otherwise isolating the cold source from contact.

4.1.2 Work practices will be introduced to reduce the effects of cold when engineering controls are not adequate or are not feasible.

4.1.2.1 Work practices include written procedures, time restrictions for extreme temperature exposures, increased recovery or warm-up time, increasing the number of employees per task, providing adequate water to hydrate employees with exposure, and encouraging physical fitness in employees.

4.1.3 Protective equipment and clothing will be provided when engineering controls and work practices are not sufficient to reduce employee exposures to acceptable levels.

4.1.3.1 Protective equipment includes standard insulated clothing for cold conditions (coats, gloves, hats, face protection, thermal clothing), specialized temperature regulated clothing (cool down or warm up vests), and shelter from sun or cold environments.

4.1.3.2 Access to shade or cooling environments will be provided for employees suffering from heat illness or believing a preventative recovery period is needed. Shade areas should have access to the open air or be provided with ventilation or cooling equipment such as fans, air conditioners or misting equipment.

4.2 Recordkeeping:

4.2.1 Environmental surveillance. Establish and maintain an accurate record of all measurements made to determine environmental and metabolic temperature exposures to employees. Where it is determined that no metabolic measurements are required, maintain a record of the evaluations or surveys relied upon to reach that determination.

4.2.2 Records retention.

4.2.2.1 Injuries and illnesses must be placed on the OSHA 300 logs, if your company is required to maintain them. Logs and supplemental information must be kept for at least 5 years.

4.2.2.2 Medical exposure records must be retained for the duration of employment plus 30 years, if a detrimental health effect (injury or illness) is sustained, regardless of the need to keep OSHA 300 logs.

4.2.2.3 Records must be made available to employees, former employees or their legal representatives at any time during the retention period.

4.3 Heat Stress Information:

4.3.1 If heat stress is recognized and treated appropriately early, a more serious condition likely can be prevented; therefore, it is important to identify and treat as early as possible.

4.3.2 There are established recommended exposure limits (RELs) and threshold limitation values (TLVs) for metabolic and environmental heat that have been established by the American Conference of Governmental Industrial Hygienists (ACGIH). These RELs and TLVs assume that the worker is healthy and medically fit for the activity levels required by the job, and that the employees are assumed to be wearing the appropriate type of clothing for the conditions.

4.3.3 Environmental heat (external temperature) is measured by the Wet Bulb Globe Thermometer (WBST) method. Standard external temperature gauges normally utilize this method. Temperature measurements should be made as close to the work area as possible, to prevent exceeding the established guidelines. During the hottest part of the work shift, temperatures should be monitored hourly, and if the RELs are exceeded twice in succession, then work conditions should be modified to accommodate the extreme heat.

4.3.3.1 Modifications may include the use of fans or other ventilation systems (1.5 meters per second or 300 ft/min is recommended).

4.3.3.2 Placement of shielding, barriers or heat deflective materials between radiant objects and employees, or otherwise isolating objects and equipment which give off heat.

4.3.3.3 Reduction in vapor, steam or humidity levels that may contribute to the surrounding temperature.

4.4 Cold/Hot Weather Alert Safety Program:

4.4.1 In the event of an alert from the National Weather Service or local weather forecast services, the following should be considered:

4.4.1.1 Postpone tasks which are not urgent

4.4.1.2 Increase the number of workers in each team in order to reduce each workers cold exposure.

4.4.1.3 Increase rest allowances.

4.4.1.4 Remind employees to drink water frequently to prevent excessive dehydration.

4.4.1.5 Monitor the environmental cold at the job sites and resting places.

4.4.1.6 Exercise additional caution on the first day of a shift change to make sure that the employee(s) is/are not overexposed to cold, because they may have lost some of their acclimatization over the weekend and or during days off.

4.4.1.7 Restrict overtime work, as needed.

4.4.1.8 Turning on/off equipment that contributes to the temperature in the area.

5. Safety Information.

5.1 Hot Work Areas:

5.1.1 General Information

5.1.1.1 Symptoms of heat stress include weakness, unsteady gait, irritability, disorientation, changes in skin color or general malaise.

5.1.1.2 Treatment generally includes drinking cool water and rest. Water (including drinking-fountains or individual drinking cups) will be provided. In general employees should be encouraged to drink cool water (50-59^{o}F) at about one-cup (5-7 oz.) every 20 minutes to remain hydrated in extreme heat situations.

5.1.2 Warning Signs

5.1.2.1 Warning signs may be required at entrances to work areas, buildings or enclosures where there is a reasonable likelihood of heat stress and other heat related conditions.

5.1.2.2 Heat warning signs should state:

DANGER – HEAT-STRESS AREA
Heat Stress Protective Clothing or Equipment Required
Exposure to Excessive Work Load in Hot Areas May be Harmful
Fainting, Exhaustion, Cramps, Heat Rash or Heat Stroke May Occur

5.1.2.3 Where emergency situations are likely due to cold stress, first aid instructions should be posted with the above warning sign and at strategic locations throughout the area.

5.1.2.4 Warning signs and instructions must be in English. Additional or supplemental signs may be posted in other languages based on the predominant language of the employee population.

5.2 Cold Work Areas:

5.2.1 General Information

5.2.1.1 There are four major conditions that cause cold related stress. They are low temperatures, wind chill, dampness or humidity, and cold water.

5.2.1.2 Inadequate or wet clothing increases the effects of cold on the body.

5.2.1.3 Medication, alcohol, nicotine, and caffeine may inhibit the body's ability to manage cold or impair judgment.

5.2.1.4 Certain diseases (diabetes, heart or vascular problems or thyroid conditions) may increase susceptibility to cold injury.

5.2.1.5 Exhaustion or extreme tiredness, falling asleep or becoming immobilized in a cold environment will speed the effects of cold on the body.

5.2.1.6 Age plays a part in the body's ability to manage cold environments. The elderly are more susceptible to cold extremes than younger people.

5.2.2 Warning Signs:

5.2.2.1 Warning signs may be required at entrances to work areas, buildings or enclosures where there is a reasonable likelihood of cold stress and other cold related conditions.

5.2.2.2 Cold warning signs should state:

DANGER – COLD-HAZARD AREA
Cold Weather Protective Clothing or Equipment Required
Excessive Exposure to Cold Can Cause:
Hypothermia, Frostbite, Trench foot

5.2.2.3 Where emergency situations are likely due to cold stress, first aid instructions should be posted with the above warning sign and at strategic locations throughout the area.

5.2.2.4 Warning signs and instructions must be in English. Additional or supplemental signs may be posted in other languages based on the predominant language of the employee population.

6. Training and Information.

6.1 Upon initial assignment, and as needed thereafter for refresher training, employees will be provided with information and/or training in the hazards associated in working in extreme temperatures. They will be provided with the means to protect themselves from extreme heat or cold working conditions.

6.1.1 General Training

6.1.1.1 Employees should understand the environmental and personal risk factors including:

6.1.1.1.1 any specific procedures,

6.1.1.1.2 the need for water,

6.1.1.1.3 the importance of acclimatization to the temperature,

6.1.1.1.4 the different types of and common signs of temperature related illness,

6.1.1.1.5 the importance of reporting signs and symptoms,

6.1.1.1.6 the first aid measures to take should signs or symptoms be apparent,

6.1.1.1.7 the process for contacting emergency response services and information needed to be provided to the emergency response service (including clear and precise directions to the area).

6.1.1.2 Supervisors should understand all of the employee requirements as well as the procedures to follow to implement the requirements and the procedures to follow for contacting and implementing emergency medical response. These procedures should be in writing and maintained.

6.1.2 Cold Conditions

6.1.2.1 Cold stress hazards involved in the work area

6.1.2.2 Factors, signs and symptoms of cold injury and illness

6.1.2.3 Potential health effects of excessive cold

6.1.2.4 First aid procedures for cold stress and frostbite

6.1.2.5 Precautions to be taken, protective equipment and clothing required

6.1.3 Hot Conditions

6.1.3.1 Heat stress hazards involved in the work area

6.1.3.2 Factors, signs and symptoms of heat injury and illness (heat stroke, sun stroke, sunburn, heat burn, etc.)

6.1.3.3 Potential health effects of excessive heat

6.1.3.4 First aid procedures for heat related injuries or illnesses

6.1.3.5 Precautions to be taken, protective equipment and clothing required

7. Definitions.

- *Acclimatization* - means temporary adaptation of the body to work in the heat that occurs gradually when a person is exposed to it. Acclimatization peaks in most people within four to fourteen days of regular work for at least two hours per day in the heat.

- *Cold Work Area* – An area where the temperature (including wind chill) is lower than 62 degrees Fahrenheit.

- *Hot Work Area* – An area where the temperature exceeds 90 degrees Fahrenheit

- *Environmental risk factors for heat illness* - means working conditions that create the possibility that heat illness could occur, including air temperature, relative humidity, radiant heat from the sun and other sources, conductive heat sources such as the ground, air movement, workload severity and duration, protective clothing and personal protective equipment worn by employees.

- *Extreme Temperature* –Extreme temperature takes into account wind chill and other environmental factors that reduce or increase the ambient air temperature. With such factors included, extreme temperatures are either a constant working temperature of $<62^{o}$F or $>90^{o}$F, or short-duration (15 minutes or less) exposures to $<45^{o}$F or >100 degrees Fahrenheit.

- *Heat Illness* - means a serious medical condition resulting from the body's inability to cope with a particular heat load, and includes heat cramps, heat exhaustion, heat syncope and heat stroke.

- *Personal risk factors for heat illness* - means factors such as an individual's age, degree of acclimatization, health, water consumption, alcohol consumption, caffeine consumption, and use of prescription medications that affect the body's water retention or other physiological responses to heat.

- *Preventative recovery period* - means a period of time to recover from the heat in order to prevent heat illness.

- *Shade* - means blockage of direct sunlight. Canopies, umbrellas and other temporary structures or devices may be used to provide shade. One indicator that blockage is sufficient is when objects do not cast a shadow in the area of blocked sunlight. Shade is not adequate when heat in the area of shade defeats the purpose of shade, which is to allow the body to cool. For example, a car sitting in the sun does not provide acceptable shade to a person inside it, unless the car is running with air conditioning.

- *Wind Chill* – A combination of temperature and wind velocity. Wind chill cools the air further than the ambient temperature of the air. For example, if the temperature is 40^{o}F and the wind velocity is 35 mph, the wind chill provides conditions that equal 11^{o}F.