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HEALTH AND SAFETY POLICIES & PROCEDURES MANUAL

REVISED
NOVEMBER 17, 2023

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Introduction

This manual is a controlled document prepared specifically for Modern Electric Co. It may not be reproduced, in whole or in part, without the express authorization of Modern Electric Co.

Policies and procedures will be updated, periodically, as federal state, corporate and client safety and environmental requirements change. A complete review of this procedure and policy manual will be conducted on a two year schedule. Suggestions for a changes or additions are requested, at any time, from our employees and clients. A form is included as an attachment to this document and should be completed and forwarded to Modern Electric Co., 71 Crooks Avenue, Clifton, NJ 07011

This manual will be maintained at each jobsite and accessible to our employees, their representatives and our clients at all times.

Wherever feasible, references to specific OSHA Standards are included in this manual. For more specific information, contact the MEC Safety Director at the previously indicated address or by calling 973.478.1222

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SUGGESTION FOR CHANGE FORM

To: Modern Electric Co.
71 Crooks Avenue
Clifton, NJ 07011
Attn: Safety Director

Procedure Name: _____

Procedure No.: _____

Suggested Change: _____

_____

_____

_____

_____

_____

_____

Reason for Change: _____

_____

_____

_____

_____

Name: _____ Date: _____

Work Location: _____

Contact No.: _____

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PREFACE

GENERAL:
MEC acknowledges that written procedures cannot address every safety requirement encountered during construction or demolition work. These safety procedures are considered minimal mandatory safety procedures. These procedures, in conjunction with the client safety manual and contract language constitute the overall MEC Health and Safety Program

TERMS:
The term “company” refers to Modern Electric Co. (MEC) The term “subcontractor” refers to any subcontractor or tier subcontractor under contract to the company or a subcontractor of the company for the purpose of performing work at a MEC managed construction site. The term “safety program” refers to the company Health and Safety Program, Safety Manual and contract language regarding health, safety and environmental issues.

APPLICATION:
The safety program will apply to all work sites managed by the company or where the company and all subcontractors are performing work. Where Federal, State, Municipal or contact established client safety standards exceed procedures outlined in this manual, those standards shall take precedent.

ADOPTION BY OTHERS:
The company acknowledges that others may adopt the safety program in whole or part. However, enforcement of the policy among employees, including the application, training and documentation required is the responsibility of the adopting employer. MEC accepts no liability for the content of this program where adopted by others.

REVIEW AND UPDATE:
This manual will be updated as changes to the company safety program and federal standards occur. All page revisions or additional will be numbered and published by the company.

ACCESSIBILITY:
The company safety program will be located at the construction field office and will be accessible to all employees, client representatives and regulatory compliance inspectors. If a field office is not present, then each service technician or group of technicians at the same jobsite will carry a copy.

PARTICIPATION:
Effective safety programs are contingent upon enforcement by the company and/or subcontractor and open participation by all employees. All employees are encouraged to participate in the effective implementation of the company safety program without fear of reprisal.

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INTRODUCTION

““A craftsman is known by his tools and a contractor by his operations” Modern Electric Co. policy states that top management considers no phase of operations or administration of greater importance than accident prevention. Accidents which result in personal injury and damage to property or equipment represent needless waste and loss. Therefore, it is the policy of Modern Electric Co. to conduct all operations safely, thereby preventing injuries to people and damage to property. The following are procedures and requirements that have been adopted by Modern Electric Co. in order to create a safe and productive worksite for all those involved.

Management and supervisory employees of the Company have adopted the elements of this Safety Program. This program will be followed throughout the planning and operations of the construction job. An accident Prevention Budget will be established to account for safety meetings, loss prevention and training.

Management will conduct daily surveys of safety procedures and will correct any possible hazards promptly and effectively.

And all suggestions from employees or management for revising safety procedures will be given fair and reasonable consideration, followed by prompt decisions on actions to be taken. These recommendations, whether honored or not, will be recorded for management to review and consider throughout the project.

All accidents will be investigated through reports, and audited to assure management that standards are adequate in content and effective in application.

Members of Modern Electric Co. management will attend certain safety meetings with foremen and superintendents throughout the project.

Foreman will conduct weekly toolbox talks with workmen to discuss safety concerns throughout the project.

Annual safety meetings of all superintendents and management staff will be conducted to discuss safety procedures, problems and requirements throughout the year to better themselves for the year to come.

Management will plan operations to assure that the necessary safety equipment of critical importance to prevention of loss is available on the job in the proper type and quantity at the time it is needed.

Each new hire will be taught Modern Electric Co. safety procedures by their foreman.

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"RED FLAG" VIOLATIONS POLICY

Several policies and procedures, contained within this manual, have been identified as "Red Flag Violations." Simply stated, failure to comply with these items will result in immediate removal from the work site and discharge from employment with Modern Electric Co. They have been identified due to the extra ordinary hazard they represent to our employees, our clients and their employees, and the surrounding community.

This listing is not all-inclusive and does not preclude the right of Modern Electric Co. to terminate employment for other violations of company policy and labor agreements. Additionally, it does not preclude our clients from requesting the removal of our employees from the job site.

1. Willingly damaging Modern Electric Co. or clients' safety equipment, (e.g. self- contained breathing apparatus, fire-fighting equipment etc.)

2. Failure to report damage of Modern Electric Co., or clients' safety equipment.

3. Failure to comply with personal protective equipment requirements of Modern Electric Co., or our clients.

4. Failure to report accidents, injuries, spills, and releases to Modern Electric Co. and its client's designated representative.

5. Intentional discharging of contaminants to the ground, atmosphere, water, or sewer without prior approval of Modern Electric Co. and our client's designated representative.

6. Unauthorized entry into a confined space.

7. Vacating a fire watch or confined space safety observer position during the performance of ongoing hot work and/or confined space entry.

8. Violation of Modern Electric Co. or client control of hazardous energy (lock out) procedures.

9. Failure to comply with the drug and alcohol abuse policy as published in this manual.

10. Willingly violating the safety, environmental, and health policies and procedures of our clients.

11. Failure to cooperate with a Modern Electric Co. or client incident investigation.

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PERSONNEL SAFETY VIOLATIONS POLICY

The primary purpose of this policy is to establish guidelines for Modern Electric Co. foremen and managers who deal with personnel safety infractions and violations. This policy attempts to establish consistent discipline for repeat offenders while allowing the flexibility necessary for fairness and effectiveness. The desired result of this policy is to prevent recurrence through re-education and/or discipline.

While every violation must be responded to based on its specific circumstances and may require a stronger response at any phase, when appropriate, the following guidelines should be used:

1st Offense – Verbal warning with an on-the-spot reminder of the potential hazard the employee exposed himself, others, or property to.

2nd Offense – Same as above with a note to job site personnel file; notify Shop Steward of 2nd offense; and enlist Shop Steward's assistance to educate/re-train.

3rd Offense – Six-month suspension or permanent suspension. Consult with Modern Electric Co., management staff and notify union. Permanent suspension can be reduced to six months suspension if their Union Business Agent informs Modern Electric Co. of steps that have been taken, such as retraining and/or counseling that will prevent occurrence of future unsafe craft execution.

In the event that the owner at the site will not accept reinstatement under any condition after any suspension, Modern Electric Co.'s, only obligation, if above conditions are met, will be to accept the craftsmen on future work when the employee is assigned by the Union Hall. This statement does not waive Modern Electric Co.'s rights of refusal under all other standard existing practices or agreements with the unions.

Physical inspections by company officials that indicate violations showing overall lack of commitment to company safety goals shall be under the same level of disciplinary actions

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PROHIBITION AGAINST HARASSMENT

It is the policy of Modern Electric Co. ("the company") to provide employees with a workplace free from sexual harassment and harassment based upon any other protected characteristic, such as one's race, color, creed, age, sex, national origin, national ancestry, disability, marital status, citizenship statuses and sexual orientation. Harassment, including, sexual harassment, is illegal and the company will not permit any employee, male or female, to harass another employee in any way.

Sexual harassment includes unwelcomed sexual advances, requests for sexual favors and other verbal or physical conduct of a sexual nature whereupon:

1. Submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment; or

2. Submission to or rejection of such conduct by an individual is used as the basis for employment decisions affecting such individual; or

3. Such conduct has the purpose or effect of unreasonably interfering with an individual's work performance or creating an intimidation, hostile or offensive work environment.

For example, an offensive or hostile working environment which may rise to the level of sexual harassment, may be created by the following kinds of conduct:

- Verbal – sexual innuendoes, suggestive comments, sexual propositions or jokes of a sexual nature; or

- Non-Verbal – sexually suggestive objects, pictures or obscene gestures; or

- Physical – unwanted physical contact of any kind.

Similar conduct of a racial nature may constitute racial harassment.

Sexual harassment does not include behavior or occasional compliments of a socially acceptable nature. It refers to unwelcomed behavior that is personally offensive, that fails to respect the rights of others and therefore interferes with work effectiveness.

REPORTING HARASSMENT

If you believe that you have been subjected to harassment of any kind, you should immediately notify Jamie Golub, the company's designated representative. If you are uncomfortable speaking with Jamie Golub, you may speak to any other officer or director of the company. If you are still uncomfortable, please obtain the assistance of a co-employee to report the conduct to Jamie Golub or another officer of the company.

All officers and employees of the company are responsible for ensuring that no harassment occurs within the company. Complaints of harassment should receive immediate attention. All incidents and allegations, whether or not the incidents or allegations have been witnessed or corroborate, should be reported to Jamie Golub or any other officer of the company.

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A prompt investigation will be conducted. The company recognizes that the questions of the whether or not a particular incident is a purely personal social relationship without a discriminatory impact require a factual determination of all evidence related to the matter. Because of the sensitive nature of such complaints, incidents must be investigated with particular care and should remain, to the extent feasible, confidential. In order to conduct a full investigation, however, the company will have to discuss the complaint with the accused, as well as with any potential witnesses.

If the investigation reveals a probability that the complaint is valid, the company will implement prompt attention and disciplinary action designed to stop the harassment immediately and to prevent its reoccurrence. This may include disciplinary action or corrective action by the company against the offending employee.

If the investigation reveals that the employee has become the victim of harassment by a non-employee of the company, such as a vendor or client, the company will register an objection or take other action as the company may deem appropriate in dealing with the person involved. It is recognized, however, that the company has no legal obligation for conduct of third parties and does not assume any liability or responsibility in that regard.

There will be no adverse action or discrimination taken against any individual filing and charge, testifying, assisting or participating in any matter, investigation, or proceeding under the policy. If however, the investigation reveals that an employee has fabricated a claim or otherwise knowingly made false accusations against another employee, the company reserves the right to the appropriate disciplinary action against the complainant.

We trust that all company employees will continue to act responsibly to establish and maintain a working environment free of harassment.

Thank you,
MODERN ELECTRIC CO.
Jamie B. Golub
President

I acknowledge that the above policy has been reviewed with me and that I have been given a copy of the policy on this date.

_____ _____
Employee Name Date

_____
Employee Signature

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SECTION 1

SUBSTANCE ABUSE POLICY

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MEMORANDAM OF UNDERSTANDING

Drug and Alcohol Abuse Policy/Program

I. Understanding

Abuse of alcohol and drugs is recognized as a serious problem in today's workplace that affects Modern Electric Co. "Company" as well as society and creates a need for guidelines regarding assistance. Accordingly, when it is determined that an employee is suffering from an alcohol or drug abuse problem, the individual is advised to utilize their existing Health & Welfare programs for treatment and rehabilitation. Additionally, efforts will be made to assist the employee using available health care and community resources. However, this does not preclude, under the policy, the Company's right to administer discipline up to and including discharge.

II. Policy

Drug and alcohol abuse is a problem of serious concern in society today. In the workplace substance abuse is reflected in increased cost, lower productivity, and increased risk to the health and safety of employees and customers. Recognizing that we have an obligation to provide a working environment that is safe and productive and not in any way detrimental to the conduct of the business of Modern Electric Co., the Company has established this policy for addressing alcohol and prohibited substances in the workplace.

It is the policy of the Company that all employees shall at all times is capable of performing safely and up to satisfactory standards while on Company premises or while acting as a representative of the Company. To this end, the Company expressly prohibits the possession, sale, use, or distribution of prohibited substances or related paraphernalia on company premises. Such an act is grounds for immediate dismissal. While at work or performing on behalf of the Company, employees shall not have a measurable level of prohibited substances or alcohol in their system. Additionally, the Company will provide training with regard to drug awareness to appropriate levels of supervision.

III. Definitions

A. **Company Premises** - Any properties owned, leased, or occupied by MEC and/or its subsidiaries including the facilities of clients occupied for the intent of conduction business at the MEC project location.

B. **Prohibited Substance** – Substances not authorized by law for sale, possession, or use. This includes, but is not limited to, prescription medicines for which the possessor has no valid prescription, mood- or mind-altering drugs, depressants, stimulants, designer and synthetic drugs.

C. **Measurable Level** – Any amount of substance found in the system that exceeds cutoff levels established by the prescribing physician or by the Medical Review Officer.

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IV. Enforcement/Testing

Due to the importance of this policy, the company will utilize the methods outlined below to detect drug and/or alcohol abuse or use on company premises and to ensure that all employees are in compliance with this policy. When required, a laboratory mutually approved by the employer and union will conduct testing. A National Institute of Drug Abuse (NIDA) certified laboratory with chain of custody procedures in place to insure continuity of specimen handling shall perform all testing of specimens. A company approved informed consent form will be signed by each person to be tested. Refusal to take the alcohol/drug test will be subject the employee to company disciplinary procedures up to and including dismissal.

A. **Reasonable Suspicion/Post Accident Drug and Alcohol Abuse Testing**

Employees will be subject to urine tests to detect the presence of drugs and/or alcohol under the following conditions:

1. In the opinion of two of the employer's management, one of which must be the project manager/superintendent or designate, there is "reasonable suspicion" of drug/alcohol use or impairment.

2. "Reasonable Suspicion" in the above two (2) instances would include but not be limited to instances where drugs and/or alcohol have been detected on site or in company vehicles; when there are observable signs of impairment to the employees ability to perform (e.g. difficulty in maintaining balance, slurred speech, significant changes in behavior or performance); or at any time an unusual or unexplained incident occurs where drug or alcohol could have been a contributing factor.

B. **Pre-Employment/Pre-Access Drug and Alcohol Abuse Testing**

Except for the exemptions provided for herein, no employee will be permitted to perform work on the owner's site unless such employee has passed a pre-employment or pre-access drug and alcohol test within a 120 day period immediately prior to commencing such work

Employees involved in "work-related" accidents shall be subject to testing. A "work-related" accident is defined as an accident resulting in an injury requiring treatment by a physician or resulting in damage to property or equipment. In the event of a work-related incident, the superintendent or project manager, and the craft foreman shall decide which individuals are to be tested.

V. Exceptions

A. Individuals who have not successfully completed an equivalent pre-employment drug screening in accordance with the preceding will immediately upon employment submit to drug and alcohol testing. It is further understood that individuals who have not successfully completed the required drug and alcohol abuse testing prior to starting work on the project shall be hired on a probationary basis pending the results of testing. Should the results of testing be positive (e.g. the individual is not within the limits prescribed), then the individual would be terminated immediately.

This exception does not apply to employees hired to work in owner "designated positions". They must be certified prior to starting work on the site.

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B. Other Drug and Alcohol Abuse Testing/Designated Positions – Unannounced periodic or random urinalysis testing will be conducting when an employee meets any one of the following conditions:

1. The employee has had a substance abuse problem
2. The employee is working in a "designated position" identified by MEC. management as requiring such testing
3. The employee is working in a position where such testing is required by law

It should be noted that MEC has advised that there are currently no MEC employees that fall into categories 2 or 3 above. Although MEC will specifically identify such "designated positions: they may include but are not limited to positions that have:

1. A high exposure to catastrophic operation incident, and
2. A direct role in the operating process where failure could result in serious harm to public or employee well being, and
3. No direct or very limited supervision available to provide operational checks.

C. Searches for Drug and/or Alcohol

The company and/or the owner may from time to time conduct unannounced searches for drugs and/or alcohol on owner or company-owned property. The owner, company supervisors, or an outside security guard force may conduct these searches. Specially trained animals may be used on the searches to aid in the detection of certain controlled substances.

VI. Enforcement/Penalties

A. If an employee tests positive, he/she will be terminated and will be ineligible for rehire for 30 days. In the event an individual is re-dispatched after 30 days and tests positive for 2nd time, the individual will be terminated and ineligible for rehire for a minimum of 12 months or until the individual provides written confirmation of current involvement and completion of a rehabilitation program and successfully passes the drug and alcohol test. Any individual hired or rehired under these circumstances shall be subject to unannounced random testing for an indefinite period of time.

B. All specimens testing will be conducted in accordance with the provisions outlined in this policy/program.

C. Refusal to submit to drug and alcohol testing as described herein shall result in the individual being denied access to the project site. Employees who refuse testing shall be subject to disciplinary action, including termination.

D. **Employees shall be required to sign the attached "Employee Consent Form: Failure to do so will result in termination**

E. The employer agrees that the grievance procedure contained in the applicable labor agreement shall apply for dispute resolution relative to this policy, providing that such grievance procedure's final step in impartial and binding third party arbitration.

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F. The employer agrees to release and hold harmless from any and all claims which the employer now has or may in the future have against the union concerning allegations of negligence in the referral of employees to work who the union knows or should have known in the past tested positive for drug or alcohol use. The employer acknowledges that the Union does not screen persons it refers to work through the hiring hall for drug or alcohol use, and that it is strictly the responsibility of the employer to test its employees for drug or alcohol use.

VII. Other

The employee agrees to review this Drug/Alcohol Abuse Policy/Program every 6 months of the first two (2) years that it's in effect. Any changes to the policy will be written and made a part of this document.

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EMPLOYEE CONSENT FORM

I, _____, hereby consent and agree to give specimens of my urine at a medical facility designed by Modern Electric Co., hereinafter referred to as "Employer" in accordance with the provisions of the company's drug and alcohol policy/program, and if applicable, the Memorandum of Understanding, regarding drug and alcohol abuse between the employer and the union.

It is agreed that upon my written request, I will be furnished with results of the tests performed on my urine specimens by the testing laboratory.

I acknowledge that I have read and understood the Employer's Drug and Alcohol Abuse Policy/Program. I understand that refusal to submit to a drug screening test in accordance with the provisions of these documents will result in termination of employment and that the presence of one or more of the prohibited substances at or above the defined threshold level will result in termination of employment.

_____
Witness

_____
Employee Signature

_____
Print Name

_____
Social Security Number

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This Substance Abuse Program, including Attachment #1 and the Employee Consent Form, Agreed to this _____day of _____ 20____.

FOR THE EMPLOYER

Organization	Organization
Signature/Date	Signature/Date
Print Name/Title	Print Name/Title

FOR THE UNIONS

Organization	Organization
Signature/Date	Signature/Date
Print Name/Title	Print Name/Title
Organization	Organization
Signature/Date	Signature/Date
Print Name/Title	Print Name/Title

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DOT DRUG TESTING PROGRAM DETECTION LEVELS

	SCREEN LEVELS		CONFIRMATORY LEVELS	
SUBSTANCE	**MODERN ELECTRIC CO.**	**DOT**	**MODERN ELECTRIC CO.**	**DOT**
Cocaine	300 ng/ml	300 ng/m	150 ng/ml	150 ng/ml
Phencyclidine (PCP)	25 ng/ml	25 ng/ml	25 ng/ml	25 ng/ml
Opiates, Codeine, Morphine	300 ng/ml	300 ng/ml	300 ng/ml	300 ng/ml
Amphetamines, Methamphetamines	1000 ng/ml	1000 ng/ml	500 ng/ml	500 ng/ml
Barbiturates	300 ng/ml	Not Required	300 ng/ml	Not Required
Methadone	300 ng/ml	Not Required	200 ng/ml	Not Required
Methaqualone	300 ng/ml	Not Required	200 ng/ml	Not Required
Propoxyphena	300 ng/ml	Not Required	300 ng/ml	Not Required
Alcohol	Detection	Not Required	.04 gm/dl	Not Required
Benzodiazepines	300 ng/ml	Not Required	300 ng/ml	Not Required

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SECTION 2

GENERAL SAFETY RULES

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I. Responsibility

The following responsibilities are in addition to those assigned by Modern Electric Co. Safety Manual.

A. **Field Managers**: The field manager shall conduct documented safety inspections at each construction site at a minimum frequency of once per month. Reports of the inspection shall be provided to MEC Safety Coordinator.

B. **Project Managers**: Project Managers shall conduct documented safety inspections for each project under their control monthly. The results of the inspection shall be retained in the job files and distributed of the President.

C. **Project Superintendents/Foremen**: Project Supers/Foremen shall conduct documented weekly safety inspections of the jobsite. Results of the inspections shall be retained at the jobsite.

D. **Site Safety Coordinator:** The company shall designate a Site Safety Coordinator. The Site Safety Coordinator shall be capable of identifying potential sanitary, safety, and health exposures to employees and is empowered to take any action required to eliminate the unsafe condition or action.

E. **Employees:** Employees shall be trained in the application of procedures outlined in this manual. Employees shall identify unsafe conditions or actions to their supervisor immediately. All employees shall work in a safe and environmentally sound manner. All accidents, incidents, occupational injuries or illnesses shall be reported to the company immediately.

F. **Subcontractors**:

1. Subcontractors will provide copies of all required insurance certificates, a current copy of their safety program, drug and alcohol program, hazard communication program and an indexed set of MSDS for hazardous materials used or stored at the work site. These documents will be provided before mobilization and performance of any work at the site.

2. Subcontractors shall designate, in write, a Site Safety Coordinator responsible for administration of the safety program and field compliance. The designated person must possess the ability to identify and resolve occupational safety and health issues on the site.

3. Subcontractors shall designate, in writing, any employee assigned to duties of competent person as required by Federal and State Occupational Safety and Health Standards. A copy of the letter of designation shall be provided to the Project Manger and shall be retained as part of the job field. The subcontractor shall assure that he designated individual meets the qualification of competent person as outlined by Federal and State standards and is empowered with the ability to take prompt and immediate action to correct unsafe actions and conditions. The competent person shall be on site at all times during the performance of related work.

4. Subcontractors shall provide trained and qualified employees for the performance of contract work and shall be responsible for employee compliance with the site and subcontractor safety program. All personnel protective equipment and training in the use, care, selection, inspection and maintenance of personnel protective equipment is the responsibility of the subcontractor.

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5. Subcontractors shall provide qualified and trained employees authorized to use tools and equipment required to complete the contract work.

6. Subcontractors will provide documented initial site hazard training to their employees and conduct documented weekly toolbox safety meetings for all employees. Subcontractors will provide documentation of all training to MEC.

7. Subcontractors will attend all safety meetings called by the company.

II. Incident Reporting and Investigation

All company and subcontractor employees will cooperate with any internal, client or regulatory agency accident/incident investigation. OSHA requires reporting of work related incidents resulting in the death of an employee or the hospitalization of three or more employees. Owner Clients require all incidents to be reported including, but not limited to, injuries, spills, property damage, fires, explosions and vehicle damage.

A. **Incident Reporting:** all incidents and accidents resulting in injury or causing illness to employees and events (near miss accidents) shall be reported in order to:

1. Establish a written record of factors that cause injuries and illnesses and occurrences (near misses) that might have resulted in injury or illness but did not, as well as property and vehicle damage

2. Maintain a capability to promptly investigate incidents and events in order to initiate and support corrective and/or preventive action.

3. Provide statistical information for use in analyzing all phases of incidents and events.

4. Provide the means for complying with the reporting requirements for occupational injuries and illnesses.

The Incident Reporting System requirements apply to all incidences involving company employees, on site vendors, contractor employees and visitors, which result in (or might have resulted in) personal injury, illness, and /or property and vehicle damage.

Incidents (Occupations Injuries and Illnesses): Injuries and illnesses that require reporting include those injuries and illnesses occurring on the job which result in any of the following: lost work time, restrictions in performing job duties, requirements for first aid or outside medical attention, permanent physical bodily damages or death. Examples of reportable injuries and illnesses include, but are not limited to, heat exhaustion from working in hot environments, strained back muscles from moving equipment acid burns on fingers, etc.

Other incidents requiring reporting include those incidents occurring on the job which result in any of the following: injury or illness, damage to a vehicle, fire/explosion, property damage of more than $100, or chemical releases requiring evacuation of at least that immediate spill area.

Examples of “non-reportable” injuries and illnesses include small paper cuts, common colds and small bruises not resulting in work restrictions or requiring first aid or medical attention.

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B. **Events (Near Misses):** Other incidents that, strictly by chance, do not result in actual or observable injury, illness, death or property damage are required to be reported. The information obtained from such reporting can be extremely useful in identifying and mitigating problems before they result in actual personal or property damage. Examples of near miss incidences required to be reported include the falling of a compressed gas cylinder, overexposures to chemical, biological, or physical agents (not resulting in an immediately observable manifestation of illness or injury) and slipping and falling on a wet surface without injury.

C. **Incident Reporting Procedures:** The following procedures are to be followed by all employees in order to effectively report occupational injuries and illnesses and other incidents or events.

D. **Incidents (Injuries and Illnesses):** Serious injury or illness posing a life threatening situation shall be reported immediately to local emergency response medical services (call 911)
The injured employee shall report injuries and illnesses, to his or her supervisor in person or by phone as soon after any life threatening situation has been addressed. If the injured employee is unable to report immediately, then the incident should be reported as soon as possible.
Upon notification of an occupational injury or illness, the supervisor should complete the Incident/Accident Report and forward it to the Health and Safety Coordinator

E. **Events:** Incidents not involving injury or illness, but resulting in property damage, must be reported within 24 hours of the incident. In cases of fire or explosion that cannot be controlled by one person, vehicular accident resulting in injury or more than $500 worth of damage or a chemical release requiring a building evacuation, the involved party must immediately report the incident to the emergency response services in the area (911, police, fire, etc.)
All near miss incidences also must be reported on the Incident/Accident Report Form within 24 hours of occurrence. In place of indicating the results of the incident (e.g. actual personal or property damage), the reporting person shall indicate the avoided injury or damage.
Events, hazardous working conditions or situations and incidents involving contractor personnel must be reported to the Health and Safety Coordinator immediately.

F. **Recordkeeping:** The Health and Safety Coordinator will maintain required OSHA 300 Log and 300A Summary of Work Related Injuries and Illnesses for each calendar year.
Within 8 hours after occurrence of an employment accident which is fatal to one or more employees or which results in hospitalization of three or more employees, MEC shall report the accident either orally or in writing to the nearest OSHA area office. The report shall relate the circumstances of the accident, the number of fatalities and the extent of any injuries.
The OSHA 300a Summary of Work Related Injuries and Illnesses will be reviewed, signed by an executive and posted annually from February 1st through April 30th for the previous calendar year.
OSHA logs will be maintained by Modern Electric Co. for a period of at least five (5) years.

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III. Accident Investigation

Accident prevention is the key to eliminating possibility of injury to employees and property loss. Learning from past accidents is one of the key elements in accident prevention. This chapter addresses the procedures to be followed for all accidents resulting in employee injury or property damage. All employees must be trained in their roles and responsibilities. All employees who could be first responders shall be current in first aid and CPR.

A. **Management:** will conduct accident prevention and investigation training for supervisors and ensure that all accidents and injuries are investigated, ensure immediate and long term corrective actions are taken to prevent re-occurrence. The Health and Safety Coordinator will maintain Accident Reports permanently on file and ensure proper entries are made on the OSHA 300 Log and First Report of Injury. Management will provide all necessary medical care for injured workers.

B. **Safety Committee:** will review all Incident Report/Investigations and management responsible for the department involved insuring pertinent information is transmitted to all concerned and remedial action taken.

C. **Employees:** will immediately report all accidents and injuries and near misses to their supervisor and assist as requested in all accident investigations.

D. **Supervisor Involvement:** supervisors will conduct the investigation. Direct supervisors are familiar with employee's work environment and assigned tasks. The supervisor is the person who must take the accident situation under control and immediately eliminate or control hazards to others. The supervisor will document he investigation on the Incident/Accident Investigation Report. The supervisor will take the following immediate steps:

1. Provide First Aid for any injured person
2. Eliminate or control hazards
3. Document accident scene information to determine the cause
4. Interview witnesses immediately.

Note: After immediate rescue, actions to prevent further loss should occur. For example, maintenance personnel should be summoned to assess integrity of buildings and equipment, engineering personnel to evaluate the need for bracing of structures, and special equipment/response requirements such as safe rendering of hazardous material or explosives employed.

Initial identification of evidence immediately following the incident might include a listing of people, equipment and materials involved and a recording of environmental factors such as weather, illumination, temperature, noise, ventilation, etc.

E. **Investigative Procedures:** the actual procedures used in a particular investigation depend on the nature and results of the accident. The Supervisor will gather evidence from many sources during an investigation**.**

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1. Get information from witnesses and reports as well as by observation.
2. Interview witnesses as soon as possible after an accident
3. Inspect the accident site before any changes occur.
4. Take photographs and make sketches of the accident scene
5. Record all pertinent data on maps.
6. Get copies of all reports.
7. Documents containing normal operating procedures, flow diagrams, maintenance charts, or reports of difficulties or abnormalities are particularly useful.
8. Keep complete and accurate notes.
9. Record pre-accident conditions, the accident sequence, and post accident conditions. In addition, document the location of victims, witnesses, machinery, energy sources and hazardous materials.

Equipment needed may include some or all of the following items: writing equipment such as paper and pens, measuring equipment cameras, small tools, audio recorder, PPE, marking devices, etc.

F. **Problem Solving Techniques:** Accidents represent problems that must be solved through investigations. Several formal procedures solve problems of a degree of complexity. This section discusses two of the most common procedures: Change Analysis and Job Safety Analysis

G. **Change Analysis:** As its name implies, this technique emphasizes change. To solve a problem, an investigator must look for deviations from the norm. Consider all problems to result from some unanticipated change. Make an analysis of the change to determine its causes. The following steps will be utilized:

1. Define the problem…what happened?
2. Establish the norm…what should have happened?
3. Identify, locate & describe the change…what, where, when and to what extent?
4. Specify what was and what was not affected
5. Identify the distinctive features of the change
6. List the possible causes
7. Select the most likely causes

H. **Job Safety Analysis:** As discussed Section 3.3 a Job Safety Analysis (JSA) breaks a job into basic steps and identifies the hazards associated with each step. The JSA also prescribes controls for each hazard. A JSA is a chart listing these steps, hazards and controls. Review the JSA during the investigation if a JSA has been conducted for the job involved in an accident. Perform a JSA if one is not available. Perform a JSA as a part of the investigation to determine the events and conditions that led to the accident.

I. **Investigation Report:** An accident investigation is not complete until a report is prepared and submitted to proper authorities. An accident report should be clear and concise. The purpose of the investigation is to prevent future accidents. The completed Incident/Accident Investigation Report will be forwarded to the Health and Safety Coordinator.

All accident reports will be maintained on file permanently. MEC will maintain a log and summary of all recordable occupational injuries and illnesses by calendar year. Each recordable injury and illness will be entered 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. They shall receive timely review by upper management to ensure proper corrective actions have been taken.

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J. **Accident Prevention:** Accidents are usually complex. An accident may have 10 or more events that can be causes. A detailed analysis of an accident will normally reveal three cause levels: basic, indirect, and direct. At the lowest level, an accident results only when a person or object receives an amount of energy or hazardous material that cannot be absorbed safely. This energy or hazardous material is the DIRECT CAUSE of the accident. The direct cause is usually the result of one or more unsafe acts, or unsafe conditions, or both. Unsafe acts and conditions are the INDIRECT CAUSES or symptoms. In turn, indirect causes are usually traceable to poor management policies and decisions, or to personal or environmental factors. These are the BASIC CAUSES.

In spite of their complexity, most accidents are preventable by eliminating one or more causes. Accident investigations determine not only what happened, but also how and why. The information gained from these investigations can prevent recurrence of similar or perhaps more disastrous accidents. Accident investigators are interested in each event as well as in the sequence of events that led to an accident. The accident type is also important to the investigator. The recurrence of accidents of a particular type or those with common causes shows areas needing special accident prevention emphasis.

In an attempt to reduce accidents periodic and regular inspections of jobsite, equipment and material will be conducted. These inspections or audits will identify and unsafe equipment and conditions. All employees will be instructed to avoid unsafe conditions. Should they be presented with unsafe conditions on the works, the employee will inform management. Only qualified employees shall be permitted to operate equipment. Any machinery, tool, equipment or material that is unsafe or presents an unsafe condition will immediately be removed from the worksite. If the equipment cannot be removed from the worksite it will be tagged and its controls will be locked out until the equipment can be repaired by a qualified individual.

Lessons learned should be reviewed and communicated. Changes to processes must be placed into effect to prevent reoccurrence or similar events

IV. Emergencies

Each project will post emergency reporting numbers near telephones and in areas frequented by employees. All subcontractors will post emergency numbers for fire, police, rescue and medical treatment facilities selected in the same manner. A copy of the subcontractor emergency listing will be provided to the company project superintendent.

A. Emergencies are defined as follows:

- Occupational Injury and/or Illness
- Fires
- Environmental Incidents (spills, leaks, releases)
- Vehicle Accidents
- Near Miss Incidents

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1. Injuries, spills, chemical releases, leaks and fires rapidly become life threatening situations. Emergencies must be reported quickly and accurately to obtain the proper assistance. Failure to report emergencies immediately may result in excess property damage, employee exposure to illness and injury, releases to the atmosphere and surrounding communities.

2. Employees must be aware of our company and client procedures prior to field assignment. The Project Superintendent shall insure that our employees are knowledgeable of client and company procedures. Emergencies shall be reported to the Regional Safety Director immediately.

3. The following are general guidelines for reporting (BE CLEAR AND CONCISE, DON'T PANIC)

a) State your name
b) Location of the emergency
c) Nature of the emergency and material involved
d) Type of injury
e) If possible, remain in the area and provide direction to location to the Emergency Response Teams
f) Do not interfere with Emergency Response Teams

SPECIAL NOTE: *Injuries, spills, chemical releases, leaks and fires can rapidly evolve to a life-threatening situation. Your primary responsibility is to report the emergency quickly and secure the appropriate assistance. Do not wait to contact your supervisor. Failure to report emergencies immediately may result in well-intentioned individuals being overwhelmed by what was initially thought to be a "small problem."*

V. Emergency Response

It is imperative that our employees understand that their role in emergency response is limited, primarily, to reporting and securing assistance. In most cases, our client's procedures require you to follow their emergency notification plan, provide direction to the site (if possible) and evacuate to a safe location as specified in their Site Emergency Evacuation Plan. Once at the form up area, remain in place and follow instructions. A head count will be conducted and, if you are missing, Emergency Responders may be placed at unnecessary risk trying to locate you.

A. **OSHA References:** 29CFR 1910.68, 29CFR 1910.119, 29CFR 1910.120, 29 CFR 1926.65

B. **Fire Control**

1. In the event of fire, follow the site emergency notification plan posted in this section of the manual

2. Those individuals assigned to fire watch duties are primarily responsible for spark containment and incipient stage quenching of materials that may have ignited due to hot spark contact. Remember you are not trained or equipped for firefighting duties; immediate notification of emergency personnel is required.

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3. The area must be evacuated by following the Site Emergency Evacuation Plan. If your assistance is needed by trained Emergency Responders, it will be requested. Your presence, whether well intentioned or out of curiosity, constitutes an additional hazard and concern to Emergency Responders.

4. Only Halon, Carbon Dioxide or Purple K dry powder extinguishers must be used on or near electrical equipment fires. Special care must be exercised to insure that water does not come in contact with an open electrical bus or circuit.

5. The use of water in chemical or oil production and storage areas must be carefully evaluated. Many chemicals and hot oils react violently when in contact with water. Water can rapidly spread oil and gasoline fires. If needed, firewater should be applied in a fog pattern, not a direct steady stream.

6. If hazardous material are involved in an incident, or may potentially become involved, the material safety data sheets shall be provided to the emergency responders.

C. **Fire Fighting Equipment and Control Devices**

1. All electrical equipment and motorized vehicles operated within the confines of a client's property must be equipped with fire extinguishers.

2. Firefighting equipment must be readily accessible and not blocked by tools, vehicles, debris, or equipment.

3. Use of emergency fire-fighting equipment for any purpose other than an emergency situation is prohibited.

4. Client's Safety Procedures must be consulted for instructions on use of fire hydrants, lines, and standpipes.

5. Horseplay, involving firewater and hoses, will not be tolerated.

6. Any person or persons that may need to use a fire extinguisher shall be trained in the general use of fire extinguishers and the hazards of incipient firefighting. Where the employer has provided portable fire extinguishers for employees use in the workplace, Modern Electric Co. shall provide training to familiarize employees with the general principles of fire extinguisher use and the hazards involved in incipient stage firefighting. Employees shall receive training upon initial assignment and at least annually thereafter

7. Any fire extinguisher that is empty, partially used or commissioned must be returned to the Foreman immediately for recharge and replacement.

8. The client's designated representative must be notified if emergency equipment is partially or fully discharged, or requires relocation, and removal to facilitate equipment installation.

9. Fire alarms, fire detectors, smoke detectors, and other emergency signaling devices may not be disconnected or relocated without the express approval of the client's designated representative.

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10. Fire alarms and smoke detectors installed in MEC trailers or work locations must be inspected and tested monthly. Records of these inspections will be kept at the jobsite and a copy submitted to the main office.

11. MEC assigned portable fire extinguishers must be visually inspected monthly for charge and condition of cylinder and hose. Corroded and partially discharged equipment must be returned immediately. MEC assigned portable fire extinguishers must also have an annual maintenance check performed. These inspections will be documented and kept on file at the site office, a copy will be sent to the main office.

12. Fire extinguishers used for fire watch duties must be inspected at least daily, at the beginning and end of each daily job. Defective, damaged or discharged equipment must be returned to the Foreman and replaced immediately.

VI. First Aid

The purpose of this chapter is to provide general information regarding First Aid. It is not our intent to train, qualify or certify Modern Electric Co.'s employees as First Aid Personnel or Emergency Responders. All Modern Electric Co. employees are reminded that their primary duty in the event of an injury or illness is to get help from qualified Emergency Responders!

Modern Electric Co. employees having a valid certificate in first aid / CPR/ AED training, the National Safety Council or equivalent shall be available at work sites to render emergency first aid.

Provisions shall be made prior to commencement of a project for prompt medical attention in case of serious injury. A competent person will be assigned to post the emergency phone numbers for physicians, hospitals and ambulances and directions to medical facilities around the site so that they are accessible to all employees.

Proper equipment for prompt transportation of injured persons to a physician or hospital or a communication system for contacting necessary ambulance service shall be provided.

At least one (1) First Aid Kit per 25 employees will be on each jobsite. The kit will be in an environmentally controlled location and clearly marked as to its whereabouts at the site. The first aid kit shall be readily accessible at all times.

All Safety Kits will be checked prior to shipment to jobsite.

All First Aid Kits will be visually inspected on at least a weekly basis by a competent person assigned this duty prior to start of job. A complete list of all first aid items will be provided by the site

First Aid Kits shall be stored in a weatherproof container with individual sealed packages of each type of item per ANSI Standard Z308. 1-1998 or Appendix A of CFR 1910.151.

In addition, one employee on site will be currently certified in Standard First Aid/CPR/AED.

Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for flushing of eyes or body shall be provided within the work area.

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MEC will provide appropriate PPE in accordance with the 1910.1030(d)(3) "occupational exposure to Blood Borne Pathogens" to employees that may be exposed to blood or other potentially infectious materials. For more information on Blood Borne Pathogens please refer to 29 CFR 1910.1030

A. **OSHA References**: 29 CFR 1926.21, 29 CFR 1910.1030

B. **Artificial Resuscitation:**

1. Check for consciousness

2. Check for breathing

   a) Look, listen and feel for about 5 seconds
   b) Position victim on back
   c) Open airway using head tilt and chin lift
   d) Recheck breathing
   e) Look, listen and feel for about 5 seconds
   f) If not breathing, keep head tilted
   g) Pinch nose shut
   h) Seal your lips tightly around person's mouth
   i) Give 2 slow breaths
   j) Watch to see that breaths go in

3. Check for pulse

   a) Locate Adam's apple, slide fingers down into groove of neck
   b) Feel for pulse for 5-10 seconds

4. Check for severe bleeding, "head to toe"

5. Find hand position

   a) Locate notch at lower end of sternum, place heel of other hand on sternum next to fingers
   b) Remove hand from notch and place on top of other hand
   c) Keep fingers off chest
   d) Give 15 compressions and 2 breaths
   e) Compress downs/ups smoothly, keeping hand contact w/chest at all times
   f) Watch chest to see that our breaths go in

6. Repeat compression/breathing cycles

7. Recheck pulse

   a) After about 1 minute, feel for pulse for above 5 seconds
   b) If person has a pulse and its breathing, keep airway open
   c) Monitor breathing
   d) If person has a pulse, but isn't breathing, perform rescue breathing
   e) If person doesn't have a pulse and isn't breathing, continue compressing/breathing cycles.

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C. **Burns:** The rapid stabilization and transport of burn victims is extremely important.

1. Care for burns:

   a) Stop the burning
   b) Cool the burn
   c) Cover the burn

2. Do's:

   a) Do cool a burn by flushing with water
   b) Do cover the burn with a dry clean covering, such as a sterile dressing.
   c) Do keep the victim comfortable and from being chilled or overheated.

3. Don'ts:

   a) Don't apply ice directly to any burn, unless very minor
   b) Don't touch a burn with anything except a clean covering
   c) Don't remove pieces of cloth that stick to the burned area
   d) Don't try to clean a severe burn
   e) Don't break blisters
   f) Don't use any kind of ointment (or butter) on a severe burn.

D. **Chemical Burns – splash to skin or eyes:**

1. Flush burn with large amounts of cool running water until the ambulance arrives.

2. Have victim take off any clothes with the chemical on them, info possible.

3. If only one eye has been exposed to the chemical, flush the affected eye from the nose outward to prevent washing the chemical into unaffected eye

4. Where the eyes or body of any person may be exposed to injuries corrosive materials, suitable facilities shall be provided within the work area and shall be inspected on a weekly basis

E. **Electrical Burns:**

1. Sources of electricity include: power lines, lighting, defect

2. The burns are often deep and have two wounds, one where the current entered the body and one where it left.

3. Never go near a victim you think has been injured by electricity until you're sure the power has been turned off

4. With an electrical burn, the burn itself will not be the major problem; check breathing and pulse if victim is unconscious. Check for other injuries such as possible fractures, or spinal injury. **DO NOT MOVE THEM.**

5. Cover an electrical burn with a dry, sterile dressing but do not cool the burn. Keep the victim from getting chilled.

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VII. Housekeeping

Many injuries and incidents, at work or in the home, have been caused by poor housekeeping. Housekeeping is the responsibility of all Modern Electric Co. employees

A. OSHA Reference 29CFR 1926.25

B. Jobsites and work locations must be kept clean of all debris

C. Hoses and electrical lines must be laid out to minimize tripping hazards in walkways or other traffic area. Lines shall not interfere with pedestrian or vehicular traffic.

D. All jobsites must be cleaned at the end of each day, at any time accumulated debris or equipment constitutes a safety or health problem or at the completion of the job assignment, whichever comes first.

E. Oil or chemical spills must be cleaned and reported immediately. If spills cannot be promptly cleaned, they must be barricaded or warning taped off to prevent access. Clients must be notified

F. Oily rags and debris must be disposed of in proper metal covered containers.

G. Water and/or ice shall be cleared from the work area. Ice accumulation overhead, on scaffolding, ladders, steel under erection and walking surfaces is extremely hazardous and shall be cleared before beginning work in the affected areas.

H. Electrical cords and hoses must be coiled and stored out of the traffic area at the completion of the job or workday whichever comes first.

I. Exposed nails must be bent over or pulled and all lumber stacked neatly.

J. Oils, solvents, chemicals, etc. will not be dumped on the ground on in sewer

K. The client's procedures for disposing of recyclables, rash, oils, solvents, chemicals or contaminated trash and equipment must be followed.

VIII. Barricades and Warning Devices

Barricades provide a substantial barrier that obstructs the normal passage of equipment and personnel. It cannot be disturbed or moved by natural elements. Warning tape and barrels and drums, etc. do not constitute a barricade, they are considered warning devices. Subcontractors supplying non-English speaking employees are responsible to post multi-lingual signage. Failure to heed or circumventing a barricade and warning device will result in disciplinary action.

A. OSHA Reference 29 CFR 1926.202, 29 CFR 1926.203

B. Unattended excavations or floor openings must be barricaded or covered with planks, steel plates or other suitable material to prevent accidental entry

C. Night warning lights must be placed at all excavation sites.

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D. Handrails, guardrails, hatch covers, or floor opening covers, temporarily removed to facilitate work, must be replaced promptly at the end of the work period or as soon as the need for the opening has ended.

E. If guardrails, handrails or floor opening covers have been removed, fall protection is required while working in the area.

F. Ladder access to platforms must be guarded with chains or bars and securely fastened when working on platforms. Floor openings must also be closed and secured.

G. Equipment and vehicles left on access roads or alleyways over night must be identified to the client's designated representative and marked with flashing lights over night.

H. Barricades and or warning devices must be used whenever work is performed above a road, walkway or machinery.

I. Yellow warning tape must be used to restrict access to areas immediately beneath overhead work

J. Barricades or warning devices must be used to protect workers from contact with t he swing or rotation of construction equipment, e.g. cranes.

K. Oil spills and overhead ice and iced walking areas must be marked with warning tape to restrict access.

L. Radiography work must be isolated with the client specified warning device and approved warning signs.

IX. Smoking

Many of our client's locations restrict smoking it designated areas or ban smoking entirely. Compliance with our client's policy on smoking is mandatory. Failure to comply shall result in termination.

A. Smoking in vehicles, operating within the confines of our client's property is also prohibited.

B. Open top butane type lighters and "strike anywhere" type matches are prohibited in most refineries and chemical production and storage areas. Check client's policy for further restrictions.

C. "Smokeless" tobacco, snuff, etc. may not be allowed while working in facilities packaging or producing products under FDA regulation

D. Where smoking is permitted, sand filled buckets shall be provided for disposal.

X. Vehicle Inspection and Operation

All MEC vehicles are expected to be operated in a safe manner and in full compliance with traffic regulations and laws. A valid driver's license is required to operate motor vehicles in the community or work site.

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A. **OSHA Reference**: 29 CFR 1926.601

B. The following items are also required:

1. All vehicles will be inspected daily, prior to use. Discrepancies will be noted and vehicles will not be operated until repairs are made.

2. Vehicles will be operated within the posted speed limits on or off site.

3. Drivers will yield to pedestrians

4. Vehicle access to the operating areas of our clients is generally restricted. Special permits may be required for vehicle entry. Consult the client's Safety Policy and Procedures Manual for further information

5. Vehicles may not be parked or spotted in a manner that would restrict access by Emergency Response Personnel or without prior approval of the client's designated representative.

6. Vehicles will not be parked or spotted in a manner that would restrict access to emergency equipment, e.g. fire hydrants, extinguishers, safety showers and eye wash.
7. Vehicles will not be left running and unattended.

8. Seat belts and harnesses will be worn in all company vehicles.

9. Personnel will not be transported in cranes, forklifts or other construction equipment not specifically designed for the transportation of personnel.

10. Accidents involving company vehicles must be reported immediately.

XI. Working on or Near Railroad Equipment

When working near railroad tracks, railroad cars or on railroad equipment, the following special precautions are required:

A. Tools, scaffolding, equipment, vehicles, etc. must not be placed closer than 8 feet 6 inches from the center line of the track or 22 feet 8 inches

B. Tools and equipment must not be laid across tracks, under, over or between rail cars.

C. Climbing over, under, or between rail cars is strictly prohibited. Rail cars move without warning.

D. Railroad tracks and cars must never be used as anchors for tying down equipment or grounding of welding equipment.

E. If work must be performed on tracks, permission must be obtained from the client's designated representative and MEC Site Supervisor. Red flags must be placed on the racks 200 feet in front and behind the work area and de-rails installed at the flag locations.

F. Stationary rail cars must be shocked and the breaks set

G. Work shall not be performed between connected rail cars.

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XII. Working near Traffic Areas

When working near streets, roadways, or other traffic areas, coordination with local law enforcement agencies or facility security is required.

A. Signs will be placed advising motorist of contraction.
B. All employees working near vehicular traffic shall be clearly identified with traffic vests.
C. Flagmen and traffic warning devices shall be provided as required.

XIII. General Electric Rules

The following are provided as general rules regarding electrical work and electrically powered equipment. They are not all inclusive and more specific rules can be found in the referenced OSHA standards, the National Electrical Code and our clients' Safety, Health and Environmental Procedures Manuals.

A. **OSHA References:** OSHA 29 CFR Subpart S, OSHA 29 CFR 1910.147, OSHA 29 CFR 1926 Subpart K, The National Electrical Code

B. **General Safety Conduct**

1. Only authorized and qualified personnel are permitted to energize and de-energize electrical circuits and the standards governing this activity must be strictly followed.

2. All wires must be regarded as live and dangerous

3. All electrical substations, motor control centers, room and vaults as well as work areas around exposed energized electrical parts must be kept clean and free from debris and water accumulation

4. Electrical substations, vaults, rooms and motor control centers shall not be used storage of tools and/or equipment

5. Only approved non-conductive ladders may be used in or near electrical transmission devices, exposed energized circuits, substations, motor control centers, rooms and vaults.

6. Only non-conductive plastic headwear is approved for use during electrical work. Conductive jewelry must not be worn.

7. Extreme care must be exercised to prevent objects from coming in contact with electrical transmission equipment.

C. **Guarding of Live Parts**

1. Live parts operating at 50 volts or more shall be guarded against accidental contact by approved cabinets or other forms of approved enclosures.

2. Access to motor control centers, vaults, rooms, substations, etc. housing live parts operating at 50 volts or more is restricted to qualified persons only.

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3. Motor control centers, substations, vaults and rooms housing live parts operating at 50 volts or more must be kept locked or attended to prevent entry by other than qualified persons.

4. Sufficient headroom and front working space shall be provided if there are live parts exposed on the front of switchboards or motor control center.

5. Warning signs of high voltage must be posted where other than qualified persons might come in contact with exposed live parts in excess of 600 volts

D. **Grounding (consult Section 19 and 20 of this manual)**

1. Stationary or portable electrical equipment must be properly grounded.

2. Grounding connector pins must not be removed from equipment plugs.

3. Lamps used for illumination must be protected from breakage and metal shell sockets must be grounded

4. All tools, portable lighting and electrical equipment used by MEC Employees on construction sites will be protected by GFCI's.

5. Temporary electrical power at all company locations will be equipped with a GFCI. GFCI's must receive a documented inspection monthly by a competent person. Power connections on sites not equipped with GFCI circuit breakers or outlets must be connected to a temporary GFCI outlet cord. **THERE ARE NO EXCEPTIONS**

E. **Electrical Extension Cords and Temporary Wiring**

1. Electrical extension cords must be inspected prior to each use. Worn or frayed cords will be removed and discarded immediately.

2. Extreme care must be taken to insure that extension or other temporary wiring is not draped or laid across hot surfaces in pipe racks (e.g., steam tracing)

3. Extension cords must not be fastened with staples, hung from nails, suspended by wires, installed above drop ceilings or below carpeting.

4. Extension cords must not be run across roadways or other traffic areas without suitable protection from damage

5. Extension cords and temporary wiring must be removed as soon as possible.

6. Extension cords and temporary wiring will not be laid out so that it creates a tripping hazard in high traffic areas.

7. Extension cords and power sources cords for tools will not be used to lift, hoist or carry equipment

8. Extension cords must be of the three-wire type and designed for hard or extra hard usage (e.g., types S, ST and SO)

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9. Temporary light is must not be suspended by their cords unless they are so designed.

10. Temporary lighting shall be installed in accordance with the National Electrical Code. Two conductors wiring, BX or Romex cable are not acceptable.

11. Separate branch circuits shall be used for lighting and power. Power cannot be taken from temporary lighting circuits or fixtures.

F. **Special Requirements for Electrical Equipment**

1. Only approved, intrinsically safe electrical equipment may be used in areas when the potential for explosive or flammable mixtures may exist. Many of MEC clients allow the use of electrical equipment in restricted areas by use of gas testing and permitting for hot work procedures. Refer to the client's Safety, Health and environmental Policies for more information.

2. Tape recorders, players, disc player, portable radios, hand held TV's, pocket calculators and flash devices for cameras, etc. are prohibited in the work place without prior approval of clients designated representative and MEC Site Supervisor of Foreman

3. All electrical conduits must be supported and sealed per client specifications.

4. All explosion proof boxes must be fully sealed and bolted per client and manufacturer's specifications.

5. All electrical circuit housings must be sealed per client & manufacturer's specs

6. Opening or exposing electrical circuits may be considered at "Hot Work" by our clients and require gas testing and permits. Consult the client's Safety, Health and Environmental Policy prior to opening or exposing any electrical circuit.

G. **Lockout Tag Out (refer to sect 5, Control Hazardous Energy Policy, for detail info)**

1. Equipment circuits that are de-energized must be locked out in accordance with the client and MEC Control of Hazardous Energy Policy

2. Circuits that cannot be locked out must be tagged with an approved tag.

3. Specific approval is required by MEC site supervisor and the Control of Hazardous Energy Policy must be consulted.

H. **Vehicles and Mechanical Equipmen**t – Vehicles and mechanical equipment which may come in contact with energized lines must maintain a 10 foot minimum clearance PLUS 4 inches for each 10kV over 50kV. In transit, equipment must maintain 4 feet of clearance plus 4 inches for every 10kV over 50kV.

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I. **Approach Distances:**

1. When unqualified persons are working in an elevated position or at grade, in the vicinity of energized overhead lines, they may not bring any conductive tool or equipment closer than

a) *Voltages to ground of 50kV or below – 10 feet*
b) *Over 50kV – 10 feet plus 4 inches for every 10kV over 50kV*

2. When qualified persons are working in the vicinity of overhead lines, whether elevated or at grade, they may not approach a conductive item without an approved insulating handle closer than:

Electrical Voltage	**Distance**
400V or less	Avoid Contact
Over 300V, less than 750V	1 foot
Over 750V, less than 2kV	1 foot 6 inches
Over 2kV, less than 15kV	2 feet
Over 15kV, less than 37kV	3 feet
Over 37kV, less than 87.5kV	3 feet 6 inches
Over 87.5kV, less than 121kV	4 feet
Over 121kV, less than 140kV	4 feet 6 inches

J. **Illumination** – Illumination in electrical equipment rooms must be no less than 10-ft candles, while any work in progress for demolition and general construction work.

XIV. Material Substitution

Design specifications for material used in construction and repair of equipment are subjected to industry standards, engineering standards, hazard analysis and compatibility with the process material.

Substitutions for materials required in clients specs, e.g., gasket material, pressure rating of valves and flanges; material composition; stud or bolt size and rating etc., are specifically prohibited without the express written approval of the client's designated representative and a Modern Electric Co. Site Supervisor

A. OSHA Reference 29 CFR 1910.119

XV. Radiographic Work and Radioactive Material

Radioactive materials are used in several of our client's facilities. In petrochemical facilities, they are primarily used in vessel level devices, and radiography work. Ionizing radiation emitted by radioactive materials and x-ray equipment is capable of causing damage to the body if not properly used and controlled. The following general rules have been established.

A. OSHA Reference 29 CFR 1926.53

B. All client's applicable rules and regulations regarding the use of radioactive material and devices must be strictly adhered to.

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C. Only those properly licensed & registered with the State and Federal Regulatory Agency.

D. Government will be permitted to use radiographic or x-ray equipment

E. Radioactive source containers must be properly identified with a sign, type of source, source strength, date of measurement, etc. All x-ray equipment must be provided with the proper warning signs, shielding and interlocks and must be operated within the design parameters to minimize leakage and potential overexposure to ionizing radiation.

F. Radioactive sources must never be left exposed or unattended.

G. Areas of radiography work must be barricaded or warning taped, with appropriate warning signs and cleared of personnel prior to exposing the source.

H. Regardless of reason, all MEC employees are prohibited from entering areas barricaded or restricted for ongoing radiology work.

I. Individuals who have been potentially exposed to ionizing radiation must immediately report the incident to their foreman and/or site supervisor.

J. Subcontractors of MEC must be competent, license, registered and familiar with MEC Safety Procedures and client mandated Safety Procedures before being allowed to perform radiographic work

K. All accidents or incidents involving radioactive material and/or equipment must be immediately reports to the client's Radiation Protection Officer and MEC's Safety Director.

XVI. Compressed Air Use

Compressed air supplies for instrumentation or utilities shall not be used as a supply for breathing air. Chemicals, liquids, inert gases, or other contaminants have been known to enter into these systems. In some cases, a plant compressed air system may be backed up by nitrogen or other inert gases in the event of compressed air system failure.

A. Compressed air, oxygen or gas will not be used to clean clothes, work surfaces or skin.

B. Compressed air supplied for plant utilities must not be used as a source for air-operated tools used in confined spaces

C. Compressed air used for pneumatic tools, exhaust fans, air movers, etc. and must be provided by a compressor with a proper filtration system.

D. Extreme care must be utilized when locating a compressor and filtration system for use in confined spaces to insure that exhaust fumes from vehicles or vapors and mists from chemicals will not enter the system.

XVII. Material Handling and Storage

A. **General Requirements**

1. Maximum safe load limits in pounds per square feet must be posted in all storage areas within buildings and structures except floors or slabs.

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2. Aisle and passageways must be kept clear for free and safe movement of material handling equipment and employees

3. Materials must not be placed within six feet of hoist way or floor opening or within 10 feet of exterior wall which do not extend above the top of the material stored.

4. Non-compatible materials must be separated in storage.

5. Bagged materials must be stacked by stepping back the layers and cross laying the bags at least ten bags high.

6. Materials must not be stored on scaffolds or runways in excess of supplies needed for immediate operations.

7. Brick stacks must be a maximum of seven feet high. When loose brick stacks reach a height of four feet, they will be tapered back two inches in every foot above the four foot level.

8. When masonry blocks are stacked higher than six feet, the stack shall be tapered back one half blocks per tier above the six foot level.

9. Structural steel, poles, pipe and other cylindrical materials, unless racked, will be stacked and blocked.

10. Lumber piles must not exceed 20 ft in height or 16 ft when lumber is to be handled manually

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SECTION 3

PERSONNEL SAFETY RULES

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I. Conduct

A. All employees are ultimately responsible for their own safety and share the responsibility for the safety of their co-workers, our client's employees, and their property and equipment.

B. Subcontractors are responsible for the safe conduct of their employees and visitors at company managed locations.

C. All employees must comply with MEC Health and Safety Program, all Federal and State requirements and craft specific safety practices.

D. All employees must comply with the established Safety, Health and Environmental Policies and Procedures of our clients.

E. All employees must comply with posted safety instructions such as posted signs, barricades, barriers and permit instructions, etc.

F. Only those employees qualified and authorized will operate equipment, machinery, power tools, etc.

G. Employees are prohibited from operating equipment, machinery, power tools, vehicles, etc. that are the property of our clients or subcontractors, unless they are qualified and approval obtained from MEC Site Supervisor and designated client representative

H. Horseplay, fighting, willful damage of equipment, and failure to report accidents, incidents occupational illnesses, or injury are cause for request for removal from the site.

I. Firearms or other items that may be considered a weapon shall not be permitted at company work locations.

J. Employees are expressly prohibited from the use of profanity with employees, customers, members of the public, and aggressive driving.

II. Inspection and use of Safety Devices and Protective Equipment

A. All employees must use safety devices and protective equipment provided and required by Federal, State, Modern Electric Co. and our clients.

B. A Competent person shall be assigned to inspect safety devices and protective equipment prior to use and at the completion of use.

C. Any and all defects or damage to safety devices and protective equipment must be reported to Modern Electric Co. Foreman.

D. Defective and/or damaged safety devices and protective equipment will not be used. Items will be clearly identified, indicating the defect or damage and removed from the jobsite immediately.

E. Damaging, altering, bypassing, or otherwise rendering safety devices and protective equipment ineffective is prohibited.

F. Specific requirements and procedures for the selection and use of safety devices and protective equipment are provided in Section III of this manual.

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III. Exposure to Toxic or Other Hazardous Substances

A. Workers performing job assignments associated with Hazardous Substances shall be trained in the proper use, storage, and potential exposure to the substance in accordance with the Hazard Communication Standard or applicable Right to Know. Additionally, contact with Hazardous Substances and Potentially Hazardous Substances are part of every aspect of employment in the construction industry and the home environment.

B. The contaminants may enter the body by any or all of the following methods.

1. INHALATION: The simple act of breathing in airborne vapors, dusts, mists, fibers or other particulate matter.

2. INGESTION: Swallowing of contaminants

3. INJECTION: (self-explanatory)

4. ABSORPTION: Many contaminants that come in contact with the skin may be absorbed through the skin and passed to the blood stream or nervous system.

C. In general, the best method of avoiding contamination to the body is to avoid contact. However, it is not always entirely possible to avoid contact. The following general rules will lessen the potential risk.

1. All employees must be aware of the hazards of the materials they are handling, working with or near. This info is available through the use of the clients Safety Data Sheets (SDS) or MEC Hazcom Program.

2. All employees of MEC or their subcontractors must be trained in the Hazcom Standard prior to beginning field assignments.

3. All employees of MEC or their subcontractors must be knowledgeable of the location and availability of client or MEC Hazcom Program and SDS sheets.

4. Personal Protective Equipment must be properly selected, inspected and used where and when required. (See section III of this manual)

5. Food and beverage will not be consumed or stored in areas where contaminants are present.

6. Wash hands prior to eating, drinking or smoking.

7. Never consume food or beverage while wearing contaminated work gloves.

8. Do not allow chemicals, oils or solvents to remain in contact with the skin.

9. Thorough washing with soap and water should be sufficient to clean contaminated skin.

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10. Extreme caution must be used when working with corrosive materials, e.g. acids or caustics. These materials can severely damage skin, eyes and mucous membranes. Immediate flushing with large amounts of water and immediate medical attention are required.

11. Never wear clothing or work gloves contaminated with oils, chemicals or solvents.

12. Report all incidents of exposure or contact immediately to your supervisor or client's designated representative.

13. Never wash skin, clothing or gloves with solvents or gasoline.

14. Never place skin in contact with compressed air stream from spray nozzles or hoses operating above 30 PSI.

IV. Clothing Requirements

A. Excessively loose clothing, dangling sleeves, ties, bandannas, scarves, rings, earrings, chains, necklaces, etc., will not be worn while working with moving equipment or tools.

B. Long hair must be kept back from contact with moving or rotating equipment.

C. Long sleeve shirts must be worn while working near hot or cold equipment and surfaces. (Consult clients' policies for additional requirements.)

D. Short pants, tank tops, "muscle" type shirts, etc., are unacceptable as work clothing.

E. Clothing contaminated with oils, chemicals, solvents or other hazardous materials must not be worn.

F. Steel toed or Fiberglass toed work shoes (complying with ANSI Standards) are strongly recommended.

G. Sneakers, canvas shoes, boat shoes, moccasins, high heels, open toed shoes, sandals, etc. are not acceptable foot wear for field assignment. Substantial shoes must be worn.

H. Proper protective clothing must be worn when handling or working on or near equipment known or suspected to have contained hazardous materials.

I. High visibility ANSI Class II vest (yellow) must be worn for all outdoor work.

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SECTION 4

PERSONAL PROTECTIVE EQUIPMENT (PPE)

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I. Introduction

Modern Electric Co. and their clients make every effort to eliminate an employee's exposure to hazards in the work place. Our employees are expected to review the job site to identify and, where possible, eliminate hazards prior to commencing work. Additionally, discussion of identified and potential hazards is an important part of any job planning and execution.

It is not always possible to eliminate all hazards or potential hazards. The best rule of thumb is to expect the unexpected. Properly selected, used, and maintained personal protective equipment has been proven to protect our employees from hazards in the work place. Personal protective equipment use, however, is not an excuse for taking unacceptable risks.

Personal protective equipment must be inspected prior to use and prior to return. It must be kept in a state of good repair and cleanliness. Damaged equipment must be identified and immediately removed from the work site. Equipment temporarily issued by Modern Electric Co. or their client's must be returned at the end of each workday.

Employees may adjust personal protective equipment for fit. Alteration, change, modification, or use for purposes other than designed and intended is strictly prohibited.
Foreman and Site Supervisors are advised to check with client policy manuals for additional personal protective equipment requirements.

Hazard assessment forms will be filled out prior to commencement of work to determine the job hazards are present or are likely to be present, which necessitate the use of PPE, personal protective equipment to be worn and signed by all employees on that project. The exposure determination shall be made without regards to the use of personal protective equipment. Certifier must sign and date the form.

When it is established that Personal Protective Equipment is needed a training program shall be put in place that will include the following:

A. When PPE is necessary
B. What PPE is necessary
C. Limitations
D. Proper care
E. Maintenance
F. Useful life and disposal

Retraining is required when:

A. Change in workplace occurs
B. Type of PPE changes
C. Employee shows lack or improper use, or understanding

Certification for training must include employee name, dates of training, and the certification subject. All Personal Protective Equipment Shall be provided to employees at no cost to the employee. Employees are not permitted to use personally owned PPE unless approved by the Site Supervisor or designated safety representative.

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II. Head Protection

A. OSHA References: 29CFR1926.951(a)(2), ANSI Z89.2-1971, 29CFR 1910.135, ANSI Z89.1-1969

B. Head protection for Modern Electric Co. employees will comply with ANSI Standard Z89.2-1971 and will provide protection from falling objects, electric shocks, or burns. (Compliance and testing data should be indicated or stamped into the helmet).

C. Head protection is required to be worn while performing all mechanical, construction, and maintenance work.

D. Head protection is required when visiting work sites as described in 2 above.

E. Head protection is not required in buildings, passenger vehicles, trucks, or enclosed heavy equipment cabs, or other areas that have been designated by Modern Electric Co. or the client designated representative as not requiring head protection.

F. Aluminum head protection and bump hats will not be worn.

G. Head protection will be used and cared for in the following manner:

1. Helmets must be worn straight and squarely on the head with the bill and peak facing forward.

2. The cradle must be adjusted so that there is a one-inch minimum clearance between head and the shell.

3. Helmet shells and suspension systems may be adjusted but not altered or modified (e.g. drilling ventilation holes in helmet or taping suspension together.)

4. Helmets must be inspected daily and replaced at the first sign of damage or excess wear.

5. Suspensions and helmets may be cleaned with mild soap and water only. The use of solvents may damage the helmet and suspension material, thereby weakening the capability of the equipment.

6. The use of warning or hazard labels and stickers on head protection is prohibited.

III. Hearing Protection Policy and PPE

The business of Modern Electric Co. is to supply qualified crafts people and service to our clients. We have few permanent work locations in which engineering and noise monitoring data may be obtained and maintained. Our employees are reminded that hearing protection is required in all client locations or Modern Electric Co. locations that are marked by signs indicating the need for hearing protection. Further, client designated representatives may require the use of hearing protection via the work permitting system. Where noise exposure readings are not available, employees must be aware of a simple rule. If you must raise your voice to be heard above background noise or equipment noise, ear protection is required.

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A. **OSHA References**: 29 CFR 1926.52, 29 CFR 1926.101, 29CFR 1910.95

B. **Objectives:**

1. To ensure that no employee will be exposed to noise levels at or above 85dBA without approved hearing protection equipment

2. To provide a Hearing conservation program for all employees regularly exposed to hazardous noise in their assigned duties

3. To identify hazardous noise areas and sources through appropriate monitoring surveys and evaluate protection for specific environments.

4. To clearly identify hazardous noise areas with designated noise signs

5. To maintain a noise-monitoring program that will detect hazardous noise levels of specific job duties and various work areas.

6. To conduct audiometric examinations annually for employees exposed to hazardous noise exposure as required by 1910.95

C. **Responsibilities:**

1. **Designated Site Safety Person**:

a) Identify hazardous noise areas

b) Monitor each fixed facility job classification to determine noise exposure levels.

c) Assure that personnel are trained in the proper usage of the hearing protection equipment and the importance of hearing conservation

d) Coordinate re-training of employees identified w/significant threshold shifts

e) Conduct periodic field checks to determine if employees are complying with the hearing conservation program

f) Make certain the program complies with federal, state and local regulations.

g) Notify each employee of his or her audiometric test results.

2. **Supervisors:**

a) Insure that all elements of the Hearing Conservation Program are followed.

b) Enforce the wearing of personal hearing protection in hazardous noise areas

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c) Alert the Safety Coordinator of process/equipment changes which would affect the noise level in the area

d) Maintain a supply of hearing protectors in the work area

e) Enforce use of hearing protection devices in areas where applicable

3. **Employees:**

a) Comply with guidelines of the hearing conservation Policy

b) Use the provided hearing protection equipment in accordance with the training and instruction received

c) Notify the supervisor immediately when conditions or practices change and result in increased noise levels

d) Affected employees will be notified of both monitoring and audiometric testing results, which pertain to the employee.

D. **Exposure Limits**: Hearing protection must be worn when the sound levels exceed the following:

Duration (hours per day)	db-A
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25	115

E. **Monitoring for Noise Exposure**:

1. **Personnel:** Each classification or fixed facilities will be monitored periodically for (8) hour noise exposure levels (at least every 2 yrs)

2. **Area:** Each project/facility will be monitored for hazardous noise areas. The area will be re-monitored during and after major process/equipment changes. Areas which have high noise levels greater than or equal to 85dBA must be posted with appropriate warning signs.

F. **Selection of Protective Equipment:** Hearing protection equipment should be selected in accordance with 29CFR 1926.101. High quality, disposal earplugs are recommended.

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G. **Use of Hearing Protection**: Hearing protective devices will be provided at no cost to the employee

1. Disposable foam hearing devices are recommended.

   a) Roll plugs between clean fingertips.

   b) Pull back gently on the back of the ear.

   c) Gently insert, do not force, ear plug into ear

2. Form fitting earplugs may be used providing a competent individual has provided them.

3. Approved earmuffs may be worn; however eyewear and earpieces that break the seal may reduce their effectiveness.

4. Cotton, lamb's wool or other non approved material will not be used.

5. Do not handle ear protection with dirty hands or gloves.

H. **Mandatory Hearing Protection Wear**: Employees involved in the following work activities will wear hearing protection:

1. Working with compressors, jackhammers, pile driving equipment, chain saws, gas, or diesel driven welding machines, powder actuated tools, impact tools.

2. Working on or near steam leaks, working with the above or hand operated impact tools, (e.g. sledge hammers) inside of confined spaces.

3. In any area posted as requiring hearing protection, either by sign or work permit instructions.

The supervisor and/or designated site safety person shall enforce the wearing of hearing protection in hazardous noise environments.

I. **Medical Surveillance**: fixed facilities (excluding construction projects) shall perform audiometric examinations annually on employees exposed to hazardous noise. The audiometric examination will be used to gather baseline data and to detect hearing losses. A Baseline audiogram shall be conducted for each exposed employee within six months of first exposure. Initial baseline testing will be done after at least 14hrs without exposure to workplace noise.

All personnel, excepting construction, who are regularly exposed to occupational noise in the course of performing their assigned job duties, at or above an 8-hour TWA or 85dBA sound level will be included in the Hearing Conservation Program and will receive audiometric testing.

When significant threshold shift (STS0 is determined, the employee will be notified in writing within 21 days of the STS determination. Hearing protection shall be reevaluated and or refitted and if necessary additional medical evaluations shall be conducted. The safety coordinator shall also be informed of the employees STS so the employee may be included in the Hearing Conservation Program

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J. **Effects of Exposure:** Exposure to noise levels above those posted in this policy can cause temporary hearing loss. Extended exposure can and will cause permanent hearing loss. Other effects of exposure can be fatigue and irritability as well as partial loss of hearing in some tones. If you notice any of these effects, report it to your supervisor immediately

K. **Training**: The objective of the hearing conservation program is the education of employees in the procedures to minimize noise exposure. All Employees will be trained once a year in the Hearing Conservation Program. The following subjects will be covered in the training:

1. Fundamentals of noise
2. Hearing Loss- Cause and Prevention
3. Needs and Benefits of the Hearing Conservation Program
4. Hearing Protection Devices proper use and Care
5. Explanation of Audiometric Testing
6. Location of Hazardous Noise Areas

L. **Documentation:** In addition to documentation being maintained on noise surveys, hearing examinations, and training, documentation shall be maintained on the types of hearing protection provided and its application. This documentation will be maintained at the main office

IV. Eye and Face Protection Policy

A. **OSHA Reference**: 29 CFR 1926.102, 29 CFR 1910.133, ANSI Z87.1-7968

B. **Policy:** ANSI approved safety glasses, with side shields, shall be worn at all times on every construction and maintenance site. Visitors to these sites shall comply with this policy. Goggles/face shields shall be worn while working with a pneumatic or electrical tool, which may produce dust, chips, or air born objects. Tools such as a jackhammer, chipping gun, grinder, beveling machine, etc., require the use of face shields.

1. Eyewear worn at Modern Electric Co. sites must comply with ANSI requirements for impact and shatter resistance for both lens and frames.

2. Contact lenses will not be worn on Modern Electric Co. sites.

3. All prescription glasses shall have approved safety lens and frames or must be worn under goggles at all times

4. Eyewear will be examined for scratches, pitting and frame damage. Scratches, pitting, and frame damage weaken the impact and shatter resistance of the eyewear. Worn or damaged equipment will be replaced immediately.

5. Non-conductive eyewear will be worn while working on live, exposed electrical parts.

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C. **Selection Guide for Eye Wear and Face Wear:**

1. Acetylene burning, cutting, or welding:

   a) Welding goggles, eyecup type with tinted lenses
   b) Welding goggles, cover spec type with tinted lenses
   c) Welding goggles, cover spec type with tinted plate lens

2. Chemical Handling

   a) Full face shield (preferred for severe exposure hazard)
   b) Goggles, flexible fitting, with hooded ventilation
   c) First Break hood with safety glasses or goggles.

3. Electric Arc Welding

   a) Welding helmet with tinted lenses

4. Employees are reminded that compliance with client requirements is mandated, provided the clients policy meets or exceeds the Modern Electric Co. Policy

D. Selection Guide for Filter Shades for Protection against Radiant Energy:

ACTIVITY	SHADE
Shielded metal-arc welding 1/16, 3/32, 1/8, 5/32 inch diameter electrodes	10
Gas shielded arc welding (nonferrous) 1/16, 3/32, 1/8, 5/32 inch diameter electrodes	11
Gas shielded arc welding (ferrous) 1/16, 3/32, 1/8, 5/32 inch diameter electrodes	12
Shielded metal-arc welding 3/16, 7/32, 1/4 inch diameter electrodes	12
Shielded metal-arc welding 5/16, 3/8 inch diameter electrodes	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 over 6 inches	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) over 1/2 inch	6 or 8

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E. **Eye Wash Facilities:** Where the eyes or the body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body will be provided within the work area for immediate emergency use. These facilities may be portable, but must be located within 50 feet of the hazard and capable of providing 15 minutes of continuous flow. Client provided facility locations should be noted by Modern Electric Co. employees and checked for operation prior to commencement of work. Please pay specific attention to the water flow temperature, as many may overheat. If temporary or portable facilities are required, notify your immediate supervisor.

V. General Respiratory Protection Program

A. **OSHA References:** 29 CFR1910.134, 29CFR1926.103

B. **General:** This section provides the Modern Electric Co. Policy and procedures for the use, selection, care and issuance of respiratory protective equipment. Modern Electric Co. foreman must consult client- established procedures. Where the client's procedures meet or exceed this policy, the client procedure will be used. This program applies to all employees who are required to wear respirators provided by Modern Electric Co. during normal work operations, and during some non-routine or emergency operations such as a spill of a hazardous substance

1. When effective engineering controls are not feasible; Engineering controls are being instituted, but not yet complete or the potential exists for employee exposure to breathing air contaminated with harmful dusts, mists, gases, smokes, sprays or vapors, respiratory protection shall be used

2. Respiratory protective devices will not be issued to individuals not properly trained in their use, care and selection. Individuals must be fit tested within the last twelve months prior to issuance. Modern Electric Co. does not provide "in- house" fit testing and training in respiratory protection. Documentation of training and testing by an approved and qualified individual is required prior to assigning any Modern Electric Co. employee to tasks requiring respiratory protective equipment.

3. Employees who voluntarily wear filtering face piece respirators (dust masks) are not subject to the medical evaluation, cleaning, storage, and maintenance provisions of this program.

4. Respiratory hazard determinations will be conducted for each individual job-site and placed in Appendix C Job Safety Forms of the MEC Safety Manual for that site.

5. Respiratory protection will be based on the requirements of the job- site if it is deemed there is a need to have them on-site.

6. Medical, respirators, and training shall be provided by Modern Electric Co. to each employee at no cost to the employee.

C. **Selection of Respiratory Protection**: The program administrator will select respirators to be used on Modern Electric Co. sites based on the hazards to which workers are exposed and in accordance with all OSHA standards. The program administrator will conduct site specific hazard evaluations for each operation, process or work area where airborne contaminants may be present in routing operations or during an emergency. The hazard evaluation will include:

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1. Identification and development of site specific lists of hazardous substances used in the workplace, by department, or work process.

2. Site specific review of work processes to determine where potential exposures to these hazardous substances may occur. This review shall be conducted by surveying the workplace, reviewing process records, and talking with employees and supervisors.

3. Exposure monitoring to quantify potential hazardous exposures.

4. Relevant historical data on employee exposures provided by the client.

5. Guide to selection of respirators along with brands and models of NIOSH approved respirators are to be listed in Appendix H

D. Updating the Hazard Assessment: The Program Administrator must revise and update the hazard assessment as needed (e.g., anytime work process changes may potentially affect exposure). If an employee feels that respiratory protection is needed during a particular activity, he/she is to contact his or her supervisor or the Program Administrator. The Program Administrator will evaluate the potential hazard, arranging for outside assistance as necessary. The Program Administrator will then communicate the results of that assessment back to the employees. If it is determined that respiratory protection is necessary, all other elements of this program will be in effect for those tasks and this program will be updated accordingly.

E. **NIOSH Certification**: All respirators must be certified by the National Institute for Occupational Safety and Health (NIOSH) and shall be used in accordance with the terms of the certification. Also, all filters, cartridges and canisters must be labeled with the appropriate NIOSH approval label. The label must not be removed or defaced while it is in use.

F. **Responsibilities:**

1. Program Administrator: The program administrator is responsible for administering the respiratory protection program. The program administrator must be knowledgeable of the complexity of the program, conduct evaluations and be properly trained, address appropriate surveillance, and ensure employees leave the area to watch, change cartridges or if they detect break through or resistance.

2. The employer is required to establish and retain written information regarding medical evaluations, fit testing, and the respirator program. Records of medical evaluations required by this section must be retained and made available in accordance with 29 CFR 1910.1020. The Program Administrator will maintain the records and the companies Main Office. Other duties of the program administrator include:

a) Identifying work areas, processes or tasks that require workers to wear respirators, and evaluating hazards.

b) Selection of respiratory protection options

c) Monitoring respirator use to ensure that respirators are used in accordance with their certifications

d) Arranging for and/or conducting training.

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e) Ensuring proper storage and maintenance of respiratory protection equipment.

f) Conducting qualitative fit testing

g) Administering the medical surveillance program

h) Maintaining records required by the program.

i) Evaluating the program

j) Updating written program, as needed.

3. Supervisors: Supervisors are responsible for ensuring that the respiratory protection program is implemented on their particular jobsite. In addition to being knowledgeable about the program requirements for their own protection, supervisors must also ensure that the program is understood and followed by the employees under their charge. In addition, the program should be monitored for program effectiveness these duties of the supervisor include:

a) Ensuring that employees under their supervision (including new hires) have received appropriate training, fit testing, and annual medical evaluation

b) Ensuring the availability of appropriate respirators and accessories

c) Being aware of tasks requiring the use of respiratory protection

d) Enforcing the proper use of respiratory protection when necessary.

e) Ensuring that respirators are properly cleaned, maintained, and stored according to the respiratory protection plan.

f) Ensuring that respirators fit well and do not cause discomfort

g) Continually monitoring work areas and operations to identify respiratory hazards.

h) Coordinating with the Program Administrator on how to address respiratory hazards or other concerns regarding the program

4. **Employees**: Each employee has the responsibility to wear his or her respirator when and where required and in the manner in which they were trained. Employees must also.

a) Care for and maintain their respirators as instructed and store them in a clean sanitary location.

b) Inform their supervisor if the respirator no longer fits well, and request a new one that fits properly.

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c) Inform their supervisor or the Program Administrator of any respiratory hazards that they feel are not adequately addressed in the workplace and of any other concerns that they have regarding the program.

d) Provide feedback to the Program Administrator when asked about fit, selection, use, maintenance so program effectiveness can be verified.

G. **Types of Respiratory Protective Equipment:**

1. **Air Purifying Respirators**: These air-purifying respirators are used to filter contaminants from the air. They must be selected for use in accordance with the selection procedures outlined in this section. AIR PURIFYING RESPIRATORS MUST NOT BE USED IN OXYGEN DEFICIENT ATMOSPHERES OR IN AREAS WHERE THE CONCENTRATION OF AIRBORNE CONTAMINANTS EXCEED THE LEVEL FOR WHICH THE CARTRIDGE IS APPROVED.

a) Filtering Face piece Respirator: This type of respirator is designed to provide protection from non-hazardous nuisance dusts and non-hazardous vapors.

b) Gas Mask (canister) Respirators: These respirators may be in use at some client locations.

c) Cartridge Respirators: These respirators are available in full or half face design. Replaceable cartridges are used to provide filtration of materials. A check valve allows for exhalation of air and closes to prevent intake of unfiltered air. They provide protection against low concentrations of airborne contaminants. It is extremely important that the proper cartridge be selected.

d) Filtering face piece respirators, Gas Mask (canister) Respirators and Cartridge Respirators are effective when properly selected, fitted and used. Cartridges, canisters and dust respirators must be replaced when breathing becomes difficult and/or the wearer detects breakthrough of the filtering device by smelling and/or tasting the contaminant. CAUTION: Many hazardous materials do not possess good warning characteristics. Several will hamper or deaden your sense of smell at higher concentrations. Periodic replacement of cartridge, canister or dust respirator is required

2. **Self Contained Breathing Apparatus (SCBA):** Selection criteria outlined in III B of this section is required. Warning devices and configuration of SCBA may differ from manufacturer to manufacturer. In addition to proper use of SCBA, training and, familiarization with the specific equipment configuration and warning devices of the model are required before use. It is not possible to provide specific manufacturer information on all SCBA that Modern Electric Co. employees may encounter. The following information is provided in generic terms.

3. **Escape Capsules**: These devices are generally equipped with a clear plastic over the head hood. They are approved for escape purposes only and may not be used for the performance of work requiring respiratory protection.

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4. **Air Packs**: Air packs are the standard self-contained breathing apparatus to be used where oxygen or a hazard exists or may exist. Pure self-contained breathing air from a high-pressure cylinder(s) is supplied to the facemask, continuously, to provide air required for breathing. The mask provides good visibility and can be fitted with an anti-fogging nose cup. The plastic lens is subjected to the same testing as chipping goggles for needle puncture and impact. These devices may provide 1/2 hour or hour (estimated) breathing air. It is important to that several factors, e.g. exertion, heat, physical condition of the user, etc. will determine the amount of time the supply of breathing air will last.

5. **Supplied Air Respirators (SAR)**: Selection criteria, as indicated in Section B of this procedure, must be applied. When it is necessary to perform duties of a non-emergency nature in contaminated areas the use of an airline must be considered.

a) Supplied air respirators (SAR) provide breathing air to the wearer through a hose from an independent 300 CF breathing air cylinder, air compressor or specially filtered air compressor. (See use instructions for compressor and air line requirements).

b) An escape or egress bottle must be used in areas where an oxygen deficient atmosphere or contaminants that are immediately dangerous to life and health exists (IDLH). SAR must never be connected to plant utility air or instrument air systems

c) **Respirator Fitting Requirements**: Modern Electric Co. will ensure that all employees using tight fitting face piece respirators pass an appropriate qualitative or quantitative fit test prior initial usage, if a different respirator is used, and annually. SARs are required to be fit tested as well. All fit tests will be conducted in accordance with 29 CFR 1910.134 Appendix A.

d) Qualitative fit tests (e.g. Irritant smoke, banana oil) may only be used to fit test negative pressure respirators which much achieve a fit factor of 100 or less.

e) Quantitative fit tests (e.g. porta count) are required for negative pressure respirators which must achieve a fit factor greater than 100.

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The following table should be used to determine the acceptable fit test for the respirator selected.

ACCEPTABLE FIT-TESTING METHODS		
Respirator	**Qualitative**	**Quantitative**
Half Face, Negative Pressure, APR (<100 fit factor)	Yes	Yes
Full Face Negative Pressure, APR (<100 fit factor) used in atmospheres up to 10 times the PEL	Yes	Yes
Full Face, Negative Pressure, APR (>100 fit factor)	No	Yes
PAPR	Yes	Yes
SAR or SCBA used in Negative pressure mode	No	Yes
(>100 fit factor)		
SAR or SCBA Positive Pressure Mode	Yes	Yes
SCBA- Structural Fire Fighting Positive Pressure	Yes	Yes
SCBA/SAR- IDLH, Positive pressure	Yes	Yes
Mouth bit respirators	Fit-Testing Not Required	

H. **Face Seal Protection:** Employees whose job function includes tasks which require the use of respiratory protective equipment, must be able to achieve a leak tight seal and must have nothing inside the face piece, which interferes with the valve function. The following items are known to interfere with a tight seal:

1. Facial abnormalities or absence of dentures.

2. Eyeglasses with temple pieces extending under the sealing surface of the mask.

3. Hairstyles, sideburns, beards and long mustaches that extend into the sealing surface of the mask. (Note: Check clients "facial hair policy")

4. Sweatbands, helmet liners or other headgear or appliances that come between the sealing surface and the face.

Job tasks requiring the use of respiratory protective equipment will not be assigned to employees that cannot obtain and maintain a seal.

I. Training: All Modern Electric Co. personnel who are required to use a respirator must receive training, at least annually, in the proper selection, use, care and fitting of the respirator. Modern Electric Co. will secure the services of a qualified consulting firm for the purpose of providing this training and refresher training on an as needed basis.

J. **Inspection Prior To Use**: All respirators must be inspected prior to use. Specific attention must be paid to cleanliness, condition of mask sealing surface, condition of face plate and face plate seal, cartridges etc. Damaged equipment will not be used and must be identified and returned immediately

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K. **Field Fit Test**: Qualified MEC employees required to work in respiratory protection will perform a negative and positive pressure fit test prior to entering the hazardous environment

1. Positive Pressure Test: Cup or otherwise close the exhalation valve and exhale gently into the face piece. The fit is considered to be satisfactory, if slight positive pressure can be held without leakage at the seal.

2. Negative Pressure Test: Close off the inlet openings of the cartridge with the palms of your hands. Inhale gently collapsing the face piece slightly against the face. Do not breathe for approximately 10 seconds. If the face piece remains in the collapsed position, the fit is satisfactory.

L. **Care and Maintenance:** Respirators shall be regularly cleaned and disinfected. Respirators used by more than one individual will be thoroughly cleaned and disinfected at the end of each individual use and prior to issuance to the next individual. An individual specifically qualified to perform maintenance on respiratory equipment will perform maintenance. Cleaning and disinfecting of respirators will be done in accordance with 29 CRF 1910.134 Appendix B-2

M. **Respirator Storage**: Must be stored in a convenient, clean and sanitary location

N. **Medical Evaluation:** Employees who are either required to wear respirators, or who choose to wear an APR voluntarily, must pass a medical exam before being permitted to wear a respirator on the job. Employees are not permitted to wear respirators until a physician has determined that they are medically able to do so. Any employee refusing the medical evaluation will not be allowed to work in an area requiring respirator use. Medical Evaluations will be conducted by a Physician or licensed Health care provider in accordance with 29 CFR 1910.134

1. The employee will be sent directly to a Physician or Licensed Health Care Practitioner for medical evaluation.

2. Follow-up medical exams will be granted to employees as required by the standard, and/or as deemed necessary by the designated medical clinic physician.

3. Any employee required for medical reasons to wear a positive pressure air-purifying respirator will be provided with a powered air-purifying respirator.

4. After an employee has received clearance and begun to wear his/her respirator, additional medical evaluations will be provided under the following circumstances:

a) Employee reports signs and/or symptoms related to their ability to use a respirator such as shortness of breath, dizziness, chest pains or wheezing.

b) Information from this program including observations made during fit testing and program evaluation, indicates a need for re-evaluation

c) A change occurs in workplace conditions that may result in a n increased physiological burden on the employee

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All examinations and questionnaires are to remain confidential between the employee and the physician. The medical condition of employees assigned to work requiring respiratory protection is of concern. Those employees having medical conditions, e.g. upper respiratory infections, severe asthma, known heart conditions, or ruptured ear drums must not be assigned respiratory protection required work.

Program Administrator is required to establish and retain written information regarding medical evaluations, fit testing, and the respirator program. Records of medical evaluations will be retained at Modern Electric Co. home office by the Program Administrator. Copies can be obtained from the Program Administrator as needed.

O. **Air Quality**: Breathing air must meet, at a minimum, the requirements of the specification for Grade D breathing air as described in Compressed Gas Association Commodity Specification G-7.1-1966 (Consult 29CRF 1910.134 (d) for other air source requirements).

P. **Breathing Air:** May be supplied to respirators from cylinders or air compressors

1. Cylinders shall be tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49CFR part 178).

2. Compressors for supplying air shall be equipped with safety and standby devices. A breathing air type compressor shall be used. Compressors shall be constructed and situated as to avoid entry of contaminated air into the system and suitable in-line air purifying sorbent beds and filters installed to further assure breathing air quality. A receiver of sufficient capacity to enable the respirator user to escape from a contaminated atmosphere in event of compressor failure, and alarms to indicate compressor failure and overheating shall be installed in the system. If an oil-lubricated compressor is used, it shall have a high temperature alarm or carbon monoxide alarm or both. If only a high temperature alarm is used, the air from the compressor shall be frequently tested for carbon monoxide to ensure that it meets the specifications outlined in this section.

Q. **Air Line Couplings**: Airline couplings shall be incompatible with outlets for the gas systems to prevent inadvertent servicing of airline respirator with non-respirable gases or oxygen.

R. **Containers:** Breathing gas containers shall be marked in accordance with American National Standard Method of Marking Portable Compressed Gas Containers to identify the material contained (ANSI Z48.1-1954)

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

When self-contained breathing apparatus or hose masks with blowers are used in atmospheres immediately dangerous to life or health, standby employees must be present with suitable rescue equipment.

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Persons using airline respirators in atmospheres immediately hazardous to life and health shall be equipped with safety harness and safety lines for lifting or removing persons from hazardous atmospheres or other equivalent provisions for the rescue of persons from hazardous atmospheres shall be used. A standby person(s) with suitable self- contained breathing apparatus shall be at the nearest fresh air base for emergency protection. This individual will be responsible to monitor compressor alarms and/or air cylinder pressure and must be in visual, verbal contact with the safety observer.

VI. Protective Equipment for Abrasive Blasting

A. **OSHA Reference:** 29CFR 1910.94

B. In abrasive blasting operations, the following apply:

1. Surface to be blasted must be tested for lead content.

2. Continuous flow air line respirator constructed so that it will cover the wearers head, neck and shoulders to protect him from rebounding abrasive will be worn

3. Only respiratory protective equipment approved by the Bureau of Mines, US Dept. of the Interior (30CFR Part 11) shall be used for protection of personnel against dusts produced during abrasive blasting operations.

4. All abrasive blasting operators shall wear abrasive blasting respirators.

5. When using silica sand in manual blasting operations where the nozzle and blast are not physically separated from the operator in an exhaust ventilated enclosure, the operator shall wear abrasive blasting respirators.

VII. Hand Protection

A. **OSHA References:** 29 CFR 1926.28

B. **General:** Hand Protection against heat, flame, cold, corrosive materials, moisture, abrasion, electricity, sharp surfaces, rough surfaces, etc. is available for use. The selection of the proper work glove for the hazard should follow the following guidelines.

1. Heat and cold protective gloves must be used during any job function where contact is probable with hot objects or extremely cold objects, e.g. dry ice, liquid nitrogen, liquid oxygen, etc.

2. Welding operations require the use of welder's leather gloves, protective leather sleeves or jacket and chaps.

3. Handling or contact with chemicals, solvents and oils require use of neoprene and plastic-coated gloves. Gloves must be washed or wiped before removal and changed frequently.

4. General work gloves of leather or leather palmed are required for most job tasks assigned to Modern Electric Co.

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5. Chisel or hand-held impact tools should be equipped with hand guards to prevent accidental striking of hands and fingers.

6. Electrically Tested Gloves: Rubber protective equipment for electrical workers must meet the specifications and requirements established in ANSI Standard J6.6.1971. Dates of testing must be stamped on the glove. A visual inspection of these gloves must be performed prior to and after use. An "air" test is required for rubber gloves prior to use. Leather over gloves will be inspected prior to use. Electrically tested gloves that are out of date of inspection or fail visual and/or air testing shall be immediately removed from service.

VIII. Body Harness and Lanyards

A. **OSHA References:** 29CFR 1926.104, 29CFR 1926.959, 29 CFR 1926.502

B. **General:** The purpose of this section is to define the requirements for safety belts, harnesses, lanyards and lifelines. More detailed information on fall protection is included in the Modern Electric Co. Fall Protection Policy. In Accordance with 29 CFR 1926.502 Body belts are not acceptable as part of a personal fall arrest system

1. Lifelines, safety belts and lanyards shall be used only for the safeguarding of employees. Lifelines, safety belts and lanyards subjected to in service loading immediately removed from service as an employee protective device and will not be placed back in service as an employee protective device.

2. Lifelines will be secured above the point of operation to an anchorage or structural member capable of supporting a minimum dead weight of 5400 pounds. Lifelines will not be anchored or secured to hot piping, electrical conduit or points with sharp edges that may damage the lifeline by cutting or abrasion.

3. A minimum of 3/4 inch or equivalent manila rope with a minimum breaking strength of 5400 pounds will be used. Shock absorbing lanyards are recommended.

4. Safety belt lanyards shall be a minimum of 1/2-inch nylon, or equivalent, with a maximum length to allow a fall of no greater than 6 feet. The rope shall have a minimum breaking strength of no less than 5400. Shock absorbing lanyards are strongly recommended for safety belt use.

5. Safety belt and lanyard hardware must be drop forged or pressed steel, cadmium plated in accordance with type 1, class b plating as specified in Fed spec QQ-P-416. The surface of the hardware must be smooth and free of burrs or sharp edges.

6. All safety belt and lanyard hardware must be capable of withstanding a tensile loading of 4000 pounds, without cracking, breaking or deforming.

C. **Lineman's Body Belts, Safety Straps and Lanyard:** Must comply with the requirements outlined in 29CRF 1926.959 (a) and (b) consult standard for specifics.

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IX. Safety Nets

A. **OSHA Reference:** 1926.105

B. **General:** Safety nets must be provided when workplaces are more than 25 feet above the ground or water surface or other surfaces where the use of ladders, scaffold, catch platforms, temporary floors, safety lines or safety belts is impractical. If a safety net required, work will not commence until the net is installed.

1. Nets must extend 8 feet beyond the edge of the work surface where the employees are exposed and installed as close as practical under the work surface, but not more than 25 feet.

2. The net must be hung in a manner that would prevent the employee from coming in contact with surfaces or structures below the net. The clearances will be determined by impact load testing data.

3. The mesh size of nets must not exceed 6 inches by 6 inches. All new nets must meet an accepted performance standard of 17,500 lbs. minimum impact resistance as established, certified by manufacturer and must bear a label establishing proof of the test.

4. The edge ropes of nets must provide minimum breaking strength of 5,000 lbs.

5. Forged steel safety hooks or shackles must be used to fasten net to its supports.

6. Connections between the net panels must develop the full strength of the net

X. Protective Equipment Requirement Near or Over Water

A. **OSHA Reference**: 29 CFR 1926.106

B. **General**: All Modern Electric Co. employees working over or near water, where the danger of drowning exists must be provided with U.S. Coast Guard approved life jackets or buoyant work vests. Foremen are reminded to check client procedures for specific locations requiring near water or over water protective equipment.

1. Each life jacket, work vest or life preserver must be inspected for defects, damage (e.g. rips and damaged straps), or any other defect/damage that would alter its strength. All damaged or defective equipment must be removed from the work site immediately.

2. Ring buoys with a minimum of 90 feet of line attached must be provided and readily available for emergency rescue operations.

3. The distance between ring buoys must not be greater than 200 feet.

4. Ropes and ring buoys must be inspected for damage and defect prior to use. Defective equipment must be removed and replaced immediately.

5. At least one lifesaving skiff must be immediately available at locations where employees are working over or adjacent to water.

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XI. Foot Protection

A. **OSHA Reference**: 29 CFR 1926.96

B. **General:** All Modern Electric employees shall wear the appropriate footwear for the task being performed. Safety-toe footwear for employees shall meet the requirements and specifications in American National Standard for Men's Safety-Toe Footwear, Z41.1-1967.

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SECTION 5

HAND AND POWER TOOLS

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I. Power Tools

A. **OSHA References**: 29 CFR 1926 Sub Park I (300-307)

B. Employees using hand and power tools and exposed to the hazard of falling, flying, abrasive and splashing objects or exposed to harmful dust, fumes, mists vapors or gases shall be provided with particular PPE necessary to protect them from the hazard by MEC at no cost to the employee

C. **Hand Tools**: Hand tools are non-powered tools and include anything from axes to wrenches. The greatest hazard posed by hand tools result from misuse and improper use.

1. All tools will be used for their designed purpose. e.g., a screwdriver may not be used for a chisel

2. The handles and point where the head attaches to the handle must be inspected prior to use. Loose heads will be repaired prior to use and tools with damaged, splintered or cracked handles will not be used until repaired.

3. Wrenches must not be used as hammers. Pipe wrench “teeth” must not be worn smooth or broken. Wrenches with sprung jaws will not be used.

4. Pipes and bars will not be used on wrench handles for increased leverage.

5. Impact tools, such as chisels, wedges, or drift pins may not be used if the head is mushroomed or the blade has been "blued" by overheating during sharpening operations.

6. Chisels and punches should be equipped with hand/wrist impact guards.

7. CAUTION: Spark Resistant tools are recommended when working around combustible or flammables.

D. **Power Tools**: Power tools are divided in categories based on the power source used, e.g., electric, pneumatic, liquid fuel, hydraulic and powder actuated. Employees must be trained and qualified in the use of power tools and the special hazards they present. Whether furnished by the employer or the employee, the tools shall be maintained in a safe condition. The following general precautions must be followed:

1. Never carry a tool by the cord or the hose.

2. Never yank the cord or hose to disconnect from the poser source.

3. Keep all cords and hoses away from sharp edges, hot objects, solvents and oils.

4. Disconnect tools when not in use, before servicing and when changing accessories such as blades, bits and cutters. The plug or connection must be disconnected from the power source and clearly visible to the individual servicing the equipment or lockout procedure must be followed.

5. All observers should be kept at a safe distance from work area.

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6. Work should be secured with clamps or a vise, freeing both hands to operate the tool.

7. Avoid accidental starting. A power tool should not be carried with the finger by the switch.

8. Tools should be maintained, inspected, kept sharp, lubricated property and clean for safe performance

9. Keep good footing and balance when working with power tools.

10. All tools that are damaged or defective must be tagged and removed from service immediately.

E. **Guards and Safety Switches:**

1. Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other rotating, reciprocating or moving parts of equipment must be guarded if such parts are exposed to contact by employees.

2. Guards must be provided to protect operators and employees from the:

a) Point of Operations
b) In running nip points
c) Rotating parts
d) Flying chips and sparks

3. Safety Guards, e.g. power saws, portable grinders, must never be operated with disabled blade guards or covers

4. The following hand-held power tools must be equipped with a momentary contact "on-off" control switch:

a) Drills, tapers, fastener drivers, horizontal, vertical and angle grinders with wheels larger than two inches in diameter, disc sanders, belt sanders, reciprocating saws, saber saws and other similar tools.

b) The above listed tools may be equipped with a lock on control provided that turnoff may be accomplished with a single motion of the same finger or fingers that turn it on.

5. The following hand-held powered tools may be equipped with only a positive on-off control switch:

a) Platen sanders, grinders with wheels of two inches or less in diameter, routers planers, laminate trimmers, nibblers, shears, scroll saws and jigsaws with blade shanks one- fourth inch wide or less.

b) Other hand-held tools, such as circular saws, chain saws, and percussion tools without positive accessory holding means must be equipped with a constant pressure switch that will shut off the power when released.

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F. **Electric Tools:**

1. All hand held electric tools used in wet or potentially wet locations will be connected to GFCI.

2. All hand held electric tools used in confined space entry work will be connected to GFCI.

3. All hand held electric tools shall be equipped with a three-wire cord with ground and the ground connected, or double insulated, or powered by a low voltage isolation transformer.

4. The grounding pins must not be removed.

5. Electric tools must be operated within their design limitations.

6. Gloves, safety footwear and eyewear are recommended for use while using electric tools.

7. Work areas should be kept well lit.

G. **Powered Abrasive Wheel Tools:**

1. Abrasive wheels selected for tools must be rated for the spindle wheel speed.

2. Before mounting an abrasive wheel, it should be inspected closely and a sounding or ring test must be completed. NOTE: A ring test is accomplished by tapping the wheel gently with a light non- metallic implement. If the wheel sounds cracked or dead, the must be discarded. If the wheel is sound, it will give a clear metallic tone or ring.

3. When mounting wheels, the installer must be sure that it fits freely on the spindle. The spindle nut must be tightened enough to hold the wheel in place, but not so tight as to distort the flange.

4. Employees must never stand in front of the wheel when starting.

5. The wheel should not be used until it has come to full operating speed.

6. Safety guards must be in place and functioning properly.

7. Face shields over safety glasses with side shields should be worn.

8. Turn off the power when completed.

9. Never clamp a hand-held grinder in a vise or to a workbench.

10. In many client locations, use of electric tools, including battery- operated tools constitutes hot work and a hot work permit will be required.

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H. **Pneumatic Tools:**

1. Pneumatic tools that shoot nails, rivets, or staples, and operate at more than 100 PSI, must be equipped with a special device to keep fasteners from being ejected, unless the muzzle is pressed against the work surface.

2. Eyewear is required for all operations, and face protection is recommended for work with pneumatic tools.

3. Hearing protection is required.

4. Hoses connected to pneumatic tools must be equipped with positive locking devices or wired together at the connection hose/tool connection point and the tool hose to feed hose connection point.

5. Airless spray guns operating at 1,000 PSI or more must be equipped with manual safety devices which will prevent pulling the trigger until the safety is manually released.

6. Air hoses more than one half inch in diameter must have a safety excess flow check valve installed at the source that will cause the air supply to shut off automatically in the event of hose failure.

7. A safety clip or retainer must be installed to prevent attachments, such as chisels on a chipping hammer, from being accidentally shot out from the barrel.

8. Cups installed on impact guns must be installed with pin and rubber-retaining ring in place. A piece of tape should also be installed around the rubber-retaining ring.

9. Compressed air guns must never be placed against body parts and turned on.

10. Compressed tools must not be pointed at other individuals

I. **Powder Actuated Tools:**

1. Powder actuated tools must be operated by trained, qualified and licensed employees only.

2. They must never be used in an explosive or flammable atmosphere.

3. The tool must be inspected prior to use, to insure that it is clean, all moving parts operate freely, and the barrel is free from obstructions.

4. It must never be pointed at anyone.

5. The tool must not be loaded unless it is to be used immediately.

6. When the tool is not in use, it must be locked away.

7. Hands must be kept clear of the barrel end.

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8. The tool must be designed that it will not operate until the barrel and the surface of the material to be fastened are pressed together with a force of five pounds greater than the total weight of the tool.

9. In the event of misfire, the user must wait 30 seconds before attempting to fire again. If the tool misfires again, wait another 30 seconds and remove the load. The bad cartridge should be placed in water.

10. Eye and Hearing protection must be worn at all times during use.

11. The area should be marked with barrier tape and signs posted.

12. Tools must be designed to accept varying load charges. Extreme care must be used to select the proper charge.

13. The muzzle end of the tool must have a protective shield or guard centered perpendicularly on the barrel to confine any flying fragments or particles.

14. Any defect noticed in a tool will require immediate removal from service and tagging to indicate defect.

15. Fasteners must not be fired into material, which would allow the fastener to pass through to the other side.

16. The fastener must not be driven into materials like brick or concrete any closer than 3 inches to an edge or corner.

17. The fastener must not come any closer than 1/2 inch from any corner or edge when fired into steel fasteners must not be driven into spalled areas

18. An alignment guide must be used when shooting a fastener into an existing hole.

19. Fasteners must not be driven into very hard or brittle materials, which might chip, spatter or make the fastener ricochet.

J. **Hydraulic Power Tools**: The fluid used in hydraulic power tools must be an approved fire-resistant fluid and must retain its operating characteristics at the most extreme temperatures to which it will be exposed. The manufacturers recommended safe operating pressure for hoses, valves, filters and fittings must not be exceeded.

K. **Liquid-Fuel Tools**: The most serious hazard of fuel-powered tools is the vapors from fuel that can burn or explode and give off dangerous exhaust.

1. Care must be used in the transport, storage and use of fuel.

2. The engine must be shut off and allowed to cool down before refueling.

3. A fuel-powered tool must not be used in a confined space, unless appropriate ventilation and SCBA are in use.

4. Fire extinguishers must be located with the tool.

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L. **Jacks:**

1. Lever, ratchet, screw and hydraulic jacks must be equipped with a device that prevents them from jacking up to high.

2. Load rating and manufacturers recommendations must be permanently marked on the jack in a prominent place.

3. Manufacturer's recommendations must not be exceeded.

4. A jack must never be used to support a lifted load. The lifted load must be blocked up.

5. Use wooden blocking under the base, if necessary, to keep the jack level and secure.

6. If the lift surface is metal, a one-inch thick hardwood block or equivalent between it and the metal jack head must be installed to prevent slippage.

7. A jack must be set up so that:

   a) The base rests on a firm, level surface.
   b) The jack is correctly centered.
   c) The jack head bears against a level surface.
   d) The lift force is applied squarely.

8. Jacks exposed to freezing temperatures must be filled with an adequate anti-freeze liquid.

9. If a jack is subjected to abnormal load or shock, it must be thoroughly inspected to make sure that it has not been damaged.

10. Leaking jacks, damaged jacks, bent jacks must be taken out of service and tagged as defective, immediately.

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SECTION 6

ELECTRICAL SAFETY/CONTROL OF HAZARDOUS ENERGY

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I. Control of Hazardous Energy Policy and Procedures

A. **OSHA References**: 29 CFR 1910.147, 29 CFR 1910.332, 29 CFR 1910.333, 29 CFR 1926.417

B. **Policy**: It is the policy of Modern Electric Co. to comply with electrical safety / control of hazardous energy standards established by OSHA in 29 CFR 1910.147, 332, and client established policies and procedures for Control of Hazardous Energy. This program shall be inspected annually by the Field Services Manager. A certified review of the inspection including date, equipment, employees & the inspector shall be documented and maintained on file. The client policy and procedure will supersede this policy and procedure if it meets or exceeds the OSHA and Modern Electric Co. requirements.

C. **Scope:** This program covers the servicing and maintenance of machines and equipment where the unexpected energization or startup of the machine or equipment, or the release of stored energy could cause an incident. This program establishes minimum performance requirements for the control of such hazardous energy. When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers MODERN ELECTRIC CO. employees and contractors and shall be used on owned premises or when an operator's program doesn't exist or is less stringent

D. **Purpose**: This procedure covers the minimum requirements for lockout/and or tag out of energy isolating devices to protect employees from hazardous energy including electrical, mechanical, hydraulic, pneumatic, or other stored energy. It will be used as a procedure for isolation of all potentially hazardous energy before employees perform any servicing and maintenance activities where unexpected start up or release of stored energy could cause injury.

E. **Definitions:**

1. **Affected employee** - An employee whose job requires them to operate or use a machine or equipment on which servicing and maintenance is being performed under lockout/tagout, or whose job requires the employee to work in an area in which such servicing or maintenance is being performed.

2. **Authorized employee** - A person that performs lockout/tagout procedures on machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes authorized when that employee's duties include performing servicing or maintenance covered under this program.

3. **Capable of being locked out** - An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out if lockout can be achieved without the need to dismantle, rebuild or replace the energy isolating device or permanently alter its energy control capability.

4. **Energized** - Connected to an energy source or containing residual or stored energy.

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5. **Energy isolating device** - A mechanical device that physically prevents the transmission or release of energy including, but not limited to, the following:

a) *A manually operated electrical circuit breaker, a disconnect switch, a manually operated switch by which the conductors and no pole can be operated independently, a line valve, a block and any similar device used to block or isolate energy.*

b) *Push buttons, selector switches and other control circuit type devices are not isolating devices.*

6. **Lockout** - The placement of a lockout device on an energy isolating device in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

7. **Lockout device** - A device that utilizes a positive means, such as either a key or combination type lock, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

8. **Normal operation** - The utilization of a machine or equipment to perform its intended operation.

9. **Potential Energy Sources** - Any source of gas, electrical, mechanical, hydraulic, pneumatic, chemical, gravity, steam, thermal, tension or other energy sources.

10. **Servicing and/or maintenance** - Workplace activities such as constructing, setting up, adjusting, inspecting, modifying and maintaining and/or servicing machines and equipment, where the employee may be exposed to an unexpected energization or startup of the equipment or release of a hazardous energy source.

11. **Setting up - Any work performed to prepare a machine or equipment for performing its normal operation.**

12. **Tagout** - The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

13. **Tagout device** - A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until tagout device is removed.

F. **Training**:

1. Training will be provided to appropriate Modern Electric Co. employees and subcontractors in accordance with 29 CFR 1910.147.

2. Each authorized employee shall receive adequate training and address that all affected employees are instructed in the purpose and use of the energy control procedure.

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3. **Training must include**:

a) Recognition of hazardous energy source,
b) Type & magnitude of energy available,
c) Methods & means necessary for energy isolation & control.

4. There should be training provisions included for any other employee whose work operations are or may be in an area where energy control procedures may be utilized.

5. The employee training should also address when tag out systems are used including the limitations of a tag (tags are warning devices & do not provide physical restraint).

6. Training should also include that a tag is not to be removed without authorization. The tag is never to be ignored or defeated in any way.

7. Retraining is required when there is a change in job assignments, machines, change in the energy control procedures, or a new hazard is introduced.

8. All training and/or retraining must be documented, signed & certified.

9. The employees will also be trained in the application of this policy or client policy by MEC or its clients for:

a) Employees who face a risk of electric shock but who are not qualified persons shall be trained & familiar with electrically related safety practices.

b) Employees shall be trained in safety related work practices that pertain to their respective job assignments.

10. Clearance distances (The lines shall be de-energized and grounded or other protective measures shall be provided before work is started)

G. **Exceptions**: This policy does not cover:

1. Installations under the exclusive control of electric utilities for the purpose of power generation, transmission, and distribution including related equipment for communication or metering.

2. Exposure to electrical hazards from work on or near electrical utilization installations that are covered by 29 CFR 1910 Subpart S.

3. FAILURE TO COMPLY: Failure to comply with this policy and procedure or the client established policy and procedure are grounds for immediate removal and subsequent discharge in accordance with the Modern Electric Co. Red Flag Violations Policy

H. **Inspection**: An inspection for compliance with the Modern Electric Co. policy and procedures for control of hazardous energy will be conducted and documented annually, by a company designated competent person.

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I. **Deviations**: The Modern Electric Co. Safety Coordinator may approve Deviations to this policy and procedures only.

J. **Protective Materials and Devices**:

1. Locks, tags, chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware will be provided by the employer for isolating, securing or blocking of machines or equipment from energy sources. These devices must be singularly identified and used specifically for the purpose of isolating, securing, or blocking from energy sources. They must be durable and capable of withstanding the environment to which they are exposed.

2. Lockout devices must be substantial enough to prevent removal without the use of excessive force or unusual techniques, e.g. bolt cutters, hack saw, etc. Locks will be issued to individual employees. Extra keys will not be available. Keys for individual employee locks will not be given to other employees or supervisors. If a lock does not contain the identity of the installer, a tag must be installed with the lock to provide the identity of the installer.

3. Tag out devices must be constructed and printed so that exposure to damp atmospheres, weather conditions, and corrosive atmospheres will not damage the tag.

4. Tag out devices must clearly identify the name of the installer and the hazardous condition protected against, e.g. Do Not Open, Do Not Operate, Do Not Energize, Do Not Start, Do Not Close, etc.

5. Tag out devices must be attached with material that will withstand the weather and atmosphere associated with the location of the tag.

6. Shift Change or Relief from Job Assignment: Employees departing the jobsite at the end of the working day or having a change I assignment during the working day will remove the locking and tagging device in the following manner:

7. If relieved by another Modern Electric Co. employee, the departing employee will accompany the newly assigned employee to the lockout/tag out device(s) and remove their individual lock. The newly assigned employee will verify the effectiveness of the isolation and install their lockout/tag out device.

8. If no relief is provided, the employee will contact the Modern Electric Co. Foreman. The Foreman will accompany the employee to the lockout/tag out device and install their personal lockout/tag out device to the isolation equipment after verifying that effective isolation is maintained. The Modern Electric Co. Foreman shall remove their lockout/tag out device upon reassignment or resumption of work by another employee. Control of Hazardous Energy Procedure

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K. **General:** This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It must be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.

L. **Compliance**: All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment that is locked out to perform servicing or maintenance shall not attempt to start, or energize or use that machine or equipment. Under no circumstance shall employees de-energize, lockout, or return to service, machines or pieces of equipment without the express consent of the client designated representative and Modern Electric Co. Foreman.

M. **Enforcement:** Failure to comply with this procedure will cause immediate removal from the work site and subsequent termination.

N. **Job Planning:** Safe work practices shall be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts when work is performed near or on equipment or circuits which are or may be energized. Modern Electric Co. Supervisor is expected to include the anticipated need for lockout devices during the pre-job planning walk through. An alternate procedure must be used for machines or equipment that cannot accept a positive locking device. Employees may not enter spaces containing exposed energized parts unless illumination is provided that enables the employees to work safely. Protective shields, protective barriers or insulating materials as necessary shall be provided. If employees are subject to handle long dimensional conductor objects (ducts or pipes), steps for safe work practices shall be listed in the job hazard analysis. If portable ladders are to be utilized the may only be constructed of fiberglass

Conductive items of jewelry or clothing shall not be worn unless they are rendered non-conductive by covering, wrapping or other insulating means.

O. **Lockout/Tag out:** Machines and equipment may be exposed to unexpected release or start up from more than one source. Conductors and parts of electrical equipment that have been de-energized but not been locked or tagged out shall be treated as live parts. A careful check must be accomplished. A job Specific Lockout/tag out procedure will be completed as part of a Job Task Safety Analysis.

P. **Communication:** The Foreman will advise Modern Electric Co. employees that a lockout procedure will be required. The specific procedure (locking, tagging, etc.) will be communicated as well as the potential release hazard and magnitude. Unqualified personnel shall maintain a 10 feet approach distance and all unauthorized personnel shall be restricted from the work area. Barricades and signage shall be in place for this purpose. Vehicle and other mechanical equipment shall be restricted from the area until authorized by the Qualified Person. For qualified approach distances see table S5:

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Q. **Equipment Preparation:**

1. Shutdown of Equipment: Client owned equipment, Modern Electric Co. equipment, or subcontractor supplied equipment in use by the client will not be shut down by Modern Electric Co. employees without the express permission of the client designated representative and the Modern Electric Co. Foreman. If shutdown is performed by anyone other than the effected worker zero energy must be physically verified prior to the start of work.

Shutdown Sequence:

a) Shutdown the equipment/process by normal procedures.
b) Locate the necessary energy isolating device(s) for the equipment/process and operate them to isolate energy sources and affix lockout/tag out devices.

R. **Preparation:**

1. Relieve all stored or residual energy and take appropriate measures to ensure energy does not re-accumulate and affix a lockout/tag out device as necessary.

2. Ensure that other employees are not exposed and verify that energy isolation and release of stored energy have been accomplished.

(1) Check bleeders for pressure or flow or material.
(2) Operate push or start buttons. After pushing start buttons, push stop button.

3. If the machine or equipment is effectively locked out, maintenance or servicing may begin.

4. Before an authorized or affected employee turns off a machine or equipment, the authorized employee shall have knowledge of the type and magnitude of the energy to be controlled, and the methods or means to control the energy.

S. **Return to Service:**

1. Modern Electric Co. employees will not return client equipment, Modern Electric Co. or subcontractor equipment in use by the client to service without the express approval of the client designated representative and the Modern Electric Co. Foreman.

a) *Replace all guards' safety devices; remove all personnel, tools, and equipment. Remove all personally installed lockout and tag out devices.*

b) *Notify the client-designated representative and Modern Electric Co. Foreman that servicing or maintenance has been completed.*

T. **Lockout/Tag out Device Removal by Employer:** Removal of lockout/tag out devices by someone other than the installer will be accomplished under the following conditions:

1. The Foreman must establish, by contacting the employee, that all servicing and maintenance has been completed.

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2. The Foreman must confirm that all bleeders, blocks, and switches are closed or in the off position.

3. The Foreman must insure that all guards and safety devices are removed and all personnel, tools, and equipment are removed from the area.

4. The Foreman may remove the lockout/tag out device.

5. The Foreman must notify the client-designated representative that servicing and maintenance has been completed.

6. The Foreman must investigate and document the removal and cause for removal.

U. **Group Lockout Procedures**: If more than one person is involved in the lockout of equipment, the following procedure will apply:

1. If an energy lockout device is not capable of accepting multiple locks or tags, a multiple lock out, or tag out device will be used.

2. If a lockout device is to be used, a single lock may be used to lockout the machine or equipment. The key must be placed in a lockout box or cabinet that allows the use of multiple locks to secure it. Each employee will lock the box or cabinet with their individual lock and remove it as their work is ended.

3. When lockout/tag out devices must be temporarily removed to test equipment, the following must be completed, documented, and verified by the foreman:

a) *Clear away all tools*
b) *Remove LOTO device*
c) *Energize and test*
d) *De-energize and reapply LOTOI devices*
e) *Remove employees*

V. Authorized Employee: The authorized employee should ascertain the exposure status of individual group members. Each employee shall attach a personal lockout or tag out device to the group's device while he/she is working and then removes it when finished. The authorized employee will designate someone on the next shift to be in charge of the lockout and shall be entrusted with a key. Documentation of the people in charge shall be kept.

II. Requirements for Electrical Lockout/Tag-Out

A. **OSHA References**: 29 CFR 1910.147, 29 CFR 1910.333, 29 CFR 1926.417

B. **Electrical Lockout/Tag out**: Live parts to which an employee may be exposed must be de-energized before the employee works on or near them, unless an additional hazard may be created, or it is not feasible due to equipment design or operational limits. Live parts that operate at less than 50 volts to ground need not be de-energized if there will be no increased exposure to electrical burns or explosion due to electric arcs. 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 out or both in the following order.

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1. Safe procedures for energizing circuits and equipment shall be followed.

2. The circuits and equipment to be worked on shall be disconnected from all electric energy sources.

3. Control circuit devices such as push buttons, selector switches and inter-locks will not be used as the sole means for de energizing equipment

4. Interlocks will not be used as a substitute for lockout and tagging.

5. Stored electric energy must be released. Capacitors must be discharged and high capacitance elements must be short-circuited and grounded, if the stored electric energy might endanger personnel.

6. Stored non-electrical energy devices that could re-energize electric circuit parts shall be blocked or relieved to prevent accidental energizing of the circuit by the device.

C. **Procedure**: A lock containing employee working on the equipment's name and contact information and tag must be placed on each disconnecting means used to de-energize circuits and equipment on which work is to be performed.

1. The lock must be installed to prevent persons from operating the disconnecting means unless they resort to undue force or the use of tools.

a) Each tag must contain a statement prohibiting the authorized operation of the disconnecting means and the removal of the tag.

b) If a lock cannot be applied or the tagging procedure will provide a level of safety equivalent to the use of a lock, a tag may be used without a lock.

c) A tag used without a lock must be supplemented by at least one additional safety measure that provides a level of safety equal to the use of a lock.

(1) Removal of an isolating circuit

(2) Blocking of a controlling switch

(3) Opening of an extra disconnecting device

(4) A lock may be placed without a tag if:

(a) Only one circuit or piece of equipment is de-energized

(b) The lockout period does not extend beyond one work shift

(c) Employees exposed to the hazard associated with re-energizing the circuit or equipment are familiar with procedure

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(d) It must be verified by a qualified person that the circuit has been de-energized in the following manner:

(i) A qualified person must operate the equipment operating controls or otherwise verify that the equipment parts are de-energized

(ii) A qualified person must use test equipment to test the circuit elements and electrical parts to the equipment and verify that the circuit elements and equipment parts are de-energized.

(iii) Tests must also determine if any energized condition exists as a result of inadvertently induced voltage or unrelated voltage back feed even though specific parts of the circuit have been de-energized and presumed to be safe

(iv) If the circuit to be tested is over 600 volts, nominal, the test equipment must be checked for proper operation prior to and immediately after testing.

(5) Prior to re-energizing equipment, the following requirements must be met, even if the circuit of equipment is to be temporarily energized.

(a) A qualified person must conduct tests and visual inspections to verify that all tools, electrical jumpers, shorts, grounds and other devices have been removed.

(b) Employees exposed to the potential hazards from re-energizing the circuit or equipment must be warned to stay clear of the circuits and equipment.

(c) The employee who installed it must remove each lock and tag. If the employee who installed the tag or lick is absent, the lock may be removed by a qualified person designated by the foreman provided.

(i) The foreman ensures that the employee who installed the lock or tag is not available at the site

(ii) The foreman ensures that the employee who installed the lock or tag is made aware that the lock or tag has been removed before that individual resumes work at the workplace.

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(d) A visual determination must be made that all employees, tools, electrical jumpers, shorts, grounds and other devices have been removed.

(e) The only electrical circuits and electrically powered equipment which no not have to be locked and tagged are:

(i) Lighting circuits for the purpose of re-lamping, unless the removal of a broke lamp base is required.

(ii) Circuits of less than 50 volts

(iii) Circuits that must remain energized to accomplish the task, e.g., electrical troubleshooting

(iv) Electrically driven hand tools, office equipment and portable electrical equipment supplied power by cord and plug do not require lock out if the plug is disconnected and in full view of the employee servicing the equipment.

Only qualified persons may work on electric circuit parts or equipment that has not been de-energized. Such persons shall be made familiar with the use of special precautionary techniques, PPE, insulating & shielding materials and insulated tools and minimum approach distances (see table):

TABLE S-5 - APPROACH DISTANCES FOR QUALIFIED EMPLOYEES - ALTERNATING CURRENT

Voltage range (phase to phase)	Minimum approach distance
300V or less	Avoid Contact
Over 300V, not over 750V	1 ft 0 in (30.5 cm)
Over 750V, not over 2kV	1 ft 6 in (46 cm)
Over 2kV, not over 15kV	2 ft 0 in (61 cm)
Over 15kV, not over 37kV	3 ft. 0 in (91 cm)
Over 37kV, not over 87.5kV	3 ft 6 in (107 cm)
Over 87.5kV, not over 121kV	4 ft 0 in (122 cm)
Over 121kV, not over 140kV	4 ft 6 in (137 cm)

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SECTION 7

CONFINED SPACE ENTRY

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I. Confined Space Entry Policy

The Modern Electric Co. Policy and procedures for confined space entry are mandated for use an all Modern Electric Co. work sites. If a client-approved policy exists, that meets or exceeds the Modern Electric Co. Policy; the client's policy shall be followed. A copy of this policy shall be maintained at the work site

A. **OSHA References**: OSHA 29 CFR 1910.146, OSHA 29 CFR 1926.21, OSHA 29 CFR 1926.352, OSHA 29 CFR 1926.353, OSHA 29 CFR 1926.651, OSHA 29 CFR 1926.956

B. **Definitions:**

1. **Confined Spaces**: A Confined Space is a space that is large enough and so configured that an employee can bodily enter and perform assigned work and has limited or restricted means for entry or exit (e.g., tanks, vessels, silos, storage bins, hoppers, vaults, and pit that are spaces that may have limited means of entry) and is not designed for continuous employee occupancy.

2. **Entry into Confined Space**: Entry means the action by which a person passes through an opening into a confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

3. **Permit-Required Confined Space**: A permit-required confined space means a confined space that has one or more of the following characteristics:

a) It contains or has a potential to contain a hazardous atmosphere

b) It contains a material that has the potential for engulfing an entrant.

c) It has the internal configuration that could trap an entrant or asphyxiate an entrant by inwardly converging walls or by a floor, which slopes downward and tapers to a small cross section.

d) It contains any other recognized serious safety and health problems.

4. Permit-Required Confined Space Program: A permit- required confined space program is the employer's overall program for controlling and protecting employees from permit-required confined space hazards and regulating employee entry into permit-required confined spaces

5. Non-Permit Confined Spaces: A non-permit required confined space is a confined space that does not contain, or with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

C. **Designation**: It is the policy of Modern Electric Co. that specific employees will be designated as Entry Supervisor, Attendant and Confined Space Entrant. Furthermore, employees who have not been trained, qualified and designated will not perform duties associates with the previous listed titles.

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D. **Training:** Training will be provided in the hazards of confined space entry, the confined space entry policy, and the procedures for permit- required and non-permit required confined space. Entry Supervisors, responsible for hazardous atmospheric testing will be trained and qualified in the use of gas detection equipment and the interpretation of the data. Certificates for all entrants, attendants, and supervisors involved in confined space operations shall be at each project site where confined space entries are taking place or readily available.

Each affected employee must be trained prior to initial assignment, prior to a change in assigned duties, if a new hazard has been created or special deviations have occurred.

Modern Electric Co. must certify that the required training has been accomplished. The certification shall include employee name, trainer signature/initials, and dates of training. Certification must be made available to employees & their authorized representative

E. **Violations:** Violations of the Confined Space Entry Policy and the Permit- Required and Non-Permit Required Confined Space Entry procedures will not be tolerated**.**

II. Permit Required Confined Space Entry Procedure

A. **OSHA Reference**: 29 CFR 1910.146, 29 CFR 1926.21(b)(6)(i) thru (ii)

B. **General**: If the client or Modern Electric Co. has determined a confined space to be a permit-required confined space, the following procedure will apply. If the client procedures meet or exceed this procedure, the client procedure will be used. All permits will be retained for a one-year period and evaluated by the corporate safety representative to review and improve on future confined space entry policies and procedures. Review process to include and not limited to the following:

1. Any and all unauthorized entry of a confined space
2. A hazard not covered by the permit
3. Occurrence of an injury or near miss
4. Employee complaints

C. **Qualifications:**

1. **Entry Supervisor**: MEC employees assigned to entry supervisor duties must be trained and qualified in Modern Electric Co. and Client confined space procedures. Unless specifically designated by Modern Electric Co., no employee will assume the duties of Entry Supervisor. Certification of training in hazardous atmosphere testing equipment must be obtained.

2. **Attendant (Safety Observer)**: The attendant (safety observer) must be trained, qualified and designated by to perform the duties of an entry attendant. Note: One attendant is typically required for each specific Confined space; attendants are not authorized to attend multiple confined space entries unless specific provisions are made prior to entry.

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3. **Authorized Entrants**: Entrants into confined space must be trained, qualified and authorized by Modern Electric Co.

D. **Duties of Entry Supervisor:**

1. The Entry Supervisor must know the hazards faced during entry, including information on the mode, signs and symptoms and consequences of exposure. An SDS or Similar written material must be kept at the work site for any material to which the authorized entrant may be exposed.

2. The Entry Supervisor must verify that the appropriate entries have been made on the confined space entry permit and that all specified tests have been conducted.

3. Verifies by checking that all procedures and equipment specified by the permit are in place before signing the permit and allowing entry.

4. Terminates the entry and cancels the permit if the confined space hazard or conditions outside the confined space pose a hazard to the entrants.

5. Verifies that rescue services are available and that the communication with rescue services is readily available.

6. Removes unauthorized individuals who enter or who attempt to enter the confined space.

7. Reviews the confined space operation at intervals dictated by the hazard and the operation to insure compliance with this policy

8. Determines when responsibility for a permit space entry operation is transferred.

9. Reviews the permit required confined space work, prior to commencement with the attendant, entrants and the client designated representative.

10. Designates qualified individuals to act as entrance and attendants

11. Monitor the space and inform the entrants of the potential hazards and results; they must participate in the permit review and signing. Ventilation must be used and testing must be conducted before entry and during work.

E. **Duties of Attendant:**

1. The attendant must know the hazards that may be faced during entry, including information on the mode, signs, symptoms, and consequences of exposure.

2. The attendant must be aware of possible behavioral effects of hazard exposure in authorized entrants.

3. The attendant must maintain an accurate count of authorized entrants in the permit space and ensure that the entrants are properly identified and authorized on the permit.

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4. The attendant must insure, by head count, that all authorized entrants have departed the confined space prior to closing out the permit or departing the confined space.

5. The attendant will contact emergency responders utilizing 9-1-1 if the attendant feels the entrants may need assistance to escape from hazards or may have displayed the effects of the hazards of the confined space.

6. The attendant will prevent unauthorized entry to the confined space.

7. The attendant will not attempt to rescue by entry into the confined space. Non-entry rescue attempt only is allowed.

8. The attendant will not vacate the area, for any reason, or perform any duty, which would prevent or inhibit the ability to communicate with the entrants.

9. The attendant will evacuate the confined space if:

a) The attendants detects a condition outside (e.g. an alarm, leak, etc.) which may endanger the entrants or any alarm condition on continuous monitoring equipment

b) The attendant detects a behavioral or symptomatic change in the entrant(s).

c) The attendant must leave the site or cannot comply with all the duties listed in this section.

d) The attendant cannot effectively communicate with the entrants.

e) The attendant is advised to vacate the confined space by a client representative or Modern Electric Co. Supervisor.

f) The attendant determines that the entrant (s) is (are) not complying with personal protective equipment practices or safe work practices.

F. **Duties of the Authorized Entrant:**

1. The authorized entrant must know the hazards that may be faced during entry, including information on the mode, signs and symptoms and consequences of the exposure. (See A-1)

2. Properly use protective equipment and monitoring devices as specified.

3. Establish and maintain open communications with the attendant.

4. Alert the attendant if the entrant detects a prohibited or hazardous condition.

5. Alert the attendant and other entrants if the entrant notices any warning sign or change in behavior or symptom of exposure in any other entrant. The entrant will notify the entry supervisor of the condition changes. The supervisor will then cancel the existing permit and re-evaluate the space.

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6. The entrant will immediately take action to evacuate the confined space if the entrant:

a) Is directed to do so by the attendant, entry supervisor or designated client representative.

b) Detects a failure to comply with personal protective equipment requirements.

c) Is unable to maintain effective communication with the attendant.

d) Detects any condition noted in items (B.4 and 5).

e) Detects any alarm on continuous monitoring equipment

G. **Duties of the "Host" Employer or Client**: The host employer will provide qualified rescue service personnel as prescribed by OSHA 29 CFR 1910.146(k). This must be discussed with Modern Electric Co. designated representative and procedures to contact rescue organizations must clearly be established. The host employer will be responsible for the issuance of confined space entry permits and providing Safety Data Sheets for hazardous materials previously stored or present in the confined space.

IMPORTANT NOTE: IF THE PERMIT REQUIRED CONFINED SPACE IS EVACUATED FOR ANY REASON, MODERN ELECTRIC CO. EMPLOYEES WILL NOT RE-ENTER THE CONFINED SPACE WITHOUT DETERMINATION OF THE CAUSE AND ELIMINATION OF THE HAZARD TO THE SATISFACTION OF THE AUTHORIZED ENTRY SUPERVISOR, ATTENDANT, ENTRANTS AND CLIENT REPRESENTATIVE. RETURN TO FULL COMPLIANCE WITH THIS PROCEDURE OR CLIENT ESTABLISHED PROCEDURE IS REQUIRED BEFORE ENTRY CAN RESUME. ALL EMPLOYEES OR THEIR REPRESENATIVES ARE ENTITLED TO REQUEST ADDITIONAL MONITORING AT ANY TIME THEY DEEM NECESSARY OR APPROPRIATE.

H. **Personal Protective Equipment**: The following personal protective equipment must be used for entry into permit-required confined space, unless it can be clearly established that the retrieval equipment will increase the overall risk of entry or would not contribute to the rescue of the entrant.

1. Each authorized entrant shall 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.

2. Wristlets may be used in lieu of the chest or full body harness if the employer can establish that the full body harness or chest harness is not feasible or creates a greater hazard and that the wristlets are the safest and most effective means of retrieval.

3. The retrieval line must be attached to a mechanical device or fixed point outside of the confined space in a manner that would allow immediate non-entry rescue by the attendant or rescue response.

4. A mechanical retrieval device must be available to retrieve entrants from a vertical confined space more than 5 feet deep.

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I. **Rescue Services and Retrieval Equipment**:

1. **Rescue Services**: The host employer shall identify qualified rescue services as their main means of rescue to be utilized in the event of an emergency. The name and method of contacting rescue services shall be clearly identified on the confined space permit. Response time for rescue arrival on site should be identified prior to start of work. The rescue services shall have the opportunity to examine the entry site and be trained in performing confined space rescue and shall have practiced a rescue situation within the last 12 months. The rescue service will have the opportunity to decline service. Rescue services are required to be on site in cases of IDLH entries.

Employees will not attempt a rescue by entering the confined space unless specifically trained, designated and authorized in writing by the company president and the host employers designated entry supervisor.

2. **Retrieval Equipment**: To facilitate non-entry rescue, retrieval systems or other methods shall be used whenever an authorized 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. The retrieval system should be in place prior to entry and shall meet the following requirements:

3. Each authorized entrant shall 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.

4. The other end of the retrieval line shall be attached to a mechanical device or a fixed point outside the permit space as the rescuer becomes aware that a rescue is necessary. A mechanical device must be available to retrieve personnel from vertical type permit space than 5 feet deep.

J. **Hazardous Material Exposure**: Since exposure to hazardous materials inside a confined space is possible, a copy of the Safety Data Sheet for materials contained, previously contained, or used within the confined space. They shall be posted with a copy of the confined space permit and be available for rescue personnel immediately outside the access point to the confined space

III. Permit Required Confined Space Preparation for Entry

A. Isolation: The confined space must be removed from service and completely protected against the release of energy and material into the space.

B. All energy sources must be locked out.

C. All lines, pipes, hoses, intake vents, ducts, etc., leading to or from the confined space must be broken away in a manner which would prevent intake or through put of hazardous materials or energy: blanked, blinded, or sections removed.

D. Rotating equipment must be de-energized and locked out.

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E. The confined space must be purged, flushed, ventilated, cleaned or inert to eliminate or control the hazardous atmosphere (Note: Inert Atmospheres create a hazard by displacing oxygen with an inert. Special care and ventilation prior to testing and entry must be exercised prior to entry. An SDS must also be provided and kept at the site for chemical-cleaning agents used in confined spaces. Confined spaces purged with steam or cleaned with hot water must be allowed time to cool to acceptable levels prior to the onset of entry).

F. Barriers to prevent pedestrian or vehicle entry, which could pose a hazard to entrants, must be erected.

1. Determine if the cover (if any) can be safely removed by the following:

a) Conduct visual examination for existence of hazards, (e.g. liquid etc.).

b) Test the atmosphere around the cover to determine the presence of hydrocarbons or toxic vapors.

c) Slowly open the cover to insure no existence of pressure, fluids, etc. If possible, atmospheric testing should be conducted.

d) Remove cover and visually inspect from the outside for the presence of hazards

e) Conduct atmospheric testing in this exact manner (NOTE: Ventilation systems must be off for a minimum of 30 minutes prior to testing):

(1) Test atmosphere outside of confined space for oxygen content.

(2) Test atmosphere inside of confined space for oxygen content.

(3) Compare reading, a difference of –1% oxygen content inside of the confined space may represent 10,000 PPM or a toxic material.

(4) Oxygen content must be above 19.5% & below 23.5% for entry.

(5) Test for combustible gases must be below 2% LFL for entry.

(6) Test for toxic gases or vapors must read 0 Parts per Million (PPM).

(7) If testing falls outside of the parameters established above, a permit cannot be issued without elimination of hazard and retest.

(8) Entrants or their representatives are to be given an opportunity to review and participate in the review and calibration of air monitoring data before entering.

(9) Entrants must also be given the opportunity to participate in the permit review and signing.

f) Designate attendant & entrants as described in this procedure

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g) Provide all personal protective equipment.

h) Provide ventilation, (Refer to Section on Welding and Burning).

i) All lighting and electrical tools used in confined spaces must be connected to GFCI or reduced to 12 volts.

j) All air-operated tools must be connected to breathing air quality air sources.

k) Discuss job requirements, emergency procedures and hazards with entrants, attendants and client-designated representatives. Secure / issue proper confined space entry permit and appropriate work permit for confined space work (if required by client). Note: In spaces where multi employers are working in the same space, all of the above information will be discussed with those individuals entering the space and information gathered/discussed as to their purpose of entering the space. If for any reason it would increase the hazards to employees entering the space an effort to schedule different entry periods will be made.

l) Post copies of the permits; permit required confined space entry procedure, SDS and emergency procedures plan at the work site

m) A permit required confined space may be declared and certified as a non-permit required confined space by following the procedures outlined in the Non-Permit Required Confined Space Procedure.

n) Periodic hazardous atmosphere monitoring will be conducted and logged on the confined space entry permit form.

o) If the confined space is vacated, unattended, or recovered, visual inspection and re-testing of the space for hazardous atmosphere must be conducted.

p) **Caution:**

(1) Hazards such as welding fumes, electrical shock, flammable and toxic vapors may be introduced to the confined space by work in the confined space.

(2) Welding and cutting torches may not be left on and unattended. The source must be isolated prior to departing the confined space.

(3) Adequate ventilation must be provided for welding, cutting, and burning work inside of confined spaces.

(4) Employees or their representatives are entitled to request additional monitoring at any time.

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IV. Non Permit Required Confined Space Entry Procedure

A. **Determination of Permit-Required or Non-Permit Required Confined Space**: In most cases, our clients have previously determined permit- required and non-permit required confined spaces. For permit-required confined spaces, the employer must inform all exposed employees by posting signs or by any other effective means, of the existence and location of the danger posted by the permit-required space.

Modern Electric Co. employees must consider all confined spaces meeting the definition of a confined space as a permit-required confined space, until a determination has been made by a trained, competent entry supervisor (e.g., client designated individual, Modern Electric Co. Foreman or Site Supervisor).

Modern Electric Co. employees shall not enter the confined space until a determination has been made. Certification of non-permit required confined space determination will be provided to the Modern Electric Co., employees assigned to enter and must be kept at the job site. Under no circumstances shall Modern Electric Co., employees enter a Permit-Required Confined Space without a properly issued permit for entry and work will not begin in the permit-required confined space until additional appropriate permits, e.g. hot work, have been issued.

B. The following steps must be taken and the attached form be completed in determining the status of the confined space by the Modern Electric Co. Entry Supervisor

1. Entry covers must be SAFELY removed.

2. A visual inspection, if possible, without entry must be performed to establish the absence of recognized hazards.

3. Install proper railing or temporary barrier that will prevent accidental fall through the opening.

4. Test internal atmosphere with a calibrated direct reading instrument for the following conditions AIR MOVERS MUST BE TURNED OFF DURING ATMOSPHERIC TESTING AND THE TESTING MUST BE ACCOMPLISHED IN THE EXACT ORDER PRESENTED BELOW.

a) Oxygen content – must be above 19.5% and below 23.5%

b) Test for flammable gases and vapors – must be below 10% flammable limit (LFL).

c) Visually ascertain that no airborne combustible dust is present.

d) Test for the presence of H2S or other toxic contaminants

e) <u>IF YOU ARE IN DOUBT OF RESULTS, CONTACT MEC SAFETY COORDINATOR IMMEDIATELY FOR FURTHER INSTRUCTIONS</u>

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C. The Modern Electric Co. Entry Supervisor must complete the attached form and leave the form at the work site. In the event that multiple sites are involved, each site must be tested and the results posted on the attached forms.

D. Ladders must be provided for egress and entry.

E. A safety observer (attendant) must be assigned with clear communications capability with the non-permit confined space entrants. THE ATTENDANT SHALL NOT ATTEMPT TO RESCUE ENTRANTS WITHIN THE CONFINED SPACE BY ENTERING INTO THE CONFINED SPACE.

F. The attendant must be knowledgeable of how to summon emergency response personnel.

G. Non-Permit Required Confined Spaces that are vacated for a period of 1 hour, recovered for any purpose, or suspected to have any change in atmosphere or condition, must be re-tested and the results annotated on the attached form.

H. Non Permit required confined spaces must be periodically monitored for changes in conditions by the Entry Supervisor, results annotated on the attached form

I. Failure of any re-test or changes in condition required re-classification of confined space as a Permit Required Confined Space and must be noted on the attached form.

J. Modern Electric Co. employees, subcontractors, etc. will be immediately removed from the confined space and the Permit Required Confined Space. Procedures must be allowed.

K. The use of ventilation must always be considered.

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SECTION 8

FALL PROTECTION PROGRAM

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I. Purpose

The purpose of this program is to prevent work-related injuries resulting from falls. The prevention of these incidents will accomplished by the use of fall prevention and fall arrest methods, the training of effected employees and aggressive enforcement by all levels of management. In addition, the fall protection plan shall be prepared by a qualified / competent person for the specified work site prior to the start of the work.

A. **OSHA References**: 29 CFR 1926 Subpart M (500- 503)

B. **Application**: This policy applies to all company employees who may be exposed to fall hazards in the course of their daily activities. This program also applies to non-site personnel, visitors or any individual on site exposed to a fall hazard. Fall protection is required at elevations of 6 ft. or greater for the following work activities.
Examples of areas were employees may have to be protected include but are not limited to the following:

1. Leading edges
2. Hoist areas
3. Holes in walk surface
4. Framework and reinforcing steel
5. Ramps, runways, and other walkways
6. Excavations
7. Working over Dangerous equipment
8. Roofing work on low or steep sloped roofs
9. Precast concrete construction
10. Wall openings
11. Scaffolds
12. Aerial lifts
13. Overhand brick laying

C. **Subcontractor's Plans**: Subcontractor plans will meet or exceed the requirements of this program. Plans must be submitted to the company project manager before beginning work. Plans must identify the person or persons responsible for monitoring the safety of the employees. (Competent person). Site-specific plans must be submitted for any specialized fall protection. In an example:

1. Controlled access zones
2. Warning line system
3. Safety Monitoring System

D. **Responsibilities**: In addition to responsibilities previously outlined in the Site Safety Program, the site safety coordinator or designated competent person for fall protection will be responsible for the training of all effected company employees and enforcement of the company policy). Competent persons must be able to recognize, warn and communicate with employees that may be exposed to a fall. Also, the competent person must be designated and assigned the task and be able to accomplish the following while workers are exposed:

1. Recognize fall hazards

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2. Warn employees if unaware of a fall hazard or is acting in an unsafe manner

3. Be on same working surface and in visual sight

4. Stay close enough for verbal communication

5. Not have another assignment that would take monitors attention from monitoring the function.

E. **Training:** The instructor shall be adequately trained in the fall protection system in use and shall be responsible for training all potentially exposed employees during the new employee orientation. In the event a new system is employed, additional training on this system will commence immediately for all affected employees.

1. Training will include, at a minimum:

   a) The company fall program requirements.
   b) Identification and elimination of fall hazards on the job site.
   c) Safe work in hazardous areas.
   d) Hazards associated with working near fall hazards.
   e) Selection, use, care and inspection of fall protection equipment.

2. All training must be documented in the following manner:

   a) The date of training.
   b) The employees printed name and signature.
   c) The printed name and signature of trainer.
   d) The specific subjects covered in the training session.
   e) Testing results (if any).

F. **Re-training**: When the employer has reason to believe that any effected employee who has already been trained does not have the understanding and skill required under employee training, the employer shall retrain each such employee. Circumstances where retraining is required include:

1. Changes in the work place were previous training is obsolete.

2. Changes in the type of fall protection systems or equipment were previous training is obsolete

3. Inadequacies in an employee knowledge or use of fall protection system or equipment indicate that the employee has not retained the training provided.

G. **Accountability and Enforcement**: All field personnel will be held accountable for the enforcement and compliance with this program. Documented safety inspections, repeat discrepancies, accident investigation and implementation of accident investigation recommendations will provide the criteria for effectiveness of enforcement. Failure to comply with this policy will result in the following:

1. **First offense**: A written warning notice will be issued to the employee or employing subcontractor.

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2. **Second offense**: The employee will be dismissed from the work site.

3. **Subcontractors**: Subcontractors who fail to effectively enforce fall protection requirements or whose employees consistently violate fall protection requirements will be requested to leave the work site for failure to comply with contract requirements

H. **Hazard Identification and Elimination:**

1. Compliance with fall protection requirements will be a mandatory item for all documented safety inspections. Fall protection inspections will focus on the following hazards:

a) Scaffolds
b) Ladders
c) Steel Erection
d) Roofing
e) Floor holes
f) Open sided floors
g) Aerial lifts

2. The hazard identification process shall begin in the pre-bid phase with review of the scope of work, blue prints and drawings. Where feasible, pre-planning will be accomplished to prevent employees from being exposed to fall hazards. The following pre-planning steps must be considered

a) Order and install stairways with the guardrails already attached

b) Request the designer/architect to specify proper anchor points for fall arrest systems.

c) Do not cut opening in the floors or ceilings until the material is being installed, eliminating the need for hole covers. Attach all guardrails on open sided floors before employees are allowed to work on that level.

d) Install stairs, guardrails, and other fall protection equipment early in the construction phase.

e) Require subcontractors to install fall protection systems on horizontal industrial steel prior to installation.

f) Maximize on ground assembly of structure or equipment.

g) Plan for the utilization of aerial lifts for all steel erection and concrete pre-cast erection.

h) Controlled access zones are not allowed for leading edge operation at company locations. The work method employed will include a horizontal lifeline behind the leading edge, designed for multiple employees, with retractable lanyards attached for employees working on the leading edge. Equipment used will not allow employee to travel into the fall zone of a leading edge

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3. When no other above mentioned methods have been implemented, a safety monitoring system shall be put in place.

I. **Conventional Fall Protection**:

1. **Guardrails**: Guardrail systems incorporate a top rail at 42 inches, plus or minus 3 inches above the working platform, mid-rail and toe board. On all company projects, guardrails will be constructed of 2" X 4" construction grade lumber with posts no more than 8 feet on center; ¼" or greater wire cable, flagged every 6 feet with high visibility material; or 1.5 inch nominal diameter schedule 40 pipe with posts spaced no more than 8 foot on center. All guardrails shall be capable of supporting a 200-pound force in any direction with a maximum deflection of 3 inches. These guardrails will be placed in the following areas:

a) All stair systems.
b) All open sided floors.
c) Around all holes which are too large for hole covers.
d) On all elevator shaft openings.
e) On all excavations over six feet in elevation.
f) All scaffolding with working platforms over 6 feet.

2. Safety Nets: Safety nets will be used only during steel erection activities, when working over water and on unique projects when other conventional systems (such as guardrails, hole covers, etc.) are not feasible. In the event safety nets are employed, the following guidelines will be used.

a) Nets will be installed as close as possible under walking/working surface, but in no case will an employee be exposed to a fall of greater than 30 feet.

b) Safety nets will extend outward from the outer most edge of the work surface in the following manner.

Fall Distance	**Extension**
Up to 5' fall	8 foot
More than 5' to 10' fall	10 foot
More than 10' (does not exceed 30')	13 foot

c) Nets shall be installed in a manner that will prevent an individual from striking any object below the net.

3. Nets will be installed, tested and inspected by a competent person. All nets will be initially drop tested with a 400 pound bag of sand as specified in the OSHA standard and tested each week thereafter. Results of the tests will be documented. Where tests are not feasible, a competent person must certify the compliance of the net.

4. Site safety personnel will inspect nets each day. Results of inspections shall be documented.

5. Nets will be inspected after any occurrence, which could affect its integrity, such as a steel member falling into the net or shock loading due to a fall.

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6. Any materials, tools, scrap or equipment that falls into the net must be removed as soon as possible, but no later than the end of the work shift.

7. Safety net design and connections shall comply with OSHA standards and manufacturers recommendations.

8. Nets that are found to be out of compliance will be immediately identified and no work will be performed until the compliance issues are resolved.

J. **Hole Covers**: A hole is defined as a gap or void 2 inches or more in its least dimension in a floor, roof or other walking /working surface. Employees must be protected from falling into or through holes, including skylights that are 6 feet or more above lower levels. Where holes exist, they must be equipped with guardrail systems as described above or covered with a hole cover as described below:

1. Hole covers will be capable of supporting two (2) times the maximum intended load. (For roadways and vehicles, two times the maximum axle load of the largest vehicle expected to pass).

For plywood hole covers, the minimum requirement is ¾ CDX plywood.

2. All covers must be secured when installed so that wind, equipment or employees will not displace them.

3. All covers must have the words “DANGER – HOLE COVER” written on them in high impact, durable color.

4. All covers must be installed to eliminate any tripping hazard.

K. **Personal Fall Arrest System/Equipment:**

1. Harness and Lanyard: Only 4-point suspension harness and shock absorbing lanyards shall be used. Lanyards shall be equipped with locking snap hooks.

a) The designated competent person shall inspect equipment at time of issue and periodically throughout project. The using employee shall inspect for defect and condition prior to use and on return after use. Damaged or defective equipment shall be tagged and removed from the work site or destroyed and disposed. Shock absorbing lanyards and harness that have experienced a shock load; pitting, chaffing, burn holes or chemical exposure shall be immediately destroyed and disposed to prevent accidental use

b) All harnesses shall be properly fitted and worn. Equipment users shall be trained and instructed in the proper selection, care, use and inspection of fall protection equipment.

c) Caution shall be used in selection of all fall protection equipment to ensure the proper length and application. Swing distance shall be considered when selecting connection points and lanyard or tether length.

d) Fall protection anchor points shall be capable of sustaining 5000 lbs.

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e) Specifically, engineered slings and or chokers used to provide anchor points for lanyards shall not extend the fall distance beyond 6 feet

Note: All PFAS materials used shall meet or exceed all applicable ANSI and ASTM standards.

2. **Self Retracting Lifelines**:

a) Self-retracting lifelines are part of a complete fall protection system, which automatically limits the free fall distance to 2 feet or less, consists of:

(1) An anchorage point capable of supporting 5000 lbs.

(2) A locking type connector to mount device to the anchorage point.

(3) The self re-tracting lifeline with locking snap hook.

(4) A 4 point suspension harness.

b) The installation of this device shall be directly over the work area.

(1) Attached to an anchor point capable of sustaining 5000lbs.

(2) Attached by locking snap hook to the harness “D” ring in the center of the wearers back.

(3) Only one individual may be attached per unit.

c) Before use, the unit shall be inspected for any indication of damage, wear or malfunction including worn cable or damaged locking snap hook.

(1) Pull approximately four (4) feet of cable out of the housing and allow to retract. Maintain a slight tension on the cable. The cable shall retract smoothly and completely. DO NOT ALLOW THE CABLE TO RETRACT FREELY.

(2) Repairs and adjustments may not be accomplished in the field. Malfunctioning units will be tagged “do not use” and removed from the site immediately. Equipment subjected to a shock load will be tagged and removed from the site immediately.

*NOTE: All PFAS materials used shall meet or exceed all applicable ANSI and ASTM standards

L. **Selection and Installation of Anchorage Points**:

1. The selection of the proper anchorage point is critical to the effectiveness of fall protection. Anchorage points shall be:

a) Capable of sustaining a load of 5000 lbs.

b) Located equal to or above the point of operation.

c) Located above the work area to minimize or eliminate “swing” in the event of fall.

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2. Anchorage points should be identified and installed prior to lifting and setting equipment in place.

3. Anchorage points selected should be positioned to allow employees to immediately connect fall protection equipment without unprotected travel from anchorage point to anchorage point

M. **Personal Fall Restraint System**: A fall restraint system physically restricts or stops the fall before it occurs. For example, a harness with a cable attached, which is short enough to halt the employee before they step over an open-sided floor is considered a fall restraint system. Fall restraint systems will meet the same requirements of the positioning system and personal fall arrest system. The anchorage point, however, must be capable of supporting 200 lbs.

N. **Positioning System:** Positioning systems shall conform to the following provisions:

1. Positioning devices shall be rigged to prevent a free fall more than 2 feet.

2. Shall be secured to anchorage capable of supporting at least twice the potential impact load of an employee's fall or 3000 lbs, whichever is greater.

3. Connectors shall be equipped with locking snap hooks and sized to be compatible with the member to which they are connected.

II. Floor and Wall Openings

Slips, trips and falls are well known causes of workplace injuries. These injuries occur when employees fall through floor opening/sand wall openings. This section provides general guidelines for guarding off floor and wall openings. It is not possible, however, to cover all potential areas of concern. The OSHA Standard, other sections of barricading, housekeeping, etc. in this manual and our client procedures are additional resources and should be consulted.

A. **General:**

1. All workplaces, passageways, storerooms and service rooms must be kept clean and orderly and in a sanitary condition.

2. Floors must be maintained and drainage, platforms or mats must be provided for wet surfaces

3. Floors must be free from protruding nails, splinter, holes, loose boards, etc.

4. Aisles and passageways must allow sufficient safe clearances for handling equipment, e.g. forklifts, hand trucks, pallet jacks, etc. They must be kept clear and in good condition.

5. Permanent aisles and passageways must be marked.

6. Cover and guardrails must be provided for open pits, tanks, vats, ditches, etc.

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7. A load placed on any floor, roof, or other structure greater than that approved by the building official or indicated on the load approval plates installed on the facility.

B. **Guarding Floor Openings and Holes**:

1. All floor openings large enough for an employee's foot to enter must be covered.

2. Stairway floor openings must be guarded with standard railings.

3. Ladder way openings or platforms must be guarded by a standard railing and toe board on all exposed sides.

4. Entrances to ladders from platforms or ladders from platforms must be guarded by a swinging gate or offset to prevent walking into the opening.

5. Hatchways and chute openings must be guarded by hinged floor coverings or removable railing with toe boards.

6. Hatchways equipped with hinged covers must be guarded when open.

7. Skylight floor openings and holes must be guarded by standard screens or railings.

8. Pits and trap door openings must be guarded by covers. When the cover is open, a person must constantly guard the hazard.

9. Manhole openings must be guarded by covers. When the cover is open, a person must constantly guard the hazard.

10. Temporary opening guarded must be guarded by a person in attendance.

11. Floor holes with fixed machinery must be protected so that there is no opening greater than 1 inch.

12. Platform doors or gates that open directly on stairways must not reduce the effective platform width to less than 20 inches.

C. **Wall Openings (30 Inches High and 18 Inches Wide):** These guidelines apply to wall openings with a drop of four (4) feet or more.

1. Openings must be guarded by rail, fence, barrier, and a removable toe board.

2. A grab handle will be provided on each side of the opening approximately four (4) feet above the floor.

3. Guards must be provided for extension platforms.

4. Chute wall openings must be guarded.

5. Window openings with a drop of over four (4) feet and less than three (3) feet above the platform must be guarded with standard grills or slats.

6. Temporary wall openings must be guarded.

7. If materials can fall through wall holes, toe boards or screens must be provided.

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D. **Open-Sided Floors, Platforms and Runways**: These guidelines apply when the open sided floor, platform or runway is four (4) feet or above ground.

1. Standard railing must be provided.

2. Toe boards must be provided if persons can pass beneath the opening, moving machinery is beneath the opening, or equipment is in a position that would create a hazard if contacted by falling materials.

3. Special purpose runways used for oiling, etc., over 18 inches wide, may by guarded on one side only when all other hazards are guarded against.

4. Standard railings must be provided above dangerous equipment.

E. **Stairways, Railings and Guards**: Stairs with four or more risers must be provided with protection.

1. Stairs with a width of less than 44 inches must be provided with a handrail on the right side descending for enclosed stairs.

2. Stairs with a width of 44 inches must be protected on the open side.

3. Stairs of less than 44 inches must be protected on both sides when both sides are open.

4. Stairs of more than 44 in. and less than 88 in. must be protected on each side.

5. Stairs of more than 88 inches in width must be protected on each side and in the middle.

6. Winding stairs must be constructed so that the handrail prevents walking on tread with a width of less than 6 inches.

F. **Standard Railings:**

1. Standard railings consist of a top rail, intermediate rail (approximately halfway from surface to top rail), and posts and must be no higher than 42 inches.

2. Stair railing must not have a vertical height of more than 34 inches nor less than 30 inches.

3. Wood railings must be 2 inches by 4 inches and span must be six feet or less.

4. Pipe railings must not be less than 1 and ½ inches in diameter and the span must not be more than eight feet on center.

5. Structural steel railings must be 2 inches by 2 inches by 3/8 inches and span more than 8 feet on center.

6. Anchoring must be capable of withstanding 200 pounds applied to the top rail of approximately all railways.

7. Other acceptable railing must have a smooth-surfaced top rail, 200 pounds capacity and provide for equipment protection.

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G. **Toe Boards**: Must be four inches in vertical height, and no more than ¼ inch clearance from the floor. NOTE: More vertical clearance must be provided if materials are to be stacked above the toe board.

H. **Handrails:**

1. Attachments to handrails must offer no obstruction to the user.
2. They must furnish an adequate handhold.
3. They must present no projection hazards into the walking or working area.
4. The height of handrail must not be more than 34 inches nor less than 30 inches.
5. Handrails must be capable of withstanding a 200-pound force.
6. Wood handrails must be 2 inches in diameter.
7. Pipe handrails must be 1 and ½ inches in diameter.
8. All handrails must provide a 3-inch clearance from any object or wall.

I. **Floor Opening Covers:**

1. Trench/conduit covers in roads must withstand rear axle load of 20,000 pounds.
2. Manhole covers must withstand 20,000 pounds.
3. Covers must not project more than 1 in. above floor and no more than 30° angle.
4. Sky light screens must be capable of withstanding a 200 pound load.
   a) Must be installed to prevent deflection to break glass.
   b) The grillwork opening must not be more than 4 inches
   c) Slat work openings must not be more than 2 inches.
5. Wall opening rails must be capable of withstanding 200-pound load.

J. **Fall Protection Equipment**: All employees working in areas described in the preceding paragraphs and not protected in prescribed manner must be equipped with fall protection harness and lanyard. Care must be exercised in selection of shock absorbing lanyards to insure the proper length.

K. **Replacement of Railings and Coverings**: All rails, covers, etc., removed for equipment installations will be immediately replaced. In no event shall a floor or wall opening be left unattended or unguarded in the appropriate manner.

L. **Accident Reporting**: All accidents and serious incidents (near misses) must be reported immediately to the Site Supervisor. The Competent Person shall investigate; implement changes to the fall protection plan as necessary. The changes shall be communicated to all employees.

Modern Electric Co. shall provide for prompt rescue of employees in the event of a fall or shall assure employees are able to rescue themselves.

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SECTION 9

POWERED INDUSTRIAL TRUCKS

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I. Purpose

These procedures will be followed by all MEC employees who drive powered industrial trucks will follow these procedures. For additional information, employees should consult the above reference OSHA standards and client procedures.

A. **OSHA References**: 29 CFR 1926.602 REF: 29 CFR 1910.126

B. **General:**

1. All powered industrial trucks will be inspected daily by the operator, prior to use Discrepancies will be noted and vehicles will not be operated until repairs are made.

2. Lift trucks, stacks etc. will have the rated capacity clearly posted on the vehicle so as to be clearly visible to the operator.

3. Only trained and certified personnel will be able to operate Powered Industrial trucks. (Employers is required to certify all authorized employees regarding competency on all types of equipment)

4. If two or more trucks in unison lift a load, the total load carried by any one truck shall not exceed its load.

5. All Powered Industrial Trucks used will meet the inspection, design, construction, stability, maintenance and operations as stated in ANSI B56.1-1969.

C. **Training Requirements**: Modern Electric Co. will have a qualified trainer that has the knowledge and ability to teach and evaluate operators certify all employees who operate a powered industrial truck have been trained in accordance with 29 CFR 1910.178 requirements, which include: (each certification will list Operators name, date trained, date evaluated, and the name(s) of the Trainer & Evaluator, as well as the equipment the employee is authorized to operate)

1. Formal instruction (lecture, discussion, videos, & written materials).

2. Practical exercises (instructor demonstrations & trainee exercises).

3. An evaluation of operators' performance in the workplace. (critique).

D. **Training Program Content**: Power industrial truck operators shall receive initial training in the following topics:

1. Operating instructions, warnings, and precautions for the types of truck the operator will be authorized to operate.

2. Differences between the truck and the automobile.

3. Truck controls and instrumentation; where located, what they do, and how they work.

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4. Engine or motor operation.

5. Steering and maneuvering.

6. Visibility (including restrictions due to loading).

7. Fork and attachment adaption, operation and use limitations.

8. Vehicle capacity.

9. Vehicle stability.

10. Vehicle inspection and maintenance that the operator will be required to perform.

11. Refueling and/or charging and replacement of batteries.

12. Operating limitations.

13. Any other operating instructions, warnings or precautions listed in the operator's manual.

14. Workplace-related topics.

15. Surface conditions where the vehicle will operate.

16. Composition of loads to be carried and load stability.

17. Load manipulation, stacking and un-stacking.

18. Pedestrian traffic in areas where the vehicle will operate.

19. Narrow aisles and other restricted places where the vehicle will operate.

20. Hazardous (classified) locations where the vehicle will operate.

21. Ramps and other sloped surfaces that could affect the vehicles stability.

22. Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause a buildup of carbon monoxide or diesel exhaust.

23. Other unique or potentially hazardous environmental conditions in the workplace that could affect safe operations.

E. **Refresher Training**: Modern Electric Co. will provide refresher training to the operator every three (3) years or:

1. The operator has been observed operating the vehicle in an unsafe manner.

2. The operator has been involved in a near miss incident.

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3. The operator has received an evaluation that reveals that the operator is not operating the truck safely.

4. The operator is assigned to operate a different truck.

5. A condition in the workplace has changed.

II. Safe Operating Procedures

A. **Truck Operations**:

1. **Standing:** Trucks shall not be driven up to anyone standing in front of a bench or other fixed object.

2. **Raised loads**: No person shall be allowed to stand or pass under the elevated portion of any truck, whether loaded or empty

3. **Passengers**: Unauthorized personnel shall not be permitted to ride on powered industrial trucks. A safe place to ride shall be provided where riding of trucks is authorized.

4. **Keep arms** in: The employer shall prohibit arms and legs from being placed between the up rights of the mast or outside the running lines of the truck.

5. **Unattended Trucks**:

a) When a powered industrial truck is left unattended, load engaging means shall be fully lowered, controls shall be neutralized, power will be shut off, and brakes set. Wheels shall be blocked if the truck is parked on an incline.

b) A powered industrial truck is unattended when the operator is 25 ft. or more away from the vehicle, which remains in his/her, view, or whenever the operator leaves the vehicle and it is not in his/her view.

c) When the operator of an industrial truck is dismounted and within 25 ft. of the truck still in his/her view, the load engaging means shall be fully lowered, controls neutralized, and the brakes set to prevent movement.

d) Platforms: A safe distance shall be maintained from the edge of ramps or platforms while on any elevated dock, or platform or freight car. Trucks shall not be used for opening or closing freight doors.

e) Wheel Blocks: Brakes will be set and wheel blocks shall be in place to prevent movement of trucks, trailers, or railroad cars while loading or unloading. Fixed jacks may be necessary to support a semi-trailer during loading or unloading when the trailer is not coupled to a tractor. The flooring of trucks, trailers and railroad cars shall be checked for breaks and weakness before they are driven onto.

f) Headroom: There shall be sufficient headroom under overhead installations, lights, pipes, sprinkler systems, etc.

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6. **Overhead Guard**: An overhead guard shall be used as protection against falling objects. It should be noted that an overhead guard is intended to offer protection from the impact of small packages, boxes, bagged material, etc., but not to withstand the impact of a falling capacity load.

7. **Backrests**: A load backrest extension shall never be used whenever necessary to minimize the possibility of the load or part of it from falling rearward.

8. **Approved trucks**: Only approved industrial trucks shall be used in hazardous locations.

9. **Personnel Lifting**: Whenever a truck is equipped with vertical only, or vertical and horizontal controls within the lifting carriage or forks for lifting personnel, the following additional precautions shall be taken for the protection of the personnel being elevated

a) Use of a safety platform firmly secured to the lifting carriage and/or forks

b) Means shall be provided whereby personnel on the platform can shut off the power to the truck.

c) Such protection from falling objects, as indicated necessary by the operating conditions should be provided.

10. **Fire Exits**: Fire aisles, access to stairways & fire equipment shall be kept clear.

B. **Traveling** – all traffic regulations shall be observed, including authorized plant speed limits. A safe distance shall be maintained approximately three (3) trucks lengths from the truck ahead and the truck shall be kept under control at all times.

1. **Right of way**: The right of way shall be yielded to ambulances, fire trucks or other vehicles in emergency situations.

2. **Passing:** Other trucks traveling in the same direction at intersections, blind spots or other dangerous locations shall not be passed.

3. **View obstructions**: The driver shall be required to slow down and sound the horn at cross isles and other locations where vision is obstructed. If the load being carried obstructs forward view, the driver shall be required to travel with the load trailing.

4. **Railroad crossings**: Railroad tracks shall be crossed diagonally whenever possible. Parking closer than eight (8) feet from the railroad tracks is prohibited.

5. **Clear View**: The driver shall be required to look in the direction of, any keep a clear view of the path of travel.

6. **Grades**: Grades shall be ascended or descended slowly

7. **Stopping**: Under all traveling conditions, the truck shall be operated at a speed that will permit it to be brought to a stop in a safe manner.

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8. **Horseplay**: STUNT DRIVING AND HORSEPLAY SHALL NOT BE PERMITTED OR TOLERATED.

9. **Wet Floors**: The driver shall be required to slow down for wet and slippery floors.

10. **Loose objects**: Running over loose objects on the roadway surface shall be avoided.

11. **Turning:** While negotiating turns, speed shall be reduced to a safe level by means of turning the hand steering wheel in a smooth, sweeping motion, except when maneuvering at a very slow speed, the hand steering wheel shall be turned at a moderate, even rate.

C. **Loading:**

1. **Unstable Loads**: Only stable or safely arranged loads shall be handled. Caution shall be exercised when handling off-center loads, which cannot be centered.

2. **Capacity:** Only loads within the stated capacity of the truck shall be handled.

3. **Long Loads**: Long or high (including multiple-tiered) loads, which may affect capacity, shall be adjusted

4. **Attachments**: A truck equipped with attachments shall be operated as partially loaded trucks when not handling a load.

5. **Load Position**: A load engaging means shall not be placed under the load as far as possible; the mast shall be tilted backwards to stabilize the load.

6. **Tilting**: Extreme care shall be used when tilting the load forward, backward, particularly when high tiering. Tilting forward with load engaging means elevated shall be prohibited except to pick up a load. An elevated load shall not be tilted forward except when the load is in a deposit position over a rack or stack. When stacking or tiering, only enough backward tilt to stabilize the load shall be used.

III. Operation of the Truck

A. **Operation**: If at any time a powered industrial truck is found to be in need of repair, defective, or in any way unsafe, the truck shall be taken out of service until it has been restored to a safe operating condition.

B. **Fuel**: Fuel tanks shall not be filled while the engine is running. Spillage shall be avoided

C. **Spillage**: Spillage of oil or fuel shall be carefully washed away or completely evaporated and the fuel tank cap replaced before staring engine.

D. **Leaks**: No truck shall be operated with a leak in the fuel system until the leak has been corrected

E. **Open Flames**: Open flames shall not be used for checking electrolyte levels in storage batteries or gasoline level in fuel tanks.

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SECTION 10

WELDING, BURNING AND CUTTING

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I. Procedure

Welding, cutting and burning operations are limited to qualified personnel only. Most client locations require the issuance of hot work permits prior to starting welding, cutting and burning operations. Due to the extra ordinary hazard created by these operations, extreme care must be taken during the procedure and pre job setup.

A. **OSHA Reference**: 29 CFR 1926 Subpart J (350 through 354)

B. **Fire Prevention:**

1. Objects to be welded, cut, burned or heated should be moved to a designated safe location when practical.

2. First aid equipment shall be available at all times.

3. If the objects cannot be moved, all fire hazards in the vicinity must be eliminated by removal, cleaning, or containment of sparks, flame and slag, prior to beginning work.

4. Welding, cutting, burning or heating operations must not be performed where the application of flammable paints, compounds or heavy dust accumulation will present a hazard.

5. The proper fire extinguishing equipment and fire watch must be in place prior to the onset of work.

6. Gas supplies to torches must be shut off at a point, (preferably the source) outside of confined spaces.

7. Torches & hoses must not be left in confined spaces and excavations over night.

8. Welding and cutting on used drums is prohibited unless the drums have been properly cleaned and purged of hazardous materials.

9. Hollow spaces, cavities and containers must be vented and purged with an inert gas before preheating, welding or cutting.

10. In areas where either a flammable atmosphere or combustible materials may be present fire watch will be designated and will remain at the operation, plus a ½ hour after completion. The fire watch is required during the following:

a) Locations where other than a minor fire might develop.

b) Combustible materials closer than 35ft. (10.7M) to the point of operation.

c) Combustibles that are 35ft. (10.7M) or more away but are easily ignited.

d) Wall or floor openings within 35ft. (10.7M) radius expose combustible materials.

e) Combustible materials are adjacent to the opposite side of metal partitions, ceilings or roofs.

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Note 1: All persons performing fire watch duties will be trained in the proper use of fire extinguishing equipment and general fire watch duties.

Note 2: If the area has the potential for a flammable or explosive atmosphere, LEL readings shall be continuously monitored with a pre-calibrated instrument for that purpose.

Note 3: If fire hazards cannot be moved or guarded, welding and cutting operations shall not be performed.

f) Hot work permits will be required for all burning, cutting and welding operations by the supervisor or designated safety representative.

C. **Gas Welding, Cutting and Burning:**

1. When transporting gas cylinders, they must be secured on a cradle, sling board or pallet. Choker sling or electric magnets must not be used

2. The cylinders must be secured and transported in a vertical position with the valve protective caps in place.

3. Unless cylinders are firmly secured on a special carrier intended for the purpose, regulators must be removed and protective caps must be in place prior to movement.

4. An approved cylinder truck or chain must be sued to steady the cylinders while in use or storage.

5. The cylinder valve may be opened only when work is being performed.

6. All gas cylinders must be kept away from the actual welding or cutting operation and protected from sparks, hot slag or flames.

7. Cylinders may not be placed where they may become a part of an electrical circuit.

8. Oxygen cylinders must be stored in an upright position, with regulators removed and safety caps installed.

9. Oxygen cylinders must be separated from fuel cylinders by a minimum of 20 feet.

10. All cylinders must be properly labeled with content and hazard warnings.

11. Cylinders must have fixed had wheels, keys, handles or a non- adjustable wrench on the valve stem.

12. Acetylene cylinders must never be opened more than 11/2 turns of the spindle

13. Before connecting a regulator to a cylinder valve, crack the valve open slightly and close to insure tight stop and no leakage. Do not stand in front of the valve when opening.

14. Fuel gas hose and oxygen hose must be easily distinguishable from each other. (Red hose for fuel gases, green hoses for oxygen and non-combustible gases black hose for inert gas and air)

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15. All regulators, hoses, and valves must be kept free and clear of oil and other materials.

16. Parallel sections of oxygen and fuel hose that have been taped together must be taped with not more than 4 inches of tape each 12 inches.

17. Hoses in with noticeable or suspected defect must not be used.

18. All hoses, cables and other equipment must be kept clear of walkways and roadways.

19. Torches must be inspected each day for leaking shut off valves, hose couplings and tip connections.

20. Torches may be lit by friction lighters only.

21. All gauges, valves and pressure regulators must be in proper working order.

22. Cutting, welding and burning may not be performed on surfaces with protective coatings applied without proper breathing zone ventilation or appropriate respiratory protection.

23. Proper protective equipment must be worn when performing welding, cutting or burning.

24. Hoses must not be wrapped around an individual's body.

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

D. **Arc Welding and Cutting:**

1. Employees assigned to operate arc welding equipment must be properly instructed and qualified to operate such equipment

2. SDS for welding rods must be available in the MEC Hazcom Program

3. Positive ventilation must be provided when welding and cutting are performed in a confined space or respiratory protection must be provided.

4. A ground return cable must have a safe current carrying capacity equal to or exceeding the specified maximum output of the arc-welding unit.

5. The frames of all arc welding machines must be grounded either through a third wire in the cable containing the circuit conductor or through a separate wire that is grounded at the source of the current.

6. Gasoline or propane fueled portable welding machines and auxiliary generators must have a positive ground before placing them in service.

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7. Arc welding and cutting operations with must be screened with non-combustible or flameproof screens wherever possible.

8. Use only manual electrode holders specifically designed for arc welding and cutting

9. All current carrying parts must be fully insulated against the maximum voltage encountered to ground.

10. All arc welding cables must be capable of handling the maximum current requirements of the work being accomplished

11. Cables must be equipped with standard insulated connectors of a capacity at least equivalent to that of the cable.

12. Proper eye and face protection must be used when performing arc welding or cutting.

Note 1: All employees assigned arc welding and cutting duties must be familiar with 29 CFR 1910.254, 29 CFR 252 (a)(b) and (c), and with fire preventions and protection, health protection and ventilation and protection of personnel.

Note: 2 : Operators of equipment should report any equipment defect or safety hazards and discontinue use of equipment until its safety has been assured. Repairs shall be made only by qualified personnel.

Note: 3: Some Cities, Municipalities and Clients require that burners, welders and fire watch personnel be licensed. Therefore, prior to the start of the job, Modern Electric Co. will ascertain if licensing is required and provide only licensed welders, burners and fire watchers on those job sites that require licensing. Even in cases where personnel are not required to be licensed, persons, supervisors and fire watches shall be trained on the aforementioned policies and procedures prior to the commencement of cutting, burning and welding operations

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SECTION 11

CRANES, DERRICKS AND HOISTS

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I. Rules

These rules apply to all Modern Electric Co. employees and subcontractors. Additional specific information can be obtained from the referenced OSHA Standard.

A. **OSHA Reference**: 29 CFR 1926.1400

B. **Cranes and Derricks**:

1. Only qualified and designated individuals may operate cranes, lifting equipment, and derricks. Operators must meet the physical qualifications, pass a physical, a written examination, understand and be able to use a load chart as well as calculate loads for the crane type. Part of the qualification to include medical certification per the API 2D physical requirements. Operators should be properly trained in the use of fire extinguishers. Whenever there is a safety concern, the operator has the authority to stop and refuse to handle loads until a qualified person has determined that safety has been assured

    a) Vision of at least 20/30 Snellen in one eye and 20/50 in the other eye with or without glasses, and have depth perception.

    b) Be able to determine between red, yellow and green.

    c) Hearing, with or without a hearing aid, adequate for the specific operation.

    d) And no history of disabling medical condition which may be sufficient reason for disqualification.

    Note: Follow-up evaluations to be performed at least every four years.

2. All windows, windshields, mirrors, and other devices provided for visibility will be clean, free from cracks, and unobstructed.

3. All cranes shall be equipped with at least 1 ABC rated fire extinguisher or in the immediate vicinity of the crane.

4. The manufacturer's name and specifications applicable to the operation of the specific equipment will be attached to the equipment.

5. Rated load capacities, the most recent load test and recommended rules for safe operation will be conspicuously posted on all equipment at the operator’s station. The MEC employee shall keep written record of all load tests.

6. A competent person shall inspect all machinery and equipment prior to each use and during use to ensure that it is in safe operation condition. Ropes shall also be inspected. An initial inspection, monthly and prior to each use inspections are required to be completed and documented. The inspection shall be documented and include date of inspection. I.D. of the rope being inspected and signature of person performing the inspection. Inspections are to be turned into Site Supervisor or designated Site Safety Representative no later than 12 hours after the inspection period.

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7. All crawler, truck or locomotive cranes shall meet the requirements of ANSI Standard B30.5-1968, safety code for crawler, locomotive and truck cranes.

8. Passengers will not be transported on cranes.

9. Cranes and Derricks will not operate booms, loads or rigging within 10 feet of overhead electrical lines rated at 50kV or below. 0.4 inches will be added to 10 feet for each 1kV over 50kV. The work zone shall be identified by demarcating boundaries such as flag and range limiting devices or defining the work zone as 360 degrees around the equipment up to the maximum working radius. The hazard assessment must determine if any part of the equipment could get closer than 20 feet to a power line.

a) If it is determined that any part of the equipment, load line or load could get closer than 20 feet to power line, then at least one of the following must be taken:

(1) Ensure the power lines have been de-energized and visibly grounded.

(2) Ensure no part of the equipment, load line or load gets closer than 20 feet to the power line

(3) Determine the line's voltage and minimum approach distance permitted in Table A.

TABLE A:

kV Rating	**Minimum Distance**
	Set Crane
50kV or below	Ten Feet (10')
Over 50kV	Ten Feet (10') plus 0.4 inches (0/4") for each additional kV
Moving Crane w/Boom Lowered and No Load	
50 kV or Below	Four Feet (4')
Between 50kV and 345kV	Ten Feet (10')
Between 345kV and 750kV	Sixteen Feet (16')

10. A competent person must be assigned to observe and take prompt action in situations where the operator does not have a clear visibility.

11. Accessible areas within the swing radius of the rear of rotating superstructure will be properly barricaded to prevent employees from being struck or crushed by the crane.

12. The operator and the qualified signal person providing hand signals to the crane or derrick operator must know and use the proper hand signals for the equipment. The signals must be posted at the site.

13. Tag Lines should be used on all loads that may spin or swing.

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14. Do not pull the crane load block to one side to attach the load. It must be positioned over the load in accordance with safe rigging procedures.

15. Crane outriggers must be in place at all times, except when traveling. Outriggers may need to be extended, however, when traveling with a load.

16. Cranes must be operated on firm, level ground. Mats, plating, etc., acceptable for the weight of the equipment and the lift, must be used when the ground is soft or recently excavated or when the load is near lift capacity.

17. Modern Electric Co. or its Subcontractor shall comply with the manufacturer's specifications and limitations applicable to the operation of any and all cranes and derricks. Where manufacturer's specifications are not available, the limitations assigned to the equipment shall be based on the determinations of a qualified engineer competent in this field and such determinations will be appropriately documented and recorded. Attachments used with cranes shall not exceed the capacity, rating, or scope recommended by the manufacturer.

18. Rated load capacities, and recommended operating speeds, special hazard warnings, or instruction, shall be conspicuously posted on all equipment. Instructions or warnings shall be visible to the operator while he is at his control station.

19. Modifications or additions which affect the safe operation of the equipment may only be made with the manufacturer's written approval.

20. All hooks and chains shall be inspected months; records of inspections shall be kept on files by Modern Electric Co.

C. **Hoists:**

1. The employees shall comply with manufacturer's specifications and limitations.

2. Rated load capacities, recommended operating speeds, and special hazard warnings or instructions will be posted on cars and platforms.

3. Hoist way entrances of material hoists shall be protected by substantial full width gates or bars.

4. Hoist way doors or gates of personnel hoists shall not be less than 6 feet 6 inches high and protected with mechanical locks, which cannot be operated from the landing side and are accessible only to persons on the car.

5. Overhead protective coverings shall be provided on top of hoist cage or platform

6. All material hoists shall conform to the requirements of ANSI A 10.5-1969 (Safety Requirements for Material Hoists)

7. The supporting structure, to which a hoist is attached, must have a safe working load equal to or greater than that of the hoist.

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8. Loose tools or materials will not “ride” on the load.

9. Do not ride the load

10. Do not walk under or position yourself (or anyone else) under a load

11. Tag Lines should be used on all loads that may spin or swing.

12. A qualified rigger MUST be utilized if employees must enter fall zone for any reason

13. A signal person must be provided for the following situations

a) The point of operation is not in full view of the operator
b) The view is obstructed when the equipment is traveling
c) The operator or the person handling the load determines it is necessary due to the site specific concerns.

D. **Wire Ropes**: must be taken out of service when one the following conditions occur:

1. Running ropes are found to have six (6) randomly distributed broken wires in one lay or three (3) broken wires in one (1) lay

2. Wear has reduced diameter or outside individual wires to 2/3 of its original diameter.

3. Kinking, crushing, bird caging, heat damage or any other damage resulting in distortion of the rope structure has been found.

4. In standing ropes, more than two (2) broken wires in one lay in sections beyond end connections or more than one broken wire at end connections.

E. **Slings:** Inspected before every use. Safe work practices shall be used with all slings.

1. Slings, fastenings and all attachments shall be inspected by a qualified competent person who is designated by Modern Electric Co.

2. Whenever any sling is used specific safety practices shall be observed.

3. Proper care and use of all slings (alloy steel chain, wire rope, metal mesh, natural and synthetic fiber rope) must be conducted in accordance with manufacturer’s instructions.

F. Whenever internal combustion engine powered equipment exhausts in enclosed spaces, tests shall be made and recorded to see that employees are not exposed to unsafe concentrations of toxic gasses or oxygen deficient atmospheres.

G. A preventative maintenance plan shall be setup for lifting, hoisting equipment and cranes. It shall be setup as per manufacturer specs. An out of order sign shall be posted when maintenance and repairs are conducted.

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SECTION 12

HELICOPTER LIFT PLAN

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I. Purpose

The purpose of this plan is to establish minimum safety requirements for the helicopter lifts at Modern Electric Co. projects**. The plan must be specific to the facility and the specific lift. Lifts for any project must be discussed with the Safety Director, documents and approved prior to implementation.**

A. **Scope of Work**: _____

_____

_____

B. **Responsibility**: The project manager and project superintendent will require compliance with procedure and documentation mandated by the plan. It is the responsibility of _____ _____ to ensure that all FAA and municipal requirements are in compliance. The safety of the workers, community and property will be not be compromised. Unsafe weather conditions, equipment conditions, site conditions and unsafe actions will be cause to immediately abort the lift procedure.

1. _____ Shall be responsible to ensure that a helicopter, flight plan and use of airspace comply with application regulations of the Federal Aviation Administration.

2. The helicopter operator shall be responsible for size, weight restrictions and manner in which loads are connected to the helicopter and for all the over safety of the lift.

3. _____Shall be responsible for the safety of the lift and landing zone as well as safety requirements established by the policy, the provision of sufficient qualified and competent personnel required for safe helicopter loading, unloading and operations.

C. **Documents**: All documents below will be on file with the project manager.

1. All insurance requirements established by the subcontract

2. A signed and properly executed subcontract document

3. Copies of valid permits, secured by _____

4. The safety policies of _____

5. The plan and the lift plan of _____ will be reviewed with all affected personnel. Attendance sheets and minutes of the meeting will be on file.

6. A pre-lift briefing will be conducted on the morning of the lift between the ground and the helicopter pilot. Meeting shall include description of task, plan of operation and safety requirements. Documentation of meeting, including attendance and content shall be provided to the project manager prior to the lift.

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D. **Hazard Elimination:**

1. **Rigging:** All rigging slings, hoists and tag lines will be inspected by a competent person from _____ prior to use. Documentation of the inspection will be provided to the company superintendent prior to lift.

a) Slings and tag lines shall be properly slung and of length that will not permit their being drawn up into the rotors. Preset sleeve, swedged eyes, or equivalent means shall be used for all freely suspended loads to prevent hand splices from spinning open or cable clamps from loosening.

b) All electrically operated cargo hooks shall have the electrical activating device designed and installed to prevent inadvertent operation. Cargo hooks shall be equipped with an emergency mechanical control for releasing the load and shall be tested prior to the lift to determine the proper function of the release, electrically and mechanically.

2. **Hooking and Unhooking Loads**: Workers required to unhook loads beneath hovering helicopters will be provided with a safe route of access and egress. Work, other than hooking and unhooking loads will not be performed under hovering craft.

3. **Static Charges**: Static charge on the suspended load will be dissipated by a grounding device before grounding personnel touch the suspended load, or workers who contact the load must be protected by appropriate rubber gloves.

4. **Housekeeping:** The lift/landing zone and roof areas will be inspected prior to lift by representatives of _____ and the company project superintendent prior to lift. Loose gear and objects within 100 feet of the place of the lifting the load, depositing the load or area otherwise affected by the rotor down wash shall be removed.

5. **Communications**: Radio communications between the helicopter pilot and ground crew will be checked and adequate prior to lift. The signal person will be clearly identified by use of a traffic vest. Radio communication between helicopter and ground crew will be the primary contact. In the event of communication failure, hand signals will be used and in compliance with Figure N-1, 29 CFR 1926.551

6. **Traffic Control**:

a) Entrance to the lift and landing zone will be hard barricaded to prevent vehicle entry. One person will be provided to prevent removal of barricades and vehicle or personnel entry access points.

b) Red “DANGER” Tape will be installed, establishing a safety zone to prevent accidental pedestrian entry into the area.

c) Vehicular traffic and pedestrian entry to the area will be controlled by hard barricade or a manned “DANGER” taped control line

7. **Approach Distance**: No unauthorized person shall be allowed to approach within 75 feet of helicopter while rotor blades are turning.

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8. **Approaching the Helicopter:** Approaching or leaving the helicopter when blades are rotating shall be accomplished in a route of travel that will keep the individual in full view of the pilot and in a crouched position

9. **Load Inspection**: All electrical connections or process connections (e.g. drain lines, natural gas connectors); grounding lines or other anchorage points shall be disconnected prior to the lift. The load will be inspected to ensure no loose materials or fittings are stored on the equipment.

10. **Visibility**: The employer shall take all practical precautions to eliminate the potential for reduced visibility. Employees shall exercise extreme caution to keep clear of main and stabilizing rotors at all times, but especially during times of reduced visibility.

11. **Fall Protection**: Due to the nature of the work, dimension of the roof and work area, a risk analysis must be performed. General rules are established as follows:

a) All access to the roof will be accomplished via the access hatch located at the grid line 10 (see attached plan). When all personnel have entered the roof area, the hatch will be closed.

b) A clearly identified walkway will be established which will prohibit worker access to areas within 10 feet of unprotected roof edges or skylights.

c) Two trained and competent persons will be posted in positions that will allow clear visibility of workers

d) These individuals will act as Safety Watch with no additionally assigned duties

e) They will be equipped with air horns that will be sounded in a long blast when any worker approached ten (10) feet of an unprotected skylight or roof edge.

12. **Personal Protective Equipment**: All personal involved in this procedure will be equipped with the following:

a) Safety headwear with chin strap
b) Safety glasses and side shields
c) Hearing Protection

Loose fitting clothing, likely to flap in the downwash and potentially snag on the hoist line shall not be work

13. **Fire Protection**: Fire extinguishers will be located in the loading, landing and lift zone.

14. **Building Security**: For removal and placement of the units located adjacent to the occupied space, the area must be evacuated before a lift. If at all possible, the building must be cleared of all occupants before remaining lifts can take place. If this is not possible, a minimum unoccupied perimeter of 100 feet on each side of the flight path must be established and maintained

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SECTION 13

EXCAVATION, TRENCHING AND SHORING

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I. Policy

An excavation, as defined by OSHA 29 CFR 1926.650, means any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal. All excavation work performed by Modern Electric Co. as the contractor or sub-contractor, will conform to the guidelines of this policy, the above referenced OSHA standards. If the client's procedures and policies meet or exceed this document, the client policy and procedures will be used. THIS POLICY AND PROCEDURE IS LIMITED TO EXCAVATIONS OF LESS THAN 20 FEET IN DEPTH. EXCAVATIONS THAT EXCEED 20 FEET REQUIRE SHORING SYSTEMS DESIGNED BY A QUALIFIED PROFESSIONAL ENGINEER.

A. **OSHA Reference**: 29 CFR 19.26(f), 29 CFR 1926.650,29 CFR 1926.651, 29 CFR 1926.652, 29 CFR 1926.653

B. **Definitions**:

1. **Accepted Engineering Practices** - are those requirements, which are compatible with standards of practice required by a registered professional engineer

2. **Aluminum Hydraulic Shoring -** is a pre-engineered shoring system comprised aluminum hydraulic cylinders (cross braces) used in conjunction with vertical rails (uprights) or horizontal rails (whalers). The system is designed specifically to support the sidewalls of an excavation and prevent cave-ins

3. **Bell-Bottom Pier Hole -** is a type of shaft or footing excavation, the bottom is made larger than the cross section above to form a belled shape

4. **Benching** - is a method of protecting employees from cave-ins by excavating the sides to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between the levels

5. **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 by falling or sliding in a quantity that may be sufficient to entrap, bury, or injure and immobilize a person.

6. **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. A competent person has the ability and authority to take prompt corrective measures to eliminate the previously mentioned conditions.

7. **Cross Braces** - horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against either uprights or Wales.

8. **Faces or Sides** - vertical or inclined earth surfaces formed as a result of the excavation.

9. **Failure** is the breakage, displacement, or permanent deformation of a structural member or connection that would reduce its structural integrity and its support capabilities

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10. **Hazardous atmosphere** is an atmosphere that may be harmful, cause death, illness, or injury by being explosive, poisonous, flammable, corrosive, oxidizing, irritating, or toxic.

11. **Kick out** is the accidental release or failure of a cross brace

12. **Protective system** is a method of protecting employees from cave ins, materials that could roll or fall into the excavation or excavation face, collapse of adjacent structures. They include support systems, sloping and benching systems, shield systems, and other systems, which provide the necessary protection.

13. **Ramp** means an inclined walking or working surface used to gain access to one point from another and is constructed from earth or structural materials like wood or steel.

14. **Registered Professional Engineer** is a professional engineer registered in the state where the work is to be performed.

15. **Sheeting** is the member of a shoring system that retains the earth in position and is supported by other members of the shoring system.

16. **Shield (Trench Box, Trench Shield)** is a structure that is able to withstand the forces of a cave-in. Shields can be permanent structures that can be designed to be portable and moved along as the work progresses, pre- manufactured, or job-built in accordance with 1926.652 (c)(3).

17. **Shoring (Shoring System)** is a structure such as a metal hydraulic, mechanical, or timber shoring system that supports the sides of an excavation and is designed to prevent cave-ins.

18. **Sloping (Sloping System)** excavation to form sides of an excavation that are inclined away from the excavation. The angle of incline required to prevent a cave-in varies with differences in factors such as the soil type, environmental conditions of exposure, and application of surcharge loads.

19. **Stable Rock** is a solid mineral material that can be excavated with vertical sides and will remain intact while exposed. (See the standard for methods of converting unstable rock to stable rock.)

20. **Structural Ramp** is a ramp made of steel or wood and usually used for vehicle access. Soil or rock ramps are not considered structural.

21. **Support System** is a structure such as underpinning, bracing or shoring which provides support to an adjacent structure, underground installation, or the sides of an excavation.

22. **Tabulated Data** are tables and charts approved by a registered professional engineer and used to design and construct a protective system.

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23. **Trenches** are a narrow excavation, in relation to length, made below the surface of the ground. Generally, the depth is greater than the width, but the width of a trench measured at the bottom is not greater than 15 feet. If forms or other structures are installed or constructed in an excavation and reduce the dimension from the structure to the side to 15 feet or less the excavation is considered a trench.

24. **Uprights** are vertical members of a trench shoring system placed in contact with the earth and usually positioned so that individual members do not come in contact with each other. Uprights in contact with each other are sheeting.

25. **Wales** are 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.

26. **Confined space** for the purpose of the excavation standard is defined as one having: (refer to Section 6 for more specific information)

a) Limited access and egress.

b) Ventilation, which could produce or contain a hazardous atmosphere.

c) Is not designed for continuous human occupancy.

d) Is deeper than four (4) feet.

C. **Pre-excavation Checks:**

1. Hidden obstructions or hazards may be identified by obtaining and checking site plans identifying underground pipes or utilities in the area of the excavation. Care should be used as these plan and records may not be up to date or accurate.

2. For exposure to public traffic the employees shall be provided a highly reflective vests, and flag and/or light.

3. Tests should be conducted for air contaminants (oxygen, flammable gases, etc. and provide ventilation where necessary

4. Check the area for previously disturbed ground.

a) Excavations in previously disturbed ground may require additional bracing and shoring.]

b) Previously disturbed ground near a new excavation may also require use of bracing and shoring in the new excavation.

D. **Shoring Use:**

1. All trenches over 5 feet in depth must be shored, sloped, or shield provided to protect workers.

2. Excavations shallower than 5 feet must also be sloped or shored if they are in unstable soil.

3. The depth of an excavation must be measured at its greatest vertical dimension.

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4. Spoil piles, located close to the edge of excavation will affect the vertical depth.

NOTE: Workers kneeling in a trench less than 5 feet can still be exposed to the hazards of cave-ins or hazardous environments.

E. **Sloping**: There are three methods of sloping a trench to protect workers.

1. Sloping is cutting back the trench walls to the proper angle of repose. Refer to Table B-1 of 29CFR 1926 subpart P)

2. Angles of repose are dependent upon soil classification, water conditions, previous soil disturbances, etc.

3. The proper angle should be independently determined by a qualified person for each site and if conditions require each trench at the same site.

4. Where the excavation has water conditions, silty material, loose boulders, and areas where erosion, deep frost action, and slide planes appear, the angle of repose must be flattened.

F. **Shoring of Trenches:** Trench shoring is installed to resist or replace the force on the excavation face.

1. Shoring of a trench may be accomplished with the use of wood timbers, screw jacks, hydraulic rams, or combinations of all of these methods.

2. Timbers must be in sound condition and free of major defects. They must be equal to the grade size specified. Workers must be alert for warning signs of splintering or separating wood fibers. FAILURE OF THE SHORING IS EMINENT WHEN THESE SIGNS ARE DETECTED AND WORKERS MUST EVACUATE THE EXCAVATION.

3. Steel shoring components provide little warning before failure and workers must check and be alert for bent or damaged members.

4. Pressure Gauges, cylinders, and rails must all be in good condition if hydraulic shoring is used. Signs of fluid leakage must be detected and repaired.

G. **Trench Shoring Methods**: The type of shoring to be used is determined by the soil type and soil conditions. Ground water and water intrusion can weaken the soil face and add weight, adding additional force on the shores. If the excavation is below the water line, the shoring should be driven below the bottom of the surface of the trench to prevent undermining.

1. Tight sheeting must be provided where seepage occurs. The excavation should be kept dry 24 hours per day to avoid the possibility of saturation and possible failure of the excavation wall.

2. Shoring in Hard Compact Soil is commonly accomplished by open sheeting or "skip shoring".

a) Struts must be placed in a true horizontal position and square to the sides of the trench at a maximum vertical spacing not to exceed OSHA 29CFR 1926 Subpart B Tables C1.1- C1.3, C2.1- C2-3, D1- 1- D1.3 or the manufacturer's tabulated data.

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b) The ends must be secured to prevent slippage or kick outs.

c) The lateral spacing between struts must not exceed OSHA Tables C1.1 to C1.3, C2.1-C2.3, D1.1-D1.3 or manufacturers tabulated data or a professional engineer's specification.

d) Struts must be inspected daily for movement or decreased bearing pressure. Repairs, replacement, or reinstatement must be accomplished before workers are allowed into the excavation or around the upper edges.

3. Shoring in loose unstable soil can be considerably greater than in stable soil, due to the pressure exerted on shoring.

a) Increased strut size and or decreased strut spacing is required.

b) Very Loose soil will require closed sheeting with tight edge- to edge contact.

c) Wood or locking steel sheeting may be used when joints must be watertight.

H. **Mandatory Shoring Protection**:

1. All workers working in a trench with a depth that exceeds 5 feet must be protected by a shoring system or shield.

2. The placement of shores must be accomplished prior to any worker entering the trench.

3. A registered professional engineer must design all shoring systems used in an excavation below 20 feet in depth.

4. In trenches or excavations where a hazardous condition may exist, the space must be treated as a permit required confined space and Section 6 of this manual must be followed.

5. All workers in the excavation or trench must be provided with Personal Protective Equipment as specified in this manual, OSHA and client standards.

I. **Installation of Shoring Systems**: All installation should be in a top down method.

1. Struts must be in a true horizontal position with the ends secured to prevent slippage or sliding.

2. The uppermost shores must be placed first.

3. If possible, the workers should not be in the trench when the shores are lowered.

4. To prevent slough off and greater risk of cave-in, the shoring work should follow the trenching and excavation work as closely as possible.

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J. **Removal of Shoring Systems**: Removal of shoring should be in a bottom to up method. Hydraulic shoring, however, may be removed from above.

1. Workers removing shoring must remain in a protected zone.

2. Premature removal of shoring will expose workers to an unnecessary hazard.

3. Timer or steel jacks are usually removed while inside the trench.

4. Before removal, some force must replace the force exerted by the shores against the trench face. e.g., bottom and intermediate struts should not be removed until they have been effectively replaced by backfill.

K. **Hazards Affecting Trench Safety**:

1. Weather conditions can affect the water content of the soil through excess water from rain or melting ice and snow. Water can liquefy firm soil and increase pressure on the shores.

2. Freezing of the ground and quick thaw can undermine a shoring system and cause failure.

3. Soils can change properties from exposure to the air. Air slaking can turn hard solid soil, to soft slippery soil.

4. Vibrations from machinery, roadways, railroad tracks, explosives, flares, etc. will cause increased loads on a shoring system and extra sheeting and shoring may be needed.

5. The location of the Spoil Bank may also affect the pressure on a shoring.

6. Spoil Piles should be kept no closer than 2 feet from the trench and distances increased when site conditions warrant.

7. The edges of all open trenches must be protected. Barricades must be erected to prevent accidental entry, and, if possible, bumpers should be provided to prevent equipment from falling into the excavation.

8. All tools, equipment, and supplies must be kept back from the excavation edge to prevent accidental slippage into the site

9. Hydrocarbon vapors are heavier than air. In locations where hydrocarbon vapors may be present atmospheric monitoring and confined space procedure are required.

10. All welding and cutting torches must be shut down at the source when workers depart the excavation or trench.

L. **Excavation Equipment:**

1. Excavation equipment must be operated by trained and qualified personnel only.

2. Workers in the excavation will not place themselves below a load being lifted overhead.

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3. Equipment must be shut down when the operator dismounts the equipment.

4. Refueling of equipment must not take place in the immediate vicinity of the site.

5. Knowledgeable Signal Person must be in place when equipment operators cannot see the bottom of the excavation.

M. **Daily Inspections of the Excavation and Shoring.**

1. Daily inspections of the excavation and shoring equipment shall be made by a competent person and documented.

2. Should an unsafe condition be discovered, work must stop immediately in the affected area and corrective action taken.

3. Inspections must also be accomplished after rainstorms, snowstorms, or any other occurrence that may alter the condition and hazard of the site. Employees must be protected from water accumulation, including the use of shields, and must be inspected by a competent person before work begins.

N. **Competent Persons**: The OSHA Standards require that the competent person must be capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and have authorization to take prompt corrective measures to eliminate them and, if necessary, to stop the work. Modern Electric Co. is responsible for the designation of a competent person at excavation sites. Modern Electric Co. reserves the right to review the qualifications of any client or sub-contractor furnished competent person.

O. **A competent person is required to:**

1. Have a complete understanding of the applicable safety standards and any other data provided.

2. Assure the proper locations of underground installations or utilities, and that the proper utility companies have been contacted.

3. Conduct soil classification tests and reclassify soil after any condition changes.

4. Determine adequate protective systems (sloping, shoring, or shielding systems) for employee protection.

5. Conduct all air monitoring for potential hazardous atmospheres. Conduct daily and periodic inspections of excavations and trenches.

6. Approve design of structural ramps, if used.

P. **Access and Egress: A means of access and egress (usually ladders) must be provided within 25 feet of every worker**.

1. Ladders must be in good condition, extend 3 feet over the top of the trench and secured in such a manner as to prevent movement while in use.

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2. Access and egress must be provided for all excavations in excess of 4 feet in depth.

3. Walkways, runways, and sidewalks must be kept clear of excavated material or other obstruction.

4. No sidewalk, ramp walkway, etc., shall be undermined unless properly shored.

5. All crossings and walkways shall be protected by a handrail / guardrail system

II. Classification of Soil and Rock Deposits

Each soil and rock deposit must be classified by a competent person as one of the following: Stable Rock Type A, Type B or Type C, in accordance with the following definitions.

A. **Definitions:**

1. **Cemented Soil**: means a soil in which the particles are held together by a chemical agent, such as calcium carbonate, such that a hand size sample cannot be crushed into powder or individual soil particles by finger pressure.

2. **Cohesive Soil**: means clay (fine grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical side slopes, and is plastic when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soil includes clayey silt, sandy clay, silty clay, clay, and organic clay.

3. **Dry Soil**: means soil that does not exhibit visible signs of moisture content.

4. **Fissured**: means a soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.

5. **Granular Soil**: means gravel, sand or silt (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

6. **Layered System**: means two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

7. **Moist Soil**: means a condition in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

8. **Plasticity**: means a property of a soil, which allows the soil to be deformed or molded without cracking or appreciable volume change.

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9. **Saturated Soil**: means a soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or sheer vane.

10. **Soil Classification System**: means for the purpose of this subpart, a method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B, and Type C, in decreasing order of stability. The categories are determined based on an analysis of the properties and performance characteristics of the deposits and the environmental conditions of exposure.

11. **Stable Rock**: means natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.

12. **Submerged Soil**: means soil, which is underwater or is free seeping.

13. **Type A Soil means**:

a) Cohesive soils with an unconfined compressive strength of 1.5 ton per square ft (psf) or greater. Examples are: clay, silty clay, sandy clay, clay loam and in some cases, silty clam loan and sandy clay loam. Cemented soils such as caliches and hardpan are considered Type A, however, no soil is Type A if:

b) Soil is fissured or subject to vibration from heavy traffic, pile driving or similar effects

c) The soil has been previously disturbed; or

d) The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H;1V) or greater; or

e) The material is subject to other factors that would require it to be classified as a less stable material.

14. **Type B Soil means**:

a) Cohesive soil with an unconfined compressive strength greater than 0.5 tons per square foot (psf); or

b) Granular cohesionless soils including angular gravel similar to crushed rock) silt, silt loam, sandy loam and in some cases silty clay loam and sandy clay loam.

c) Previously disturbed soils except those which would otherwise be classed as Type C soil.

d) Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or

e) Dry rock that is not stable; or

f) Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep that four horizontal to one vertical (4H: IV), but only if the material would be otherwise classified Type B.

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15. **Type C Soil means**:

a) Cohesive soil with an unconfined compressive strength or 0.5 psf or less;

b) Granular soils including gravel, sand, and loamy sand; or

c) Submerged soil or soil from which water is freely seeping; or

d) Submerged rock that is not stable; or

e) Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:IV) or steeper

16. Unconfined Compressive Strength: means the load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, or estimated in the field using a pocket penetrometer, by thumb penetration tests or other methods.

17. **Wet Soil**: means soil that contains significantly more moisture than moist soil, but in such a range of value that cohesive material will slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

18. **Visual and Manual Analysis**: The visual and manual analysis such as those noted as being acceptable, shall be designed and conducted to provide sufficient quantitative and qualitative information as may be necessary to identify properly the properties, factors and conditions affecting the classification of the deposits.

B. **Layered System**: The system shall be classified in accordance with its weakest layer.

C. **Reclassification**: If after classifying a deposit, the properties, factors or conditions affecting its classification change in any way, the changes shall be evaluated by a competent person. The deposit shall be reclassified as necessary to reflect the changed circumstances.

III. Acceptable Visual and Manual Test

A. **Visual Test:** Visual analysis is conducted to determine 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 the excavated material.

1. Check samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes. Soil that is primarily composed of fine-grained material is cohesive material. Soil composed primarily of coarse-grained sand or gravel is granular material.

2. Observe soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.

3. Observe the side of the opened excavation and the surface area adjacent to the excavation. Crack-like openings such as tension cracks could indicate fissured material. If chunks of soil fall off a vertical side, the soil could be fissured. Small falls are evidence of moving ground and are indications of potentially hazardous situations.

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4. Observe the area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground structures, and to identify previously disturbed soil.

5. Observe the opened side of the excavation to identify layered systems.

B. **Manual Tests**: Manual analysis of soil samples is conducted to determine the quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly.

1. **Plasticity**: Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/8" in diameter. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a 2" length of 1/8" thread can be held on one end without tearing, the soil is cohesive.

2. **Dry Strength**: If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination or gravel, sand, or silt). If the soil is dry and falls into clumps that break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand, or silt. If the dry soil breaks into clumps which do not break up into small clumps and which can only be broken with difficulty and there is no visual indication the soil is fissured the soil may be considered un-fissured.

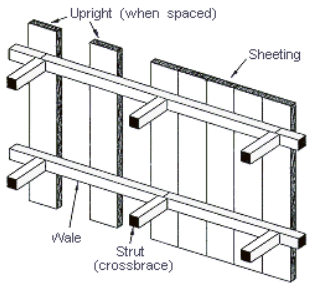
3. **Thumb Penetration**: The thumb penetration test can be used to estimate unconfined compressive strength of cohesive soils. Type A soils with an unconfined compressive strength of 1.5 psf can be readily indented by the thumb; however, only with very great effort. Type C soils with an unconfined compressive strength of 0.5 psf can be easily penetrated several inches by thumb and be molded by light finger pressure. This test should be conducted on undisturbed soil sample, such as a large clump of spoil, as soon as practical after excavation to keep to a minimum the effects of drying.

4. Other Strength Tests: Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetrometer or using a hand operated shear vane.

IV. Shoring Types

Shoring is the provision of a support system for trench faces used to prevent movement of soil, underground utilities, roadways, and foundations. Shoring or shielding is used when the location or depth of the cut makes sloping back to the maximum allowable slope impractical. Shoring systems consist of posts, wales, struts, and sheeting. There are two basic types of shoring, timber and aluminum hydraulic.

Timber Shoring



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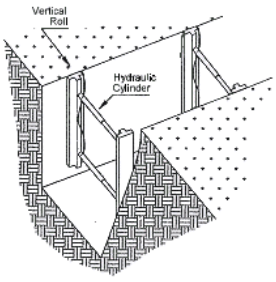
A. **Hydraulic Shoring** - The trend today is toward the use of hydraulic shoring, a prefabricated strut and/or wale system manufactured of aluminum or steel. Hydraulic shoring provides a critical safety advantage over timber shoring because workers do not have to enter the trench to install or remove hydraulic shoring. Other advantages of most hydraulic systems are that they:

1. Are light enough to be installed by one worker;
2. Are gauge-regulated to ensure even distribution of pressure along the trench line;
3. Can have their trench faces "preloaded" to use the soil's natural cohesion to prevent movement; and
4. Can be adapted easily to various trench depths and widths.

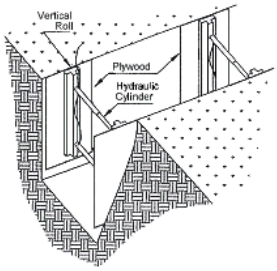
All shoring should be installed from the top down and removed from the bottom up. Hydraulic shoring should be checked at least once per shift for leaking hoses and/or cylinders, broken connections, cracked nipples, bent bases, and any other damaged or defective parts.

Vertical Aluminum Hydraulic Shoring

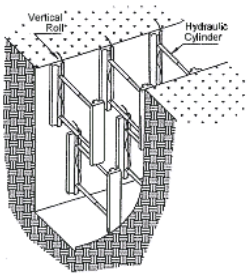
This figure below illustrates four vertical aluminum hydraulic shoring variations: Vertical Aluminum Hydraulic Shoring with Spot Bracing, Vertical Aluminum Hydraulic Shoring with Plywood, Vertical Aluminum Hydraulic Shoring (Stacked), and Aluminum Hydraulic Shoring Water System (Typical). The first variation uses a hydraulic cylinder to exert force against a vertical roll, which transfers the force the wale. The second variety adds plywood between the vertical roll and wale. The third variety stacks multiple arrangements of the first type vertically. The fourth variety uses a hydraulic cylinder exerting force on a horizontal wale that presses against upright sheeting.



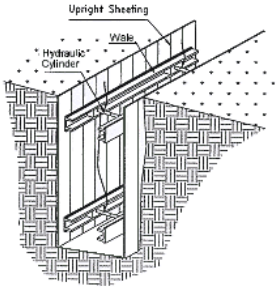
Vertical Aluminum Hydraulic Shoring (Spot Bracing)



Vertical Aluminum Hydraulic Shoring (With Plywood)



Vertical Aluminum Hydraulic Shoring (Stacked)



Aluminum Hydraulic Shoring Waler System (Typical)

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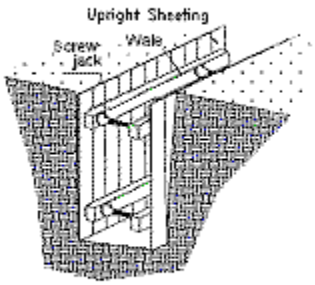
B. **Pneumatic Shoring** - works in a manner similar to hydraulic shoring. The primary difference is that pneumatic shoring uses air pressure in place of hydraulic pressure. A disadvantage to the use of pneumatic shoring is that an air compressor must be on site.

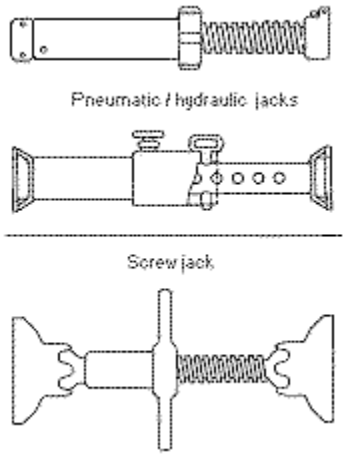
1. Screw Jacks. Screw jack systems differ from hydraulic and pneumatic systems in that the struts of a screw jack system must be adjusted manually. This creates a hazard because the worker is required to be in the trench in order to adjust the strut. In addition, uniform "preloading" cannot be achieved with screw jacks, and their weight creates handling difficulties.

2. Single-Cylinder Hydraulic Shores. Shores of this type are generally used in a water system, as an assist to timber shoring systems, and in shallow trenches where face stability is required.

3. Underpinning. This process involves stabilizing adjacent structures, foundations, and other intrusions that may have an impact on the excavation. As the term indicates, underpinning is a procedure in which the foundation is physically reinforced. Underpinning should be conducted only under the direction and with the approval of a registered professional engineer.

This figure below has a diagram showing the various components of upright sheeting, along with pneumatic/hydraulic jacks and a screw jack. The various jacks press up against the wale, which in turn keep the shoring in position





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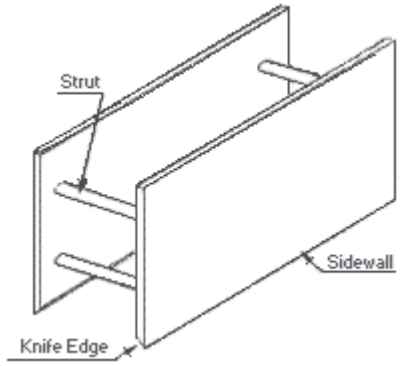
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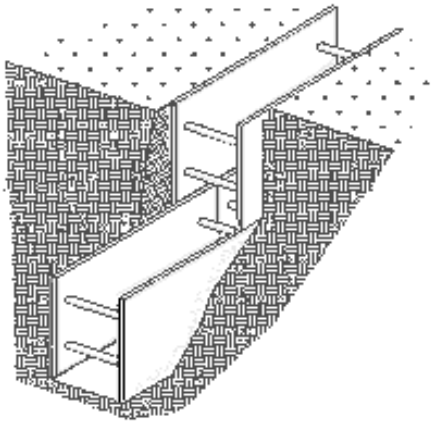
V. Shielding Types

A. **Trench Boxes**: These are different from shoring because, instead of shoring up or otherwise supporting the trench face, they are intended primarily to protect workers from cave-ins and similar incidents. The excavated area between the outside of the trench box and the face of the trench should be as small as possible. The space between the trench boxes and the excavation side are backfilled to prevent lateral movement of the box. Shields may not be subjected to loads exceeding those which the system was designed to withstand.

Trench Shield:
This figure illustrates a trench shield, consisting of a knife edge, sidewall, and struts. The knife edge is at the bottom edge of the sides of the trench shield, and struts are going between both sides of the shield, providing support.



Trench Shield, Stacked:
This figure illustrates two trench shields, stacked upon each other.



B. **Combined Use.** Trench boxes are generally used in open areas, but they also may be used in combination with sloping and benching. The box should extend at least 18 in (0.45 m) above the surrounding area if there is sloping toward excavation. This can be accomplished by providing a benched area adjacent to the box.

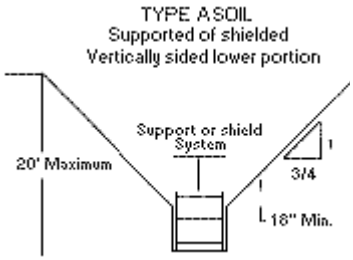
Earth excavation to a depth of 2 ft (0.61 m) below the shield is permitted, but only if the shield is designed to resist the forces calculated for the full depth of the trench and there are no indications while the trench is open of possible loss of soil from behind or below the bottom of the support system. Conditions of this type require observation on the effects of bulging, heaving, and boiling as well as surcharging, vibration, adjacent structures, etc., on excavating below the bottom of a shield. Careful visual inspection of the conditions mentioned above is the primary and most prudent approach to hazard identification and control.

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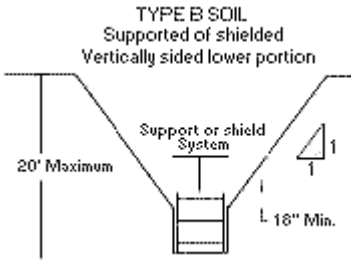
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Slope and Shield Configurations

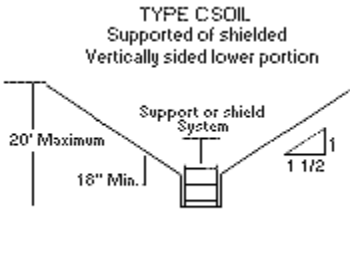
This figure illustrates how a support or shield system can be used in Type A soil. The slope alongside it is 18" minimum, 20' maximum, with a 1/0.75 slope.



This figure illustrates how a support or shield system can be used in Type B soil. The slope alongside it is 18" minimum, 20' maximum, with a 1/1 slope.



This figure illustrates how a support or shield system can be used in Type C soil. The slope alongside it is 18" minimum, 20' maximum, with a 1/1.5 slope.



VI. Sloping and Benching

A. **Sloping** - Maximum allowable slopes for excavations less than 20 ft (6.09 m) based on soil type and angle to the horizontal are as follows:

Table V: 2-1. Allowable Slopes

Soil type	Height: Depth ratio	Slope angle
Stable Rock	Vertical	90°
Type A	¾:1	53°
Type B	1:1	45°
Type C	1½:1	34°
Type A(short-term)	½:1	63°
(For a maximum excavation depth of 12 ft)		

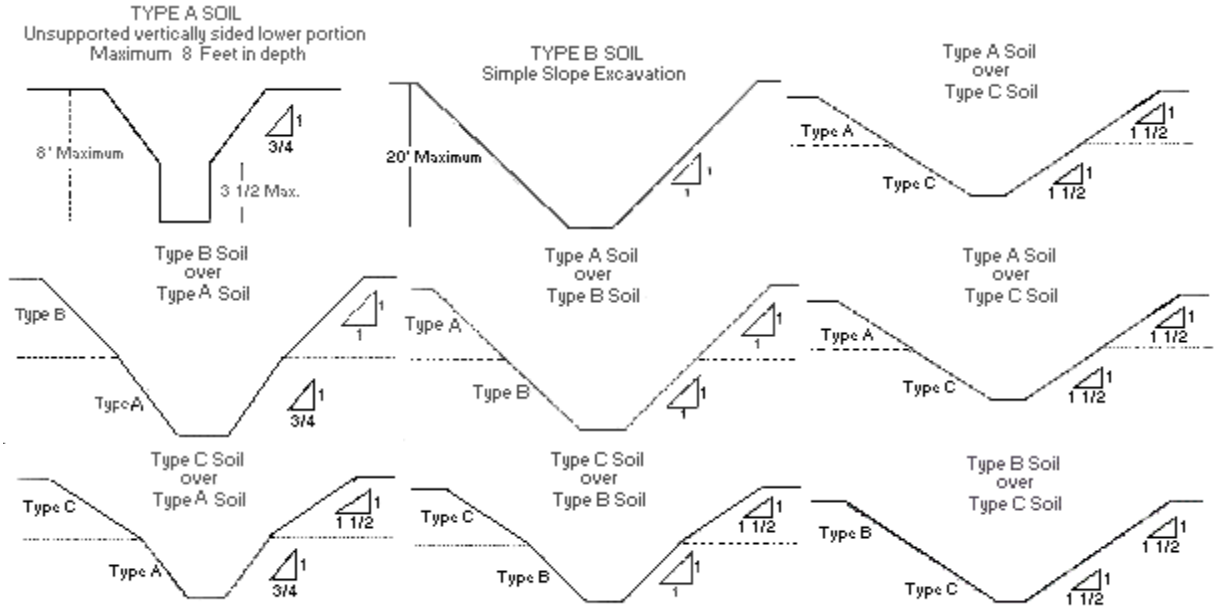
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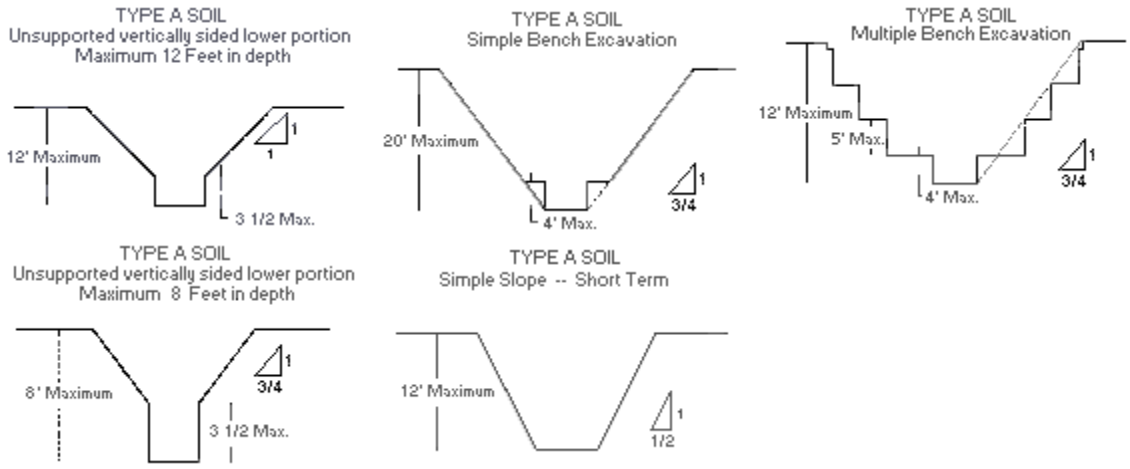
Slope Configurations: Excavations in Layered Soils

This figure below illustrates the different types of slope excavations in layered soils. This includes Type A, B, and C soils in single slope excavations, and different permutations such as: Type A soil over both Types B and C individually, Type B soil over Types A and C individually, and Type C soil over Types A and B individually.



Excavations Made in Type A Soil

This figure illustrates the types of excavations made in Type A soil: Two types use an unsupported vertically sided lower portion (with maximum depths of 8 Feet and 12 Feet), and the three remaining types include single bench excavation, simple slope - short term, and multiple bench excavation.



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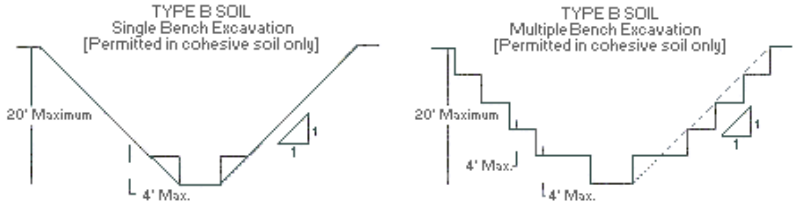
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B. **Benching** - There are two basic types of benching, simple and multiple. The type of soil determines the horizontal to vertical ratio of the benched side.

As a general rule, the bottom vertical height of the trench must not exceed 4 ft (1.2 m) for the first bench. Subsequent benches may be up to a maximum of 5 ft (1.5 m) vertical in Type A soil and 4 ft (1.2 m) in Type B soil to a total trench depth of 20 ft (6.0 m). All subsequent benches must be below the maximum allowable slope for that soil type. For Type B soil the trench excavation is permitted in cohesive soil only.

Excavations Made in Type B Soil

This figure illustrates two types of excavations made in Type B soil that are permitted in cohesive soil only: Single Bench Excavation, and Multiple Bench Excavation.

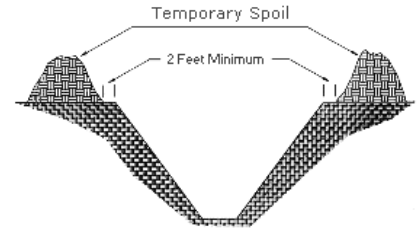


VII. Spoil

A. Temporary Spoil - Temporary spoil must be placed no closer than 2 ft (0.61 m) from the surface edge of the excavation, measured from the nearest base of the spoil to the cut. This distance should not be measured from the crown of the spoil deposit. This distance requirement ensures that loose rock or soil from the temporary spoil will not fall on employees in the trench.

Spoil should be placed so that it channels rainwater and other run-off water away from the excavation. Spoil should be placed so that it cannot accidentally run, slide, or fall back into the excavation.

This figure illustrates temporary spoil being placed at a minimum of two feet from the surface edge of the excavation.



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B. **Permanent Soil** - Permanent spoil should be placed at some distance from the excavation. Permanent spoil is often created where underpasses are built or utilities are buried. The improper placement of permanent spoil, e.g. insufficient distance from the working excavation, can cause an excavation to be out of compliance with the horizontal-to-vertical ratio requirement for a particular excavation. This can usually be determined through visual observation. Permanent spoil can change undisturbed soil to disturbed soil and dramatically alter slope requirements.

VIII. Special Health & Safety Considerations

A. **Competent Person** – the designated competent person should have and be able to demonstrate the following:

1. Training, experience and knowledge of:

   a) Soil analysis
   b) Use of protective systems; and
   c) Requirements of 29 CFR Part 1926 Subpart P

2. Ability to detect:

   a) Conditions that could result in cave ins
   b) Failures in protective systems
   c) Hazardous atmospheres; and
   d) Other hazards including those associated with confined spaces

3. Authority to take prompt corrective measures to eliminate existing and predictable hazards and to stop work when required.

B. **Surface Crossing of Trenches -** Surface crossing of trenches should be discouraged; however, if trenches must be crossed, such crossings are permitted only under the following conditions:

1. Vehicle crossings must be designed by and installed under the supervision of a registered professional engineer.

2. Walkways or bridges must be provided for foot traffic. These structures shall:

   a) Have a safety factor of 4;
   b) Have a minimum clear width of 20 in (0.51 m);
   c) Be fitted with standard rails; and
   d) Extend a minimum of 24 in (.61 m) past the surface edge of the trench.

C. **Ingress and Egress** - Access to and exit from the trench require the following conditions:

1. Trenches 4 ft or more in depth should be provided with a fixed means of egress.

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2. Spacing between ladders or other means of egress must be such that a worker will not have to travel more than 25 ft laterally to the nearest means of egress.

3. Ladders must be secured and extend a minimum of 36 in (0.9 m) above the landing.

4. Metal ladders should be used with caution, particularly when electric utilities are present.

D. **Exposure to Vehicles** - Procedures to protect employees from being injured or killed by vehicle traffic include:

1. Providing employees with and requiring them to wear warning vests or other suitable garments marked with or made of reflectorized or high-visibility materials.

2. Requiring a designated, trained flag person along with signs, signals, and barricades when necessary.

E. **Exposure to Falling Loads** - Employees must be protected from loads or objects falling from lifting or digging equipment. Procedures designed to ensure their protection include:

1. Employees are not permitted to work under raised loads.
2. Employees are required to stand away from equip. being loaded or unloaded.
3. Equipment operators or truck drivers may stay in their equipment during loading and unloading if equipment is properly equipped with a cab shield or adequate canopy.

F. **Warning Systems for Mobile Equipment** - The following steps should be taken to prevent vehicles from accidentally falling into the trench:

1. Barricades must be installed where necessary.
2. Hand or mechanical signals must be used as required.
3. Stop logs must be installed if there is a danger of vehicles falling into the trench.
4. Soil should be graded away from the excavation; this will assist in vehicle control and channeling of run-off water.

G. **Hazardous Atmospheres and Confined Spaces** - Employees shall not be permitted to work in hazardous and/or toxic atmospheres. Such atmospheres include those with:

1. Less than 19.5% or more than 23.5% oxygen;
2. A combustible gas concentration greater than 20% of lower flammable limit; and
3. Concentrations of hazardous substances that exceed those specified in the *Threshold Limit Values for Airborne Contaminants* established by the ACGIH (American Conference of Governmental Industrial Hygienists).

All operations involving such atmospheres must be conducted in accordance with OSHA requirements for occupational health and environmental controls (see 29 CFR Part 1926 Subpart D) for personal protective equipment and for lifesaving equipment (see 29 CFR Part 1926 Subpart E). Engineering controls (e.g., ventilation) and respiratory protection may be required.

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When testing for atmospheric contaminants, the following should be considered:

- Testing should be conducted before employees enter the trench and should be done regularly to ensure that the trench remains safe.
- The frequency of testing should be increased if equipment is operating in the trench.
- Testing frequency should also be increased if welding, cutting, or burning is done in the trench.

Employees required to wear respiratory protection must be trained, fit-tested, and enrolled in a respiratory protection program. Some trenches qualify as confined spaces. When this occurs, compliance with the Confined Space Standard is also required.

H. **Emergency Rescue Equipment** - Emergency rescue equipment is required when a hazardous atmosphere exists or can reasonably be expected to exist. Requirements are as follows:

1. Respirators must be of the type suitable for the exposure. Employees must be trained in their use and a respirator program must be instituted.

2. Attended (at all times) lifelines must be provided when employees enter bell-bottom pier holes, deep confined spaces, or other similar hazards.

3. Employees who enter confined spaces must be trained.

I. **Standing Water and Water Accumulation** - Methods for controlling standing water and water accumulation must be provided and should consist of the following if employees are permitted to work in the excavation:

1. Use of special support or shield systems approved by a registered professional engineer.

2. Water removal equipment, e.g. well pointing, used and monitored by a competent person.

3. Safety harnesses and lifelines used in conformance with 29 CFR 1926.104.
4. Surface water diverted away from the trench.
5. Employees removed from the trench during rainstorms.
6. Trenches carefully inspected by a competent person after each rain and before employees are permitted to re-enter the trench.

J. **Inspections** - Inspections shall be made by a competent person and should be documented. The following guide specifies the frequency and conditions requiring inspections:

1. Daily and before the start of each shift;
2. As dictated by the work being done in the trench;
3. After every rainstorm;
4. After other events that could increase hazards, e.g. snowstorm, windstorm, thaw, earthquake, etc.
5. When fissures, tension cracks, sloughing, undercutting, water seepage, bulging at the bottom, or other similar conditions occur;
6. When there is a change in the size, location, or placement of the spoil pile; and
7. When there is any indication of change or movement in adjacent structures.

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SECTION 14

SCAFFOLD

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I. General

This section outlines the basic construction guidelines for the erection or scaffolding above ground. It is not possible to cover every type of scaffold listed in the below referenced OSHA Standard. Reference to that standard must be made for more specific information. All scaffold design, construction, and use must be in accordance with the OSHA Standard.

A. **OSHA References**: 29 CFR 1926 Subpart L 450-454

B. **Scaffold Construction**: Design, construction, and modification of constructed scaffold will be accomplished by qualified persons only. Unqualified persons are not permitted to make changes or alterations to any scaffolding. Alteration of structural members, cross bracing, etc. and changes in designed scaffold construction will not be permitted. Personnel who make unauthorized modifications to scaffolding will be subject to disciplinary actions as outline in section 2.

C. **Inspection**: A qualified, competent person will conduct inspection of structural members of scaffold, e.g. tube and coupler or welded frame scaffold, on an annual basis. Additionally, all parts, used in scaffold construction will be inspected during the construction phase for obvious signs of damage and corrosion. Damaged and corroded parts will be made non-functional and immediately removed from the work site. Employees assigned to work on the scaffold will conduct daily inspections using the Modern Electric Co. scaffolding inspection form, at the beginning and end of the workday. All defects, damage or unsafe conditions will be reported immediately and the scaffold will be tagged as unsafe (examples of tags are attached) and roped off to prevent use until repairs have been made.

D. **Training**: The instructor shall be qualified and adequately trained in the proper use and safety procedures for scaffolding and shall be responsible for training all potential users during the new employee orientation and prior to use. In the event a new scaffolding system is employed, additional training on this system will commence immediately or employees will be retrained when conditions change. Training for all affected employees will include at a minimum:

1. The company scaffold program requirements.
2. Identification and elimination of fall hazards on the job site.
3. Safe work in hazardous areas.
4. Hazards associated with working near fall hazards.
5. Selection, use, care and inspection of scaffold equipment.
6. Address electric hazards
7. Identification of potential falling objects.
8. Load capacity.

E. **Dismantling:** Scaffold will be dismantled as soon as the job is completed.

F. **Fall Protection:** A designated competent person will determine the feasibility and safety of providing fall protection for employees erecting and/or dismantling scaffolding. For a detailed description of fall protection requirements, see 29 CFR 1926.451 (g).

1. Scaffolds, six feet and higher, must be equipped with handrails, mid rails, toe boards, and an access ladder or stairway.

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2. All handrails shall be a lumber size of 2" x 4" in dimension. The top of the handrail shall be forty-two inches +/- 3 inches above the platform, which they are constructed on.

3. All mid-rails shall be of an undressed lumber size of 2" x 4" in dimension. The mid-rail shall be centered between the top rail and the working platform.

4. Individuals working on scaffolds without hand rails or mid rails installed are required to wear fall protection above the working height of 10 feet.

G. **General Construction Guide Lines:**

1. All scaffolds must be constructed to support four times the anticipated maximum weight or load.

2. Drawings and specifications, supplied and stamped by a professional engineer are required for scaffolding higher than 60 feet.

3. All scaffolding components, wood and metal are to be inspected prior to use.

4. Lumber used to construct a scaffold, and subject to stress, must be straight grained, free of loose or dead knots, and/or other defects, which might impair its strength or durability.

5. All welded tubular metal frames are to be checked for cracked welds, rust, and deterioration. All cross braces, alignment pins, screw jacks, wheels, handrails and base plates must be inspected for signs of deterioration.

6. Scaffolding constructed on a sound concrete surface must have a base plate or scaffolding foot at each vertical member.

7. All sections of tube and coupler scaffold must be locked together to prevent uplift.

8. When a scaffold is to be constructed on a surface other than concrete, the area shall be graded as level as possible. The scaffold shall be constructed to rest on a mudsill that will be perpendicular to a cross brace, or the shorter distance between two vertical posts. The footing and the mudsill shall be sound, rigid and capable of carrying the full load without settlement or movement in any direction.

9. All platform decking must be 2” x 10” undressed lumber, full thickness and shall overhand not less than 6” and not more than 12”. Scaffold planks shall be battened together and secured with No. 9 wire and or a wooden cleat with no protruding nails. Scaffold platforms shall be tightly planked for the full width of the scaffold.

10. All planking used for platform decking shall be an approved Western White Spruce, or equal construction grade.

11. Where planking is lapped, each plank shall lap its end support by 12 inches at a minimum. The end or edge of all planks shall be uniform in length, not staggered.

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12. Scaffold frames and / or benches must not be placed greater than eight feet on center in a horizontal direction parallel with the cross bracing. This tubular scaffold, with 2" undressed scaffold planking will yield a working load of 50 pounds per square foot. (50 psf).

13. Access Stairways for scaffolds shall have all required railings and platforms that would normally be provided on a typical stairway.

14. Scaffolds shall be secured to a building and / or structure at twenty- four foot vertical intervals when the height of the scaffold exceeds four times the minimum base dimension above ground. In the horizontal direction, a scaffold shall be secured to a building and / or structure at a maximum of thirty-foot intervals.

15. Precautions must be provided to protect employees from entering or exiting an access ladder or stairway from vehicular and or construction traffic.

16. Scaffolding must be protected from vehicular and / or construction vehicle traffic.

17. When working on more than one level of a scaffold at the same time, each level above the working platform must be completely planked to protect the working platform

18. Area below the scaffold should be warning taped to prevent accidental entry below the work area.

19. Pedestrian traffic and / or a walkway area, adjacent to a scaffold shall be protected by installing a one-half inch wire mesh at each working platform. The mesh will be placed between the handrail and secured to the toe board

20. Open flame burning and or welding will not be permitted on a scaffold unless provisions are made to protect against the risk of fire on the scaffold or scaffolding material and the immediate area. Should burning or welding be required, the following procedures must be followed:

a) All four sides of the scaffold and the planking around the immediate working area will be covered with a fire resistant blanket.

b) Proper ventilation must be provided for the working area.

c) A fire watch will be provided

21. Platforms that are covered or partially covered with snow, ice, water, oil, or other slippery material will not be used until the material is cleared. The distribution of rock salt to melt snow or ice is not acceptable as it can corrode the scaffolding and creates a slipping hazard by itself.

22. Items such as valves, piping, blind flanges, etc. weighting over 150 lbs. will not be store on the scaffolding platform.

23. Items such as valves, piping, blind flanges, etc., weighing over 150 pounds will not be stored on the scaffolding platform.

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24. Airlines, welding lines, tag lines, etc., will not be tied off to the scaffold.

25. Scaffold frame members will not be used for the purpose of rigging or hoisting. The installation of an approved hoisting device is required.

26. Tools, materials, and equipment will not be thrown off of the scaffold or dropped to ground level. The clearance between scaffolds and power lines shall be as stated in paragraph (f) (6) in OSHA Regulation 1926.451.

27. In addition to wearing hardhats each employee on a scaffold shall be provided with additional protection from falling hand tools, debris, and other small objects through the installation of toe boards, screens, or guardrail systems, or canopy structures that contain or deflect the falling objects. Paragraph (h) OSHA Regulation 1926.451

H. **Aerial Lifts:**

1. Extensible and Articulating Boom Platforms

a) Lift controls must be tested each day prior to use to determine that such controls are in safe working condition.

b) Only authorized trained persons will be permitted to operate an aerial lift

c) Belting off to adjacent pole, structure or equipment while working form an aerial lift will not be permitted

d) All employees will always stand firmly on the floor of the basket and will not be permitted to sit or climb on the edge of the basket or use planks, ladders or other devices for a work position.

e) A full body harness must be worn and a lanyard attached to the basket when working from an aerial lift.

f) Boom basket load limits specified by the manufacturer will not be exceeded.

g) An aerial truck must not be moved when the boom is elevated in a working position with men in the basket, except for equipment that is specifically designed for this type of operation

h) Articulating boom and extensible boom platforms primarily designed, as personnel carriers must have both platform and lower controls

i) Climbers must not be worn while performing work from an aerial lift.

j) The insulating portion of an aerial lift must not be altered in any manner that might reduce its insulating value.

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k) All lifts shall be designed and constructed in accordance with ANSI requirements for “Vehicle Mounted Elevating and Rotating Work Platforms”

l) All modifications to lifts must be certified in writing by the manufacture.

m) The lift shall be equipped with a back up alarm or be backed up by a spotter.

n) All aerial lifts will be kept a minimum of 10 feet from all electrical lines rated 50kv or less.

l. **Scaffolding users** (persons working on or off of scaffolding) shall be trained on the following information:

1. **Overhead Protection**: When persons are working on the scaffold and an overhead hazard exists, overhead protection shall be provided to the user and shall be positioned not more than 9’ above the working platform of the scaffold.

2. Snow and ice on the scaffold must be removed and the planking sanded before the scaffold is to be used.

3. Tools, materials and debris shall not be allowed to accumulate so as to create a hazard on scaffold platforms.

4. **Fall Protection**: is not required when employees are inspecting, investigating or assessing workplace conditions prior to the start of work or after work is completed.

a) Floor openings, including openings in the scaffold planking 6’ or more above the ground or floor shall be protected with a guardrail or safety net system. Personal Fall Arrest can be used as an alternative or in combination. For Safety net requirements, please see the definition section of this policy.

b) Dangerous equipment located below or in close proximity to a scaffolding system shall be protected or guardrails shall be installed at the opening

c) Building Side Scaffolds: guardrails which are not required on the building side of a scaffold when the platform is less than 16” from the building itself

d) **Controlled Access Zone (CAZ**): In areas where fall protection in feasible or in areas where scaffolds make the work more dangerous, (e.g., bricklaying), when reaching less than or equal to 10” below the working surface, the CAZ line prevents non-overhand bricklayers from inadvertently entering the area immediately adjacent to the fall hazard. The CAZ designates the area where overhand bricklaying may be performed without the use of guardrails, safety nets or personal fall areas systems as fall protection.

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(1) If the overhand bricklayers must reach more than 10" below the working scaffold surface, a guardrail, safety net or other type of fall protection system must protect the bricklayer.

e) **Safety Nets**: if safety nets are selected as a means of fall protection, they shall be installed directly beneath the walk or working surfaces, but shall not be greater than 30' below said walking or working area of the scaffold.

(1) Area requirements for safety nets are outlined in the definition section.

(2) The nets shall be installed so as to provide sufficient clearance beneath them to prevent contact with a surface or structure below if a fall occurs.

f) **Personal Fall Arrest Systems**: Anchorage devices, connectors or body harnesses, which may include a lanyard, deceleration device, lifeline or suitable combination of these. The personal fall arrest system shall:

(1) Be inspected prior to use
(2) Not be attached to a guardrail system
(3) Not be attached to hoisting equipment, unless the system prevents the employee from walking off the surface.

g) **Positioning Devices**: shall prohibit an employee from free-falling more than 2 feet.

h) **Worker Safety**: a safety harness attached to a lifeline shall protect each worker. The lifeline shall be securely attached to a substantial members of the structure, not the scaffold, or to closely rigged lines, which will safely suspend the worker in case of a fall.

i) **Training**: The scaffolding users will receive the following additional training;

(1) Hazards (falls, electrical and falling objects)
(2) Fall protection
(3) Use and load capacity

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SCAFFOLD ACCEPTANCE TAG

ACCEPTED / NOT ACCEPTED	
Complete Platform	Sound, Level Flooring
Guardrails	Barricaded
Toeboards	Framing Complete
Access Ladder	
Comments:	
Signature:	
Date:	

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SECTION 15

LADDERS

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I. General

Falls are the second leading cause of all accidents following motor vehicle accidents? At age 77 and over, falls are the leading cause of accidents. Annually, more than 30,000 people are disabled by falls from ladders. Providing properly designed and well-maintained ladders, providing training for workers in ladder safety, and routinely inspecting ladders, can prevent most of these accidents from occurring on-the-job. The major causes of falls from self-supported ladders are lack of stability and sliding. This section cannot possibly cover all types of ladders and all aspects of ladder safety encountered within the construction industry, therefore for additional information, you are referred to the below referenced OSHA standard.

A. **OSHA Reference**: 29 CFR 1926.1053

B. **Handling and Storage**:

1. Ladders must be handled with care and not subjected to misuse during loading, transporting, erection, use, or dismantling.

2. All ladders must be stored in a vertical or horizontal position. If stored vertically, the ladder will be secured with a chain or rope and fastened to a fixed structure to prevent accidental tipping. Ladders stored on a horizontal rack must be supported on a minimum of two brackets and in a manner that will prevent bowing or sagging of the side rails.

3. Ladders stored or used outside must be protected from inclement weather, heat, dampness, and/or exposure to chemicals.

4. Ladders must not be used as a workbench, a horizontal walkway, platform, or horizontal support for planking. The use of a ladder for other than ascending or descending is prohibited.

5. Ladders must be kept clean and free from any slippery substance at all times.

C. **Inspection**: All ladders require inspection prior to use and annually to insure condition. The ladder will be numbered and coded and the date of the inspection recorded. Damaged ladders will be taken out of service.

1. Ladders with out-of-date inspections will be returned to Modern Electric Co. shop for inspection.

2. Ladders must be inspected for the following:

a) Loose, cracked, broken, or missing pivot pins, hinges, or threaded bolts.

b) Side rails, ladder rungs, steps for corrosion, rotting, splits, weather effects

c) Loose, missing, worn, or damaged ladder safety shoes.

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d) Moveable and non-slip rubber safety shoes.

e) Missing and/or loose extension locks which do not seat properly when the ladder is extended.

f) Proper rope and pulley functional with no rope deterioration.

g) All hinge spreaders on a stepladder must be properly bolted and not bent.

h) Unsafe ladders will be tagged as unsafe and removed or destroyed immediately.

D. **General Ladder Safety:**

1. Ladders must be rated for a minimum working weight of 250 pounds. The combined weight of the user and tools must not exceed the rating.

2. The ladder feet must be covered with a slip resistant material and free of oil.

3. The user must select the right ladder for the task.

4. Ladder users must avoid sudden shifts in body position and lack of attention.

5. The user must use climb and descend the ladder facing the ladder.

6. Only one person may be allowed to work from the ladder.

7. The ladder must be positioned on a stable surface.

8. The ladder must be positioned close to work.

9. The user must avoid reaching out too far.

10. Non-conductive ladders must be used when working near electrical transmission equipment.

11. Fall protection of harness & shock absorbing lanyard must be used above six (6) feet.

12. Wooden ladders must not be painted.

13. Ladders must not be walked or jogged when standing on them.

14. Materials and tools must not be stored on ladders.

15. Ladders must not be placed where they can block, obstruct or be struck by doors.

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16. The users must climb and work from the ladder with the body near the middle of the rung or step.

17. Materials, tools, and equipment should not be carried up or down the ladder. They should be raised and lowered by rope.

18. Ladders must extend at least 36” above the upper landing surface.

19. Ladder rungs, cleats, and steps shall be parallel, level, and uniformly spaced, when the ladder is in position for use.

20. Ladders shall be used only for the purpose for which they were designed

E. **Stepladders:**

1. Stepladders must not be longer than 20 feet.

2. The minimum clearance width between side rails at top step must be 20 inches.

3. Minimum width of the step must be 3 inches.

4. The bucket shelf must be capable of being folded.

5. The metal spreaders must have sufficient strength to hold ladder sections open.

6. The spacing between steps must be no greater than 12 inches.

7. Steps must be corrugated, serrated, knurled, dimpled, or coated with a skid resistant material.

8. The ladder must be fully open.

9. The top step must never be used.

10. Spreaders must be open, locked, and all feet contacting a firm surface.

11. Fall protection of harness & shock absorbing lanyard must be used above 6 feet.

F. **Single Section And Extension Ladders**

1. Extension and or single section ladders must not be rested or leaned against any unstable backing, such as boxes, drums, barrels, or any round objects.

2. Extension or single section ladders must be secured at the top with 3/8 inch or greater manila rope. The ladder will be held at the base while being secured.

3. It is prohibited to splice, tie, join, or fasten ladders together to form a longer section.

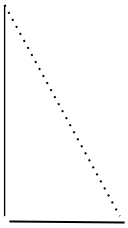
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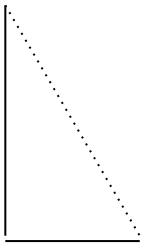
4. The pitch of the ladder shall be no less than 1/4 of the rise. (E.g. 12' rise = 3' run)

12 foot Rise



3 foot run

28 foot rise



7 foot run

NOTE: The rise is determined by measuring the distance from the base of the structure to the point where the ladder is resting. The run is determined by measuring from the base of the structure, horizontally to the base of the ladder.

5. Ever work from the top three rungs of an extension or single section ladder.

6. Safety harness and shock absorbing lanyards are required above 6 feet.

G. **Fixed Ladders:**

1. Must be designed to withstand a single concentrated load of at least 200 lbs.

2. Rungs for metal ladders must have a diameter of 3/4 inches.

3. Rungs at least 16 inch width and be spaced no more than 12 inches apart.

4. Metal ladders must be painted or treated to resist weather and chemical corrosion.

5. The preferred pitch is 75-90 degrees.

6. Unless protected by a cage must have 15-inch clear width on every side of the centerline of the ladder.

7. Rungs of individual rung ladders must have a design to prevent the foot from sliding off the end of the rung.

8. The step across distance from the ladder to the platform or structure may not be more than 12 inches or less than 2 and 1/2 inches.

9. Cages or wells must be provided for ladders more than 20 feet to a maximum unbroken length of 30 feet high.

10. The cage must extend at least 42 inches above the top landing and down to not less than 7 feet or more than 8 feet above the base of the ladder.

11. A landing platform is provided for each 30 feet of height with cages and every 20 feet without cages, wells or safety devices.

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SECTION 16

ASBESTOS WORK PROVISIONS

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I. Asbestos Work Provisions

A. **OSHA Reference**: 1910.1001

B. **Application**: This policy shall apply to all contractors and their subcontractors working with Asbestos Containing Material (ACM) at company project sites. ACM is defined as any material containing greater than 1-% asbestos. These requirements shall be in addition to any requirements specified in the Site Safety Manual, Client Safety Manual, or Contractor Safety Manual.

Note: Any material suspected to be asbestos must be reported to owner. The owner will then make a determination as to the asbestos content and make arrangements to have it removed if positive.

C. **Definitions**: “Asbestos” includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actnolite asbestos, and any of these minerals that have been chemically treated and/or altered.

1. “Surfacing materials” means materials that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, and other purposes).

2. “Presumed asbestos containing material” means thermal system insulation and surfacing material found in buildings constructed no later than 1980.

D. **Scope**: Regulated asbestos work includes but is not limited to the following:

1. Demolition or salvage of structures where ACM is present.

2. Removal or encapsulation of ACM

3. Construction, alteration, repair, maintenance, or renovation of structures, substrates, or portions thereof that contains ACM.

4. Installation of ACM products

5. Asbestos spill/emergency cleanup

6. Transportation, disposal, storage, containment of, and housekeeping activities involving asbestos or products containing asbestos, on the site or location at which the construction activities are performed.

E. **Regulations:**

1. All federal, state or local occupational safety & health standards

2. All federal, state or local environmental regulations for air quality and disposal.

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3. All federal, state or local transportation of hazardous waste requirements.

4. All federal, state of local asbestos worker licensing requirements

5. All client specified safety, health and environmental regulations.

F. **Time Weighted Average:**

1. The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.1 fiber per cubic centimeter of air as an eight (8) hour time weighted average.

a) Determinations of employee exposure shall be made from breathing zone air samples that are representative of the 8-hour TWA and 30-minutes short term exposure of each employee

b) The employer is responsible for setting up initial monitoring for all employees who are exposed to airborne concentrations at or above the TWA permissible exposure limits

c) Additional monitoring shall take place and a written program developed whenever there has been a change in the production, process, control equipment, personnel or work practices that may result in new or additional exposures above the TWA permissible exposure limit and/or excursion limit or when the employer has any reason to suspect that a change may result in new or additional exposure above the PEL.

d) All employee monitoring shall be in accordance with OSHA 1910.1001 Appendix A.

G. **Documents Submission**:

1. The following documentation shall be provided prior to the award of contract for all asbestos contractors and lower tier subcontractors. These documents will be reviewed periodically as required and during the performance of work.

a) Contractor Qualification Questionnaire and associated documents.

b) Certificate of Insurance for General Liability, Auto and Workers Compensation with any applicable asbestos removal endorsements. Certificates must include MEC and the client as additionally insured.

c) Designation of Competent Person responsible for daily supervision of asbestos work and documentation of qualification.

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d) Safety manual to include:

(1) Medically approved respiratory protection program with copy of medical certification.

(2) Site specific asbestos work practice and plan.

(3) Specific training program for asbestos workers.

(4) A copy of all citation issued for asbestos work or disposal violations for the past three years.

(5) A copy of the Contractor Substance Abuse Program and, if applicable, the DOT mandated Employee Drug Abuse Program and Employee Alcohol Misuse Prevention Plan

e) Environmental monitoring firm and testing lab information to include:

(1) Name of selected Environmental Monitoring Firm.

(2) Sampling Protocol.

(3) Certificate of Qualification for Certified Industrial Hygienist of Industrial Hygienist conducting sampling.

(4) Name of selected certified sampling testing facility.

(5) Copy of current testing facility certifications.

(6) Statement of guaranteed test result turn-around time for personal monitoring and perimeter monitoring.

(7) A copy of testing facility sample protocol

2. The following documents will be provided post contract award and prior to beginning any work.

a) All Federal, State, or Local permits for work, removal, and/or disposal.

b) By name certification that all employees on site have completed substance abuse testing with negative results.

c) Written certification, by name and social security number, that all employees have completed medical evaluation and qualification for asbestos work and respiratory protective equipment use.

d) Written certification, by name and social security number, indicating the date and method used to determine qualification of employees for asbestos work.

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e) Photocopies of current Federal, State, or Local asbestos worker licensing.

f) Approved Site Safety Plan and signed documentation of employee site safety orientation.

H. **Provision of Medical Evaluation/Examination and Personal Protecting Equipment**:

1. The contractor will provide, free of cost to employees, all required medical evaluations, examinations, and personal protective equipment.

I. **Records Review and Retention:**

1. The following documents will be made available for review and/or inspection to any Federal, State, and/or Local regulatory agency; the Client Designated Representative; Modern Electric Co. Designated Representative; contractor employees or designated employee, representative; subcontractors and their employees or designated employee representative.

a) All Industrial Hygiene and Environmental Monitoring Data.

b) All Manifests and Hazardous Waste Disposal Documents.

2. All records will be retained in accordance with Federal, State, and/or, Local regulation. In the event of conflicting retention time requirements, the longest duration specified shall be followed.

J. **Regulated Areas:**

1. Regulated areas shall be demarcated from the rest of the workplace in any manner that minimizes the number of persons who will be exposed to asbestos.

2. Only authorized persons shall be allowed to enter area.

K. **Controls**

1. It is the responsibility of the employer to institute engineering controls to bring employee exposure below the TWA

2. Each employee entering a regulated area shall be furnished with but limited to and be required to use full face respirator with appropriate cartridges, tyvek suit with head covering and gloves.

3. Employees will be prohibited from eating, drinking or chewing tobacco in designated areas.

4. All hand operated and power operated tools which would produce or release fibers of asbestos shall be provided with local exhaust ventilation systems.

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5. ACM shall be worked in a wet state sufficient to prevent the emission of airborne fibers so as to expose employees to levels in excess of the TWA.

6. ACM shall not be removed from the designated area without being either wetted, or enclosed, or ventilated so as to prevent effectively the release of airborne fibers.

7. Compressed air shall not be used in the removal of ACM.

8. Shower facilities shall be provided for employees who work in areas above the TWA.

9. No clothing wore in designated areas is to be brought off site to be laundered.

10. Signs – Each regulated area must be posted with the following words:

DANGER ASBESTOS
CANCER AND LUNG DISEASE HAZARD AUTHORIZED PERSONNEL ONLY RESPIRATORS AND PROTECTIVE CLOTHING REQUIRED IN THIS AREA

11. Warning labels shall be placed on all debris and raw materials that are in or leave designated areas.

12. The training provided for all employees that work with ACM:

a) Training shall be provided before initial assignment and at least annually.

b) Training to be in accordance with 1910.1001(j)(7)(iii).

c) Training Documents shall be retained by the company for all employees.

13. Employees will be made aware of the health effects of exposure to asbestos such as asbestosis, mesothelioma, lung cancer, and cancer of the stomach and colon.

14. When working on multi contractor worksites, the Modern Electric Co. will ensure that their employees are protected from possible exposure utilizing this program. If a breach in the lead containment is found, exposed employees will be removed from the adjacent work area until the containment can be fixed and a proper exposure assessment is performed.

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SECTION 17

LEAD ABATEMENT/REMOVAL

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I. Lead Removal and/or Abatement

A. **Scope**: This policy applies to all situations where abatement, contact or removal of materials containing lead, are encountered. Lead containing materials may include, but are not limited to the following:

1. Paints and coatings
2. Cements
3. Mortars
4. Solders
5. Tank Linings
6. Electrical Conduit
7. Sewer Line Sealant
8. Mastics
9. Roofing Materials
10. Manufacturing and occupational lead dust

B. **Application:** This policy applies to all Company Employees and Employees of Modern Electric Co. Subcontractors. Where Subcontractor Firms are hired to remove and/or abate lead, and their policy exceeds the requirements of this policy, OSHA and/or state requirements, the Subcontractor policy, upon approval by the Safety Director will be followed. Where the Client mandates their lead removal and/or abatement policy be followed, the Safety Director shall review the Client's policy for OSHA and/or state compliance before approving the use of the Client policy. Written approval by the Safety Director and General Manager is required.

C. **Training**: All affected employees are required to attend initial and annual training programs. The employees shall be informed of the specific nature of the operations which could result in exposure to lead above the action level, the purpose, proper selection, fitting, use, and limitation of respirators, engineering controls, purpose & a description of the medical surveillance program & the medical removal program. All documentation related to training shall be retained by the company

D. **Responsibility**: It is the responsibility of the Project Manager, Project Supervisor and Safety Director to require and oversee compliance with the lead abatement/removal plan. Subcontractors are responsible to ensure employee compliance with the Project Specific Lead Abatement/Removal Plan, Client Safety and Health requirements, Federal, State and Local requirements.

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E. **Abatement and/or Removal Approval**: All lead removal and /or abatement projects must include a Project Specific Plan to be reviewed and approved by the Safety Director and President during the pre-bid review or prior to the onset of abatement/removal work. This project specific plan must include, at a minimum, the following:

1. A job hazard analysis
2. The location of lead containing materials and anticipated quantity.
3. Method of removal.
4. Method of disposal
5. The approved bulk testing lab
6. The type, number and method of environmental monitoring
7. The type, number and method of personal monitoring
8. Method of containment and cleaning
9. A copy of the subcontractor lead abatement plan.
10. Subcontractor employee training records.
11. Subcontractor medical surveillance certifications and respiratory medical evaluations.
12. Subcontractor Employee respiratory fit test certifications.
13. List of equipment to be used for manual removal and cleaning.
14. Copies of all safety data sheets for chemical stripping agents.
15. State or Municipality requirements.

F. **Recordkeeping Requirements**: The record keeping requirements for lead abatement, as established by OSHA are extensive. The employer must retain medical records and exposure monitoring data for the duration of employment plus thirty (30) years, unless the duration of employment is less than one (1) year. In that event, records must be given to the employee upon termination. If the employer ceases to do business, medical records must be transferred to the successor employer who will retain and maintain the medical records. If there is no successor employer, medical records will be transferred to the US Secretary of Labor. State and Municipality requirements will be addressed in project specific documents. All records outlined in this procedure will be immediately provided to the designated client representative, the Project Manger and Regional Safety Director. Copies will be retained by the employer and accessible to the employees and employee representative. These records include, but are not limited to the following:

1. Lead Sample Tracking Logs

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2. Analytical data supplied by approved labs.

3. "Lead Free" certifications provided by the client, manufacturer, installer, etc.

4. Employee training and certification records.

5. Employee medical surveillance and testing records.

6. All exposure assessments, including medical surveillance, medical removals, reports by industrial hygiene perimeter and personnel monitoring reports.

7. Copies of licensing or permit forms issued by the state or municipalities.

8. Job records such as job logs, diaries, etc. pertaining to removal or abatement

9. Work permitted provided by clients.

10. Periodic Safety Inspections

11. Hazardous Waste disposal records.

G. **Initial Determination Procedure**: The presence or absence of lead in materials will determine the need for the implementation of this section.

H. **Pre-work determination of lead containing materials**: The presence or absence of lead may be pre-determined by several different methods. The following pre-work determinations may be used:

1. Pre-work samples analyzed by an accredited laboratory for determination of composition.

2. Written statements, such as Safety Data Sheets, technical data sheets, etc. prepared by the manufacturer and/or client may be used.

3. Testing results and certifications supplied by the manufacturer, installer and client.

4. Portable X-ray Fluorescence (XRF) detection results.

5. Previous personal and environmental monitoring results obtained by the employer, client and subcontractor.

6. All documents must be forwarded to the Regional Safety Director and maintained on file in the field. Clients must also be provided with documentation.

7. Employees will be provided with the results of testing.

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I. **No Pre-work Lead Assessment Data**: In the event that no pre-work lead assessment data is available, the lead content must be established.

1. An assumption of exposure to lead above the OSHA Permissible Exposure Limit (PEL) of 50ug/m3, and not exceeding 500ug/m3 is mandated by OSHA for the following tasks

a) Where lead containing coatings or paint are present: manual demolition of structures (e.g. dry wall), manual scraping, manual sanding, heat gun application, and power tool cleaning with dust collection systems.

b) Spray painting with lead paint.

c) Where the employee has any reason to believe that an employee is exposed to lead in excess of the PEL

2. An assumption of exposure to lead above the OSHA Permissible Exposure Limit (PEL) and in excess of 500ug/m3 is mandated for:

a) Using lead containing mortar; lead burning.

b) Where lead containing coatings or paint are present: rivet busting; power tool cleaning without dust collection systems; cleanup activities where dry expendable abrasives are used; and abrasive blasting enclosure movement and removal.

3. An assumption of exposure to lead in excess of 50 X the PEL or in excess of 2500ug/m3 is mandated for the following:

a) Abrasive blasting.

b) Welding

c) Cutting

d) Torch burning

e) Grinding

4. Until an employee exposure assessment is performed and appropriately documented, the following interim protection is required at no expense to the employee:

a) Respiratory protection as outlined in 29 CFR 1926.62

b) Personal Protective Clothing and Equipment is required as follows:

(1) Coveralls or similar full-body work clothing.

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(2) Gloves, hats and shoes or disposable shoe covers.

(3) Face shields, vented goggles, or other appropriate protective equipment.

(4) Clothing will be supplied in a clean and dry condition weekly. Clothing will be provided on a daily basis for exposure levels over 200ug/mg3.

(5) Cleaning, laundering, and disposal of clothing will be provided.

(6) Repair and replacement of all Personal Protective Equipment to insure effectiveness shall be provided.

(7) Clothing must be removed at the completion of a work shift in a change area specifically provided for that purpose.

(8) Contaminated clothing will be placed in a closed container in the change area, which will prevent dispersion of lead outside the container.

(9) All persons involved in cleaning, laundering or disposal of contaminated clothing will be advised in writing of the hazards of lead exposure

(10) All containers of contaminated clothing or equipment shall be labeled with the following statement: **Caution: Clothing contaminated with lead. Do not remove dust by blowing or shaking. Dispose of contaminated wash water in accordance with applicable local, state or federal regulations.**

(11) Shaking and/or blowing off dust particles are prohibited

5. Change areas are required.

a) Change areas will be equipped with separate storage facilities for protective work clothing and equipment for street clothes to prevent cross contamination.

b) Employees will not be allowed to depart the work area with any potentially contaminated clothing or equipment.

c) Hand washing facilities will be provided in accordance with 29 CFR 1926.51(f). If showers are not provided, all employees must wash their hand and face at the end of the workday, prior to leaving the work site.

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6. Biological monitoring to consist of blood sampling and analysis for lead and zinc protoporphyrin levels are required every six (6) months until two consecutive blood samples and analysis are acceptable. The sampling and monitoring should be performed at least monthly during the removal period. Any employee with elevated blood levels should be temporarily removed. Employees should be notified in writing within five (5) days when lead levels are not acceptable. (The standard requires temporary medical removal with Medical Removal Benefits).

7. Training under 29 CFR 1926.62 (lead) and 29 CFR 1926.59 (hazard communication), respiratory protection and fit testing and safety training in accordance with 29 CFR 1926.21 (safety training and education), 29 CFR 1910.20.

J. **Sampling Procedure:** If bulk sampling is required for positive identification, the following procedure must be followed:

1. The individual taking the samples must wear all required Personnel Protective Equipment, and dispose of contaminated equipment as follows:

   a) Outer protective clothing (e.g. Tyvek suit).

   b) Full Face Negative Pressure Respirator equipped with HEPA cartridges or Powered Air Purifying Respirator (PAPR).

   c) All potentially contaminated clothing will be disposed placed in properly marked lead disposal bags.

   d) All samples will be taken as far away from breathing zone and body as possible.

2. Only the individuals necessary for taking the samples will be present.

3. The material shall be wetted with a light water mist to minimize the discharge of airborne particulate matter during sampling.

4. The material shall be carefully removed to insure a representative sample of all layers of the material.

5. The sample must be placed in a small, transportable container, clearly marked as to the content, location of the sample source, date and time of sample. Zip lock bags are acceptable for this purpose.

6. The sample container must be tightly sealed and prevented from accidental opening. Outer surface of container should be wiped with damp cloth to prevent contamination.

7. Any material dislodged during the sampling procedure must be cleaned immediately by use of a HEPA vacuum.

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8. The sample identification number, location, date, and time of the sample will be logged on the" Lead Sample Tracking Log" and forwarded to the approved lab for analysis.

9. Results of all samples will be entered on the "Lead Sample Tracking Log".

10. Copies of all testing logs will be provided to the client, one copy will be maintained in the field, and one copy will be provided to the Regional Safety Director. In all cases, the employees will be advised of the sample results.

K. **Positive Initial Determination**: If a positive initial determination has been established which shows the possibility of any employee exposure at or above the action level, monitoring representative of the exposure for each employee in the workplace who is exposed to lead must be conducted.

1. If previous monitoring for lead exposure and the data obtained falls within the past 12 months during work operations conducted under workplace conditions closely resembling the processes, type of material, control methods, work practices, and environmental conditions used, earlier monitoring results may be used if the sampling and analytical methods meet the accuracy of confidence prescribed by OSHA 29 CFR 1926.62 (d) (10).

2. The frequency of monitoring, for blood sampling, at or above the action level of 30ug/m3 but below the PEL of 50ug/m3, monitoring will be performed every six (6) months. Six-month monitoring must continue until a minimum of two consecutive measurements, taken at least 7 days apart show results below the action level.

3. If the initial determination discloses exposure results above the PEL of 50ug/m3, monitoring must be continued on a quarterly basis until a minimum of two consecutive measurements, taken at least 7 days apart show results below the PEL but above the action level. In this event, the requirements of paragraph 6.2 shall be in force. If consecutive measurements taken at least 7 days apart show results under the action level, monitoring may be discontinued.

4. Modern Electric Co. shall provide lunch room, hygiene, shower, and changing facilities when exposures are above the PEL.

5. Warning signs should be posted in the work area where the PEL is exceeded "DANGER DO NOT ENTER – LEAD"

L. **Negative Initial Determination**: If a determination conducted under 29 CFR 1926.62 (d) (1), (d) (2) and (d) (3) has been made and displays that no employee is exposed to airborne concentrations of lead at or above the action level, a written record of the determination with all support documentation, including the date of determination, the exact location within the worksite and the name and social security number of each employee monitored must be submitted and maintained.

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1. Whenever there has been a change of equipment, process, control, personnel, or a new task is initiated that may result in additional employees being exposed to lead at or above the action level, or may result in employees already exposed at or above the action level being exposed above the PEL, additional monitoring must be accomplished.

M. **Employee Notification**: The employee must be notified within fifteen (15) working days after completion of the exposure assessment. Each employee must be notified in writing of the results that represent the employee's exposure.

N. **Accuracy Of Measurements**: The method of monitoring and analysis used must have an accuracy (to a confidence level of 95%) of not less than plus or minus 25% for airborne concentrations of lead equal to or greater than 30ug/m3.

O. **Engineering Controls**: Engineering controls and work practices controls must be the main method of controlling airborne lead contamination. All feasible engineering practices must be utilized. Personnel protective equipment should be used to supplement engineering and work practice controls.

P. **Medical Surveillance:** A medical surveillance program shall be instituted in accordance with paragraphs (j)(2) and (j)(3) of OSHA 29 CFR 1926.62 for all employees who are or may be exposed by at or above the action level for more than 30 days in any consecutive 12 months.

1. All medical examinations and procedures shall be performed by or under the supervision of a licensed physician.

Q. **Compliance Programs**: No lead removal and/or abatement work will be permitted to begin until a written compliance program has been developed, submitted, and reviewed by the Safety Director, President, and the designated client representative. Compliance programs will include, as a minimum:

1. A description of each activity that may emit lead, including the equipment used, material involved, controls in place, crew size, employee job responsibilities, and operating procedures and maintenance practices.

2. A description of the specific means that will be employed to achieve compliance to include engineering plans and studies used to determine methods selected for controlling exposure.

3. A report of the technology considered in meeting the PEL.

4. Air monitoring data that documents the source of the lead emissions.

5. Detailed schedule for implementation of the program, including documentation e.g., copies of purchase orders for equipment, contracts, and subcontracts, etc.

6. A work practice program including items required for protective clothing, housekeeping and hygiene facilities.

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7. An administrative control schedule.

8. Method of informing all affected or potentially affected employees of the potential exposure to lead and the hazards associated with lead exposure.

9. Frequency of inspections of sites, materials, and equipment by a designated, competent person(s).

10. All affected employees, authorized employee representative will be provided with a copy of the compliance program upon request.

11. Plans will be maintained on the job site for review/inspection by the client representative, any governmental regulatory agency, employees and/or employee representatives.

12. Compliance programs will be reviewed at a minimum frequency of 6 months and will reflect the current status of the program.

R. **Health Effects**: All employees will be made aware of the effects of exposure to lead including the following:

1. **Acute Exposure**

a) Loss of appetite
b) Nausea and vomiting
c) Stomach cramps
d) Constipation
e) Difficulty in sleeping
f) Fatigue
g) Moodiness
h) Headache
i) Joint or muscle aches
j) Anemia

2. **Chronic Exposure**

a) Severe damage to blood forming
b) Severe damage to nervous, urinary, and reproductive systems

S. **Multi-Contractor Site:** When working on multi contractor worksites, the Advanced Coring and Cutting will ensure that their employees are protected from possible exposure utilizing this program. If a breach in the lead containment is found, exposed employees will be removed from the adjacent work area until the containment can be fixed and a proper exposure assessment is performed.

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SECTION 18

INORGANIC ARSENIC

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I. Inorganic Arsenic

A. **Scope**: This policy applies to all Modern Electric Co. employees or employees of Modern Electric Co. subcontractors who may be exposed to inorganic arsenic The action level, as prescribed by 29 CFR 1926.1118, is 5 micrograms per cubic meter of air averaged over any eight hour period. (5ug/m3). The permissible exposure level has been established at inorganic arsenic concentrations greater than 10 micrograms per cubic meter of air, averaged over any 8-hour period. (10ug/ms).

B. **Notification of Use**: Modern Electric Co. is not a user of inorganic arsenic. However, this material may be found at many of our client's facilities. OSHA required notification of use documents to be filed by every employer by October 1, 1978 or within 60 days of introduction of the material to the work site the establishment of regulated areas was required. Modern Electric Co. should request copies of any plot plan or unit map indicating the location of regulated areas. All employees must be trained, as part of their initial site training, as to the hazards of inorganic arsenic exposure, signs, symptoms, necessary protective equipment, and the location of regulated areas.

C. **Exposure Monitoring**: Air samples, taken by certified technicians and analyzed by approved Environmental Laboratories, must be taken from air that is representative of each employee's exposure to inorganic arsenic over an eight-hour period.

1. Exposure for monitoring purposes is defined as exposure that would occur if the employee were not using a respirator.

2. Full shift personal samples (a minimum of 7 hours) must be collected for each shift, each area and one sample for each classification in each work area.

D. **Initial Monitoring**: Initial monitoring is required to accurately determine the employee's exposure to inorganic arsenic. All employees will be notified within 5 working days, in writing, of the results of any monitoring samples that represent the employee's exposure. If the results of monitoring conducted indicate exposure above the permissible exposure limit, a written notice will be provided. The written notice must include as statement that the PEL was exceeded and a description of the corrective actions taken to reduce the exposure below the PEL.

1. If the initial monitoring discloses exposure below the action level, additional monitoring will not be required unless:

a) There has been a change of production, process, control, or personal change that may result in new or additional exposures.

b) Whenever the company, the employee or the client has any other reason to suspect a change that may result in new or additional exposures.

c) Whenever an employee reports that they may be exposed above the action level

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2. If the initial monitoring discloses exposure at or above the action level and below the PEL, monitoring will be repeated at least every six months. Monitoring will continue until at least two consecutive samples taken within 7 days or each other disclose exposure levels below the action level.

3. If the initial monitoring discloses exposure above the PEL, the monitoring will be conducted at least quarterly. Monitoring will continue until at least two consecutive samples taken within 7 days of each other disclose exposure levels below the PEL (refer to 4.2 above for monitoring frequency) or below the action level.

E. **Accuracy of Measurement**: Sampling devices and equipment used to monitor exposure must be accurate (*with a confidence level of 95%*) of measuring concentrations of inorganic lead. Only certified laboratories will be selected for analyzing.

F. **Regulated Areas**: Regulated areas will be established where employee exposures are in excess of the PEL.

1. The regulated area must be segregated from the rest of the work place in a manner that will minimize the number of persons who will be exposed.

2. Access to the regulated area must be limited to persons authorized, trained, and designated as having access to the area.

3. All persons entering a regulated area must be trained, qualified, fit tested, and provided with respiratory protection in accordance with the Respiratory Protection Program. Documentation of training must be on file with the Project Supervisor and Safety Director.

4. Food, beverages, smoking products, chewing tobacco, or other smokeless tobacco and chewing gum will not be consumed in the regulated area. Cosmetics will also not be applied. Drinking water may be consumed.

G. **Respiratory Protection**: Respiratory protection must be used if engineering and work practices cannot reduce the exposure level below the PEL. Respirators will be used in the following circumstances:

1. While installing or implementing feasible engineering or work practice controls.

2. During maintenance and repair work when the client has established that engineering controls are not feasible.

3. Where engineering controls and supplemental work practice controls are not sufficient to reduce the exposure.

4. Respirator selection will be accomplished in accordance with the Respiratory Protection Program.

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5. Respirators will not be issued to any employee not trained in the use, care, and selection. Respirators will not be issued to any employee not fit tested in the specific respirator issued

H. **Protective Work Clothing**: Protective Work Clothing will be provided at no cost to the employee as follows:

1. Coveralls or similar full-body work clothing.

2. Gloves and shoes or coverlets

3. Face shields or vented goggles when necessary to prevent eye irritation. Impervious clothing for employees exposed to arsenic trichloride.

4. Cleaning and replacement will be provided at least once weekly in a freshly laundered, clean, and dry condition. If the employee is exposed to inorganic arsenic of over 100 ug/m3 or in an area where more frequent washing is needed to prevent skin irritation, clothing will be provided daily.

5. Clothing shall be repaired or replaced to maintain its protection factor.

6. Clothing will only removed in designated change rooms and will be disposed of in containers clearly marked with the following:

a) CAUTION: Clothing contaminated with inorganic arsenic; do not remove dust by blowing or shaking. Dispose of inorganic arsenic contaminated wash water in accordance with applicable Local, State, or Federal Regulations.

7. Contaminated clothing and/or equipment will not be shaken out by employees or taken outside of the designated change trailer

I. **Housekeeping**: All surfaces must be maintained free from accumulations of inorganic arsenic. Shoveling and brushing of floors and surfaces will be allowed only if vacuuming with a HEPA equipped vacuum has failed to clean the surfaces. Air blowing is not permitted at any time.

J. **Hygiene Facilities**: The following hygiene facilities will be provided to employees working in regulated areas.

1. Change Facilities will be provided with clean rooms equipped with storage facilities for street clothes and separate storage for protective clothing and equipment.

2. Showers will be provided where employees working in regulated areas.

3. Lunchrooms that have a temperature controlled positive pressure filtered air supply and readily accessible to employees working in regulated areas.

4. Employees must wash hands and faces prior to eating.

5. Lavatory facilities shall be provided.

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6. Vacuums will be provided to clean protective clothing and shoes worn in areas where the exposure exceeds l00ug/m3, in an area before entering change rooms, lunchrooms, or shower rooms required

K. **Signs And Labels**: Signs will be posted around the perimeter of the regulated area and labels will be used to identify samples, waste, contaminated clothing, and equipment will be utilized

1. Signs stating the following will be posted in and around the regulated work area:

DANGER INORGANIC ARSENIC
CANCER HAZARD AUTHORIZED PERSONNEL NO SMOKING OR EATING RESPIRATOR REQUIRED

2. Labels must be applied to all shipping and storage containers of inorganic arsenic:

DANGER
CONTAINS INORGANIC ARSENIC CANCER HAZARD HARMFUL IF INHALED OR SWALLOWED USED ONLY WITH ADEQUATE VENTILATION OR RESPIRATORY PROTECTION

L. **Medical Monitoring**: All employees who may be expected to be exposed above the action level, without regard to the used of respirators for at least 30 days per year shall be examined by a physician

1. The initial examination shall include a work history and a medical history including a smoking history, pulmonary function test, and examinations for symptoms such as breathlessness, cough, sputum production, and wheezing.

a) A 14" by 17" posterior-anterior chest x-ray and ILO U/C rating.
b) A nasal and skin exam
c) Sputum cytology examination

2. Periodic exams must be provided annually for employees who are under 45 years of age with fewer than 10 years exposure over the action level.

3. Additional examinations will be conducted if the employee develops signs or symptoms associated with exposure

M. **Employee Training**: No employee will be allowed to perform any task which may result in exposure above the action level without training in this policy and the contents of 29 CFR 1926.1118 (inorganic arsenic), 1926.59 (hazard communication), respiratory protection. Additionally, training must be provided in the following:

1. The quantity, location, manner of use, storage, source of exposure, and the nature of the operation which could result in exposure and any necessary protective steps. The purpose, proper use, and limitations of respirators.

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2. The purpose and description of the medical surveillance program engineering controls and work practices associates with the job.

N. **Monitoring Data Record Keeping**: As a minimum, the following records will be maintained and accessible to the employee, client designated representative, and employee designated representative. Monitoring records must be retained and maintained for a period of at least 40 years or for the duration of employment plus 20 years whichever is longer.

1. All environmental monitoring data including the date, number, duration, location, and results of each of the samples taken, including a description of the sampling procedure used to determine representative employee exposure.

2. A description of the sampling and analytical method used and evidence of their accuracy.

3. The type of respiratory protection worn, if any.

4. The name, social security number, and job classification of the employees' monitored and all other employees whose exposure the samples represent.

5. The environmental variables that could affect the measurement of the employee's exposure.

O. **Medical Records Retention**: The employer or the Physician must maintain medical records for at least 40 years or the duration of employment plus 20 years. A medical surveillance record will be established and maintained as an accurate record for each employee subject to medical surveillance. The record shall include as a minimum:

1. The name, social security number and description of the employee's duties.

2. A copy of the Physicians written opinions.

3. Results of any exposure monitoring done for the employee and the representative exposure levels supplied.

4. Any employee medical complaints related to exposure to inorganic arsenic.

5. A copy of the medical examination results including medical and work history

6. A description of the laboratory procedures and a copy of any standards or guidelines used to interpret the test results.

7. The initial x-ray.

8. The x-rays for the most recent 5 yrs.

9. Any x-ray with a demonstrated abnormality and all subsequent x-rays

10. The initial cytological examination slide and written description for the most recent 5 years

11. Any cytological examination slides with demonstrated atypia, if such atypia persists for 3 years and all subsequent slides and written descriptions.

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SECTION 19

ENVIRONMENTAL

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I. General

Compliance with Federal, State, Municipal, and Client Environmental Requirements are of critical concern to Modern Electric Co. This part is, for the most part, advisory. Minimal environmental requirements for all company sites are established. Where Federal, State, Municipal and/or Client Requirements meet or exceed the Company Environmental Plans; the more extensive plans shall be followed.

II. Compliance

All company employees and their subcontractors will comply with established environmental requirements. Failure to comply may result in disciplinary action up to and including termination for the offending individual or company. Additionally, each individual must be aware that willful or negligent violation of Federal, State or Municipal Environmental Laws may result in criminal or civil citation to the individual and/or the employer.

III. Training

Equipment operators, general laborers, supervisors and management, etc., must be trained prior to being allowed to participate in or supervise field activities. The training should cover the use of personal protective equipment. The training should also cover work practices which minimize hazardous risks and safe use of engineering controls & equipment.

IV. Responsibility

Modern Electric Co. most qualified employee has responsibility for controlling the operations at the site during the emergency response until properly relieved by a “Qualified” senior official.

Project Managers must be aware of any potential hazardous materials that will be used or generated as part of the project. The Project Superintendent and Project Manager are responsible for development and implementation of a site environmental plan. Employers are responsible to ensure company and employee compliance with the plan.

V. Trash/Rubbish Disposal

The Project Superintendent shall require compliance with local trash/rubbish disposal requirements such as separation of trash for the purpose of recycling. Hazardous materials, paint containers, etc. may not be permitted in normal trash or refuse.

VI. Soil Removal and Back Fill

Subcontractors responsible for excavation, removal of soil or construction demolition debris, backfill, etc. shall ensure that all permits and conditions of Federal, State, Municipal and/or Client are met. Soil sampling may be required and many municipalities restrict the transportation of back fill from one area to another. Excavated soil that may be contaminated may require isolation, containment, sampling, and special methods of disposal.

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VII. Soil Erosion and Conservation

An environmental survey of the area should be conducted to establish the location of wetlands, wildlife areas, streams, tributaries, watersheds, etc. Silt fencing, sediment-settling ponds, flocking ponds, etc. may be required to prevent soil from entering restricted areas

VIII. Sources of Environmental Contaminants

A. The following is a partial listing of activities which may generate environmental contaminants:

1. Excavation work in oil refineries, chemical plants, construction sites, underground storage areas, airports, fuel storage areas, pharmaceutical plants, etc.

2. Rags used for wiping spills.

3. Absorbent materials used for drying certain spilled materials.

4. Construction material containers with residue.

5. Draining of contaminated equipment, e.g. hoses, lines, pumps, oil filled electrical switches, etc.

6. Tank, drum, vat, vessel cleaning, or residue removal.

7. Vehicle fuels, oils, transmission fluids, hydraulic fluids, etc.

8. Painting and cleaning solvents.

9. Sand blasting spoils.

10. Asbestos removal.

11. Lead abatement/removal.

12. Burning of stumps, brush or construction debris.

IX. Resource Conservation Recovery Act (RCRA)

RCRA was enacted by the Federal Government to assure proper storage, transportation, and disposal of hazardous wastes. A hazardous waste is defined as having:

A. **Characteristic Wastes**:

1. A flash point of less than 140 degrees F.

2. A pH of less than 2.0 and greater than 12.5.

3. Reactive/unstable (reacts violently with water or generates toxic gases when mixed with water)

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4. A toxicity characteristic (TCLP) e.g. the leach ate of the waste contains certain heavy metals.

B. **Listed Wastes from Non-Specific Sources:**

1. Certain spent solvents.

2. Certain electroplating sludge.

3. Sludge and solutions from cyanide operations.

4. Certain used oils, waste oils, oil sludge, and oil spill cleanup.

C. **Listed Wastes from Specific Sources**:

1. Miscellaneous sludge, residues and waste fractions from the manufacture of wood preservatives, organic chemicals, inorganic chemicals, pesticides, explosives, petroleum refining, leather tanning, inks, pharmaceuticals, paper production, and lead, zinc, iron, or steel refining.

2. Listed acute hazardous wastes.

3. Listed toxic hazardous wastes.

4. Wastes containing certain hazardous constituent's insignificant amounts.

D. **Hazardous Waste Storage**: Hazardous wastes must be stored in the following manner

1. On an impervious surface.

2. For a period of not more than 90 days

3. It must be labeled with the type of waste and the date the hazardous waste was first placed in the container

4. All identification labels must be readily visible and legible

5. All containers must be sealed and in good condition

6. Waste must be segregated by type and incompatible wastes must be separated.

7. The storage area must be inspected daily and the inspection must be documented.

E. Shipment of Hazardous Wastes: Waste Manifests must accompany every shipment of hazardous waste. Copies of the Manifest must be sent. The purpose of the Manifest is to:

1. Track the waste movement from cradle to grave.
2. Specify the generator of the waste, the transporter and the disposal facility.
3. Identify each person handling the waste and completing a section f the manifest.

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X. Storage and Use of Hazardous Materials at Company Sites

A. The following rules will be followed:

1. Fuel storage areas will be protected against damage from motor vehicles and other construction equipment by installation of “bumpers”, curbs, stops or other devices.

2. Oils, chemicals, fuel tanks and portable fuel dispensing containers will be stored in a containment device to prevent spillage or leakage to the ground.

3. Catch basins or other devices will be installed under equipment being refueled.

4. Piping or equipment containing hazardous materials will not be cleaned to the ground, soil or allowed to run off to sewers or other estuaries.

5. Hazardous materials will be used in accordance with the manufacturer recommendations.

6. Safety Data Sheets for all hazardous materials will be provided to the project superintendent prior to bringing any hazardous material on site.

7. Hazardous materials transferred into containers other than the original manufacturer container will contain hazard and warning labels in accordance with the OSHA Hazard Communication Standard and manufacturers specifications. Under no circumstances will unlabeled containers be allowed.

8. Labels must be removed from empty containers that have been cleaned of hazardous residue material.

XI. Medical Surveillance

All employees who are or may be exposed to hazardous substances or health hazards at or above the established permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year shall be provided by Modern Electric Co. at no cost to the employee medical monitoring.

Modern Electric Co. emergency response employees who exhibit signs or symptoms which may have resulted from exposure to hazardous substances during the course of an emergency shall be provided with medical consultation at no cost to the employee. They may also be placed on a medical monitoring program based on the exposure.

XII. Engineering Controls

A. Feasible engineering controls include the use of pressurized cabs or control booths on equipment, and/or the use of remotely operated material handling equipment. Engineering controls, work practices & PPE shall be used to reduce & maintain exposure limits.

B. Air monitoring shall be used by the supervisor to identify & qualify airborne levels of hazardous substances. The monitoring shall address initial entry, periodic monitoring, possible IDLH & wherever exposure may be a possibility.

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XIII. Decontamination Procedures

A. The supervisor shall be responsible to ensure all personnel are properly decontaminated and area is restricted from all unauthorized personnel. The supervisor shall modify decontamination procedures as needed

B. Decontamination procedures shall be developed by the Supervisor that is specific for the site. The procedures shall be reviewed with workers and walk through of the decontamination line with all workers prior to commencing work. All workers, equipment, and personal protective equipment that entered the contaminated area must be properly decontaminated before exiting the area.

C. The decontamination area shall be established in an area to minimized cross contamination of clean areas and personnel.

D. If the decontamination procedure developed by the Supervisor indicates a need for regular showers and change rooms outside of a contaminated area, they shall be provided and meet the requirements of 29 CFR 1910.141. If temperature conditions prevent the effective use of water, then other effective means for cleansing shall be provided and used.

XIV. Emergency Response Procedures

The purpose of this section is for individuals who are likely to witness or discover a hazardous substance release and who have been trained to initiate an emergency response sequence by notifying the proper authorities of the release.

An emergency response plan shall be developed & implemented to handle anticipated emergencies prior to the commencement of emergency response operations. The plan shall be in writing and available for inspection by employees, their representatives and OSHA. The minimum items should be addressed:

1. Pre-emergency planning & coordination with outside parties.
2. Personnel roles, lines of authority, training & communications
3. Emergency recognition & prevention
4. Safe distances & places of refuge.

XV. Training

A. All Modern Electric Co. employees who are likely to witness or discover a hazardous substance release shall be trained at the awareness level unless otherwise determined by Modern Electric Co. Management. The instructor shall have the training and/or academic credentials and instructional experience to demonstrate competency to provide training. Employees who are trained in accordance with the plan shall receive annual refresher training. A record of methods used must be kept on file.

B. Employees who are likely to witness or discover a hazardous substance release and shall receive 8 hours awareness level training or have had sufficient experience to demonstrate competency in areas of initiating an emergency response sequence by notifying the proper authorities of the release and will be maintained as part of their training records.

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C. Employees who receive 8 hours first response operation level training or have had sufficient experience to demonstrate competency in areas of responding to releases or potential releases of hazardous substance, to protect wear by persons, property or the environment. Their function is to contain the release from a safe distance and help it from spreading. Certification is required and will be maintained as part of their training records.

D. Employees who receive 24 hours technician level of training equal to first responder operations level with knowledge of how to implement emergency response plan, know the classification, identification & verification of known or unknown substances, functions within an assigned role in the ICS, how to select & use of proper PPE, perform advanced containment, & understands decontamination & toxicology. Certification is required and will be maintained as part of their training record.

E. In addition to the 24 hours of training for the technical level, the specialist must be able to develop a site safety & control plan. This person is required to have at least 24 hours of training equal to the first responder operations level. This person knows how to implement the program & system, PPE, hazard risks, State & Federal regulations & decontamination. Certification is required and will be maintained as part of their training record.

F. In addition to the 24 hours of training for the first responder level, the On- Scene Incident Commander must be able to implement the program and system, PPE, hazard risks, State, Federal regulations and decontamination. Certification is required and will be maintained as part of their training record.

XVI. Personal Protective Equipment

All Modern Electric Co. employees will utilize the appropriate PPE dictated by the individual controlling the response provided they are currently trained in the use of the PPE. For all unknown materials Level B (see section 4) shall be utilized until it has been deemed by the controlling individual that it is safe to downgrade PPE.

XVII. Post Emergency Response

A. Modern Electric Co. does not remove hazardous substances, health hazards and materials contaminated with them (such as contaminated soil or other elements of the natural environment) from the site? This shall be the responsibility of the Host Employer, Contractors, and/or State or Federal authorities

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SECTION 20

GROUNDING PROGRAM

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I. Policy

All 120 volt, single phase 15, and twenty ampere receptacle outlets on Modern Electric Co. construction sites, which are not part of the permanent wiring of the building or structure and in use by Modern Electric Co. employees or their subcontractors must have approved ground fault circuit interrupters for personnel protection. Receptacles on a two wire single phase portable or vehicle mounted generator rated more than 5kW, where the circuit conductors of the generator are insulated from the generator frame and all other grounded circuits, need not be protected with ground fault circuit interrupters.

A. **OSHA reference**: 29 CFR 1926.404

B. **Exceptions**: Exceptions to this policy must be made by the Modern Electric Co. Safety Coordinator. If an exception is granted, the assured equipment grounding procedures, outlined in Section 20, must be followed. A copy of this program must be posted and maintained at the work site.

C. **Identification of Conductors:** A conductor used as a grounded conductor must be identifiable and distinguishable for all other conductors. A conductor used as an equipment-grounding conductor must be identifiable and distinguishable from all other conductors.

D. **Polarity of Connections**: No grounded conductor will be attached to any terminal or lead so as to reverse designated polarity.

E. **Reference**: For additional electrical information refer to the OSHA Standards referenced at the top of this page

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SECTION 21

ASSURED GROUNDING PROTECTION PROGRAM

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I. Program

This program is designed to provide for inspection, testing, and documentation of testing for all Modern Electric Co. sites not in compliance with Section 20 of this manual. All cord sets, receptacles, which are not part of the building or structure, and equipment connected by cord and plug which are available for use or used by employees covered by this program. In addition a copy of this program shall be posted or kept in a location where employees can reference it if needed.

A. **OSHA References**: 29 CFR 1926.404, 29 CFR 1926.32 (f)

B. **Scope**: On Modern Electric Co. sites, where the grounding program outlined in Section 19 of this manual cannot be complied with, the requirements of this Section and OSHA 29 CFR 1926.404 will apply.

C. **Approval Authority**: This program is not valid for the site unless approved and endorsed by the Modern Electric Co. Safety Coordinator. A separate program endorsement is required for each site.

1. **Sample Endorsement**: I have reviewed this site and found that it is not in compliance with Section 19 of the Modern Electric Co. Health and Safety policy and procedures manual. The requirements of the Assured Grounding Protection Program, as outlined in this Section, are approved for use at this site and compliance with this Section is mandatory. This policy will remain in effect until work at the site is completed.

2. **Competent Person(s):** In accordance with 29CFR 1926.32(f) and 1926.404, the below named individual(s) are named as competent person(s) required to implement the requirements of this program.

_____
Site Location and Name

_____
Name of Designated Competent Person

_____
Name of Designated Competent Person

_____
Name of Company Safety Director Date of Approval

_____
Signature

D. **Posting**: A copy of the endorsed policy for each site must be posted at the site. All required documentation of testing will be kept at the site until completion of project. At completion, all documentation will returned to the Modern Electric Co. office for appropriate disposition.

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E. **Identification of Equipment:** will be identified by engraved, yellow plastic tags, sequentially numbered and attached to the equipment with a nylon tie wrap.

F. **Visual Inspections:** Each cord set, attachment cap, plug and receptacle of cord sets and any equipment connected by cord and plug, except cord sets and receptacles which are fixed and not exposed to damage, must be visually inspected before each days use for external defects such as deformed or missing pins, insulation damage or indication of internal damage.

G. **Tests**:

1. The following tests will be performed prior to first use; prior to returning equipment to service following any repair and before equipment is used after any incident which could be reasonable expected to have caused damage (e.g. cord sets run over by vehicles) and at not less than 3 month intervals

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

b) Each receptacle and attachment cap or plug must be tested for correct attachment of the equipment grounding conductor

c) The equipment grounding conductor must be connected to its proper terminal

2. At intervals not to exceed 6 months, all cord sets and receptacles not exposed to damage must be inspected following the protocol outlined in G-1, (a), (b) and (c) above.

H. **Documentation of Tests**: All tests will be conducted by the competent person(s) designated for this site and documented on the attached form.

I. D**amaged Equipment and Failed Equipment**: Must be removed from service immediately, repaired, inspected and tested prior to return to service.

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APPROVED GROUNDING CONDUCTOR PROGRAM TEST DOCUMENTATION

Date of Test	Test Conducted	Equipment ID No.	Interval	Tested By	Results

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SECTION 22

CRANE SUSPENDED PERSONNEL PLATFORMS

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I. Scope

This policy and procedure applies to the design, construction testing use and maintenance or personnel platforms and hosting of personnel platforms on the lines of cranes.

A. The use of a crane to hoist employees on a personnel platform is prohibited, except when the erection, use and dismantling of conventional means of worksite (e.g. personnel hoist, ladder, stairway, aerial lift, elevating work platform or scaffold) would be more hazardous or is not possible because of industrial design or worksite conditions. The determination of hazard industrial design or worksite condition shall be documented and filed with the Modern Electric Co. director.

II. Definitions

A. **Failure** – means load refusal, breakage or separation of components.

B. **Hoist or Hoisting** – means all crane functions such as lowering, lifting, swinging, booming in and out or up and down, or suspending a personnel platform

C. **Maximum Intended Load** – means t he total of all employees, tools, materials and other loads reasonably anticipated to a personnel platform or personal platform

D. **Runaway** – means a firm, level surface designed, prepared and designated as a path of travel for the weight and configuration of the crane being used to lift and travel with the crane suspended platform. An existing surface may be used as long as it meets this criteria. The designated path shall be documented for each lift procedure and filed with Modern Electric Co.

E. **Training** – means all individuals involved in the lifting and use of crane suspended personnel platforms shall be trained in the procedure. This training shall be documented and on file with Modern Electric Co. prior to any lifts being accomplished.

III. Crane Requirements

Selection of crane and operator are critical components of safe use of crane suspended personnel platforms. The crane operator shall be certified by their employer as a competent person to perform this procedure. Inspection data for the crane being used shall be provided prior to accomplishing lift and job setup. This documentation shall be on file with Modern Electric Co.

A. Load Lines shall be capable of supporting, without failure, a minimum of seven times the maximum intended load. If the crane is equipped with rotation resistant rope, the lines must be capable of supporting, without failure, a minimum of ten times the intended load. (The required design factor is achieved by taking the current safety factor of 3.5 and applying the 50% de-rating of the crane capacity)

B. The load and boom hoist drum brakes, swing brakes and locking devices such as pawls or dogs, shall be engaged when the occupied personnel platform is in a stationary working position.

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C. The crane shall be uniformly level within 1% of level grade and located on firm footing

D. The crane shall be equipped with outriggers and the outriggers shall be fully deployed in accordance with manufacturer specifics when hoisting employees

E. The total weight of the loaded personnel platform and related rigging shall not exceed 50 percent of the rated capacity for the radius and configuration of the crane or derrick.

F. The use of cranes equipped with booms in which lowering is controlled by a brake without aid from other devices that slow the lowering speed is prohibited.

G. Cranes with variable angle booms shall be equipped with a boom angle indicator, readily visible to the operator.

H. Cranes with telescoping booms shall be equipped with a device to indicate clearly to the operator at all times, the boom's extended length.

I. A positive acting device shall be used to prevent contact between the load block or overhaul ball and the boom tip (anti-two blocking device), or a system shall be used which deactivates the hoisting action before damage occurs in the event of a two blocking situation.

J. The load line hoist drum shall have a system or device on the power train, other than the load hoist brake, which regulates the lowering rate of speed of the hoist mechanism (*controlled load lowering*) FREEFALL IS PROHBITED.

K. Certification that crane complies with this section must be on file with MEC..

IV. Design Criteria for Platform

A. A qualified engineer or a qualified and competent person in industrial design shall design the personnel platform and suspension system. The design information shall be on file with Modern Electric Co.

B. The suspension system shall be designed to minimize tipping of the platform due to movement employees and their equipment occupying the platform.

C. The personnel platform, except for the guardrail system, and harness/lanyard anchorages, shall be capable of supporting, without failure, its own weight and a minimum of five times the maximum intended load

D. Each personnel platform shall be equipped with a guardrail system and shall be enclosed at least from the toe board to mid-rail with either solid construction of expanded metal having openings no greater than ½ inch.

E. Harness/lanyard anchorages shall be capable of sustaining a minimum dead weight of 5400 lbs. and located above the point of operation.

F. A grab rail shall be installed inside the entire perimeter of the personnel platform.

G. Access gates shall not be allowed to swing outward during hoisting and shall be equipped with a restraining device to prevent accidental opening.

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H. Headroom shall be adequate to allow employees to stand upright in the platform.

I. All ground crew and employees working in the platform shall use hard hats. Where hazards from falling objects may exist, additional overhead protection shall be provided.

J. All rough edges exposed to contact by employees shall be smooth surfaced to prevent injury puncture, laceration, etc.

K. A qualified welder familiar with the weld grades, types, and materials specified in the platform design shall perform all welding of personnel platform and components. Repairs or additions to the personnel platform shall be documented and on file with Modern Electric Co.

L. The weight of the platform and its rated load capacity or maximum intended load shall be permanently affixed to the personnel platform in a clearly visible location

V. Personnel Platform Loading

A. The personnel platform shall not be loaded in excess of its rated load capacity. Platforms that do not have a rated load capacity shall not be loaded in excess of the posted maximum intended load data.

B. The number of employees occupying the personnel platform shall not exceed the number required for the work being performed and item 5-A above.

C. Personnel platforms and associated rigging shall be used only for employees, their tools, and materials necessary to accomplish their work and shall not be used to hoist only materials or tools when not hoisting personnel.

D. Materials and tools for used during a personnel lift shall be secured to prevent displacement or shifting.

E. Materials and tools for use during a personnel lift shall be evenly distributed within the confines of the platform while the platform is suspended.

VI. Personnel Platform Rigging

A. Certification data shall be on file with the Regional Modern Electric Co. Director for all rigging equipment used in conjunction with Personnel Platforms.

B. When a wire rope bridle is used to connect the personnel platform to the load line, each bridle leg shall be connected to a master link or shackle in such a manner as to ensure that the load is evenly divided among the bridle legs. All Shackles must be hex nut and cotter pin type and cotter pins must be installed.

C. 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.

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D. Wire rope, shackles, rings, master links, and other rigging hardware shall be capable of supporting, without failure, at least five times the maximum intended load applied or transmitted to that component. Where rotation resistant rope is used, the slings shall be capable of supporting without failure at least ten times the maximum intended load.

E. All eyes in wire rope slings shall be fabricated with thimbles.

F. Bridles and associate rigging for attaching the personnel platform to the hoist line shall not be used for any purpose other than hoisting of the personnel platform.

VII. Weather

The impact of weather on Personnel Platform work is of extreme importance.

A. Lifts shall be terminated if the wind is above 15 miles per hour (MPH).

B. Lifts shall be terminated at the first indication of electrical storms.

C. Lifts shall be terminated in the event of rain, snow, hail, or ice storms.

D. Lift platforms shall be clear of any ice and snow prior to commencement of lift.

VIII. Procedure

A. All documentation required in Part 1 of this policy and procedure shall be on file with the Regional Modern Electric Co. Director and at the job site. The documentation shall be available for review by individuals or client representatives associated with the lift.

B. A pre-lift safety meeting shall be conducted with all personnel involved in the lift. The meeting shall be documented and the following mandatory items reviewed:

1. Scope of work.
2. Site hazards.
3. Job specific hazards.
4. Emergency equipment and procedures.
5. Communication devices and signals.
6. Mandatory safety equipment.

C. A safety check of the crane, platform, rigging equipment, fall protection devices, and hook up shall be made and documented by the employees involved in the lift. Any equipment found deficient should be immediately removed from the work area and replaced with certified equipment that shall not alter the platform or rigging lifting data.

D. Secure a ¾ inch diameter shackle to the eyehole on the boom head section.

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E. Attach the eye-spliced end of a 5/8-inch diameter nylon rope to the ¾ inch diameter shackle. The rope spool should be used for weight to ensure that the safety line remains straight. No more than two persons per rope.

F. Attach a minimum of ½" diameter propylene rope for a tag line on bottom of basket.

G. Use one "Atlas Kwik Stop", one "Gemtor Rope Grab" or one similar device for each person.

H. Head-sets, two-way radio, or telephone communication shall be established between the crane operator and employees being raised if a height of greater than 50 feet is to be reached.

I. Full body harness and a 4-foot shock-absorbing lanyard shall be worn and connected by all employees being lifted.

IX. Pre-Lift Test

This pre-lift test shall be performed with the personnel platform unoccupied. Tools and equipment to be used may be loaded and secured in the platform prior to performing the test. This test must be repeated each time the crane is repositioned. An alternate lift route is used or the crane is returned to a previously lifted or tested location. Employees shall not be lifted until the pre-lift test is completed and documentation is established.

A. A full cycle operational test must be made prior to lifting employees.

B. The platform shall carry twice the intended load during the lift test.

C. Stability of footing shall be verified by visual inspection during full cycle operational test.

D. Pre-lift plans showing boom angle and maximum intended load shall be prepared for each group of lifts.

E. All shackles shall be hex nut and cotter pin type with cotter pins installed.

F. Insure that there is as little boom movement as possible when the basket is in use.

G. Hoist ropes shall be free of kinks.

H. Multiple part lines shall not be twisted around each other.

I. The primary attachment shall be centered over the platform.

J. The hoisting system shall be inspected if the load rope is slack to ensure that all ropes are properly seated on drums and in sheaves.

K. A visual inspection of the crane, rigging, personnel platform, and the crane base support shall be conducted and documented by a competent person immediately after the trial lift to determine if any defect or adverse effect upon any component or structure was caused by the test.

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L. Any defect found during inspections, which create or can be expected to create a safety hazard shall be corrected and verified by a competent person prior to hoisting personnel. If repairs or modifications are made to the platform and rigging, the platform shall be subjected to proof testing at 125 percent of the platform's rated capacity by holding it in a suspended position for five minutes with the load evenly distributed on the platform. After proof testing, the competent person shall re-inspect the platform and rigging for deficiencies. Proof testing is required each time repair or modification is made and must be accomplished, inspected, and documented prior to lifting of personnel.

M. Prior to lifting employees, the platform shall be hoisted a few inches from the ground and the competent person shall perform a final pre-lift safety check.

X. Work Practices

A. Employees shall keep all parts of the body inside the platform during raising, lowering, and positioning. (Exception: This does not apply to the signalman in the basket).

B. Employees shall not enter or exit a hoisted personnel platform that is not landed.

C. No lift shall be made on other crane load lines during this procedure.

D. The personnel platform shall be secured to the structure unless securing the platform creates an additional safety risk.

E. Tag lines shall be used unless their use creates an unsafe condition.

F. The crane operator shall remain at the controls at all times when the crane engine is running and the platform is occupied.

G. Hoisting of employees shall be immediately discontinued upon indication of any dangerous weather condition, site emergency, or any other known or suspected hazard.

H. Employees being hoisted hall remain in continuous sight and direct communication with the crane operator or signal person.

I. If work over water is required, the employees being hoisted shall wear personal floatation devices and ring buoys with a minimum of 200 feet of attached line shall be available at the crane.

J. Cranes shall not travel while employees occupy the personnel platform.

EXCEPTION TO THIS POLICY AND PROCEDURE WILL NOT BE MADE AND COMPLIANCE WITH ALL ITEMS IS MANDATORY. VIOLATION OF THIS POLICY AND PROCEDURE WILL RESULT IN IMMEDIATE TERMINATION.

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SECTION 23

MASONRY CONSTRUCTION

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I. Masonry Construction

A. Whenever a masonry wall is being constructed, a limited access zone will be established prior to construction meeting the following requirements.

1. Equal to the height of the wall to be constructed plus 4 feet, and shall run the entire length of the wall;

2. Shall be located on the side of the wall that will be unscaffolded

3. Restricted to entry only by employees actively engaged in constructing the wall

4. Shall remain in place until the wall is adequately supported to prevent overturning and collapse unless the height of wall is over 8 feet and remain in place until permanent supporting elements of the structure are in place.

II. Concrete Work

A. **General Requirements:**

1. All requirements and materials used in concrete construction and masonry work shall meet the applicable requirements for design, construction, inspection, testing, maintenance, and operations.

2. Employees working more than six feet above any adjacent working surfaces, placing and tying reinforcing steel in wall, piers, columns, etc. shall be provided with a safety harness or equivalent protection.

3. Large throat openings snap hooks (rebar or ladder hooks) are positioning only and must be used with a regular lanyard and snap hook for fall protection. Using both while climbing is required for complete protection.

4. Stripped forms and shoring shall be removed and stockpiled promptly after stripping in all areas in which persons are required to work or pass. Protruding nails, wire, ties, and other form accessories, not necessary to subsequent work, shall be pulled, cut, or other means taken to eliminate the hazard.

5. Employees shall not be permitted to apply a cement, sand, and water mixture through a pneumatic hose unless they are wearing protective head and face equipment.

6. Employees shall not be permitted to work above vertically protruding reinforcing steel unless it has been protected to eliminate the hazard of impalement.

7. Wire mesh rolls shall be secured at each end to prevent dangerous recoiling action.

8. Riding concrete buckets for any purpose shall be prohibited, and vibrator crews shall be kept out from under concrete buckets suspended from cranes or cableways.

9. Employees (except those essential to the post-tensioning operations) must not be permitted to be behind the jack during tensioning operations.

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10. Signs and barriers must be erected to limit employees' access to the post tensioning area during tensioning operations.

11. When discharging on a slope, the wheels or ready – mix trucks shall be blocked and the brakes set to prevent movement.

12. Handles of bull floats, used where they may contact energized electrical conductors, shall be constructed of non – conductive material, or insulated with a non-conductive sheath whose electrical and mechanical characteristics provide the equivalent protection of a handle constructed of nonconductive material.

13. Powered and rotating type concrete troweling machines that are manually guided shall be equipped with a control switch that will automatically shut off power whenever the operator removes his hands from the equipment handles (dead – man switch.)

B. **Cast-in-Place Concrete:**

1. Formwork must be designated, fabricated, erected, supported, braced, and maintained so that it will be capable of supporting, without failure, all vertical and lateral loads that might be applied to the formwork in conformance with sections 6 and 7 of the "American National Standard for Construction and Demolition Operations – Concrete and Masonry Work", (ANSI A10.9-1983).

2. Drawings and plans, including all revisions for the jack layout, formwork (including shoring equipment), working decks and scaffolds, must be available at the jobsite.

3. All shoring equipment (including equipment used in re-shoring operations) must be inspected prior to erection to determine that the equipment meets the requirements specified in the formwork drawings.

4. Shoring equipment found to be damaged must not be used for shoring. Erecting shoring equipment must be inspected immediately prior to, during, and immediately after concrete placement. Shoring equipment that is found to be damaged or weakened after erection must be immediately reinforced.

5. If single-post shores are used for on top of another (tiered), then additional shoring requirements must be met. The shores must be

a) Designed by a qualified designer
b) Erected shoring must be inspected by an engineer qualified in structural design
c) Vertical aligned, Spliced to prevent misalignment, and adequately braced in two mutually perpendicular directions at the spliced level.
d) Each tier also must be diagonally braced in the same two directions

6. Adjustment of single-post shores to raise formwork must not be made after the placement of concrete.

7. Re-shoring must be erected, as the original forms, and shores are removed, whenever the concrete is required to support loads in excess of its capacity.

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8. The steel rods or pipes on which jacks climb or by which the forms are lifted must be (1) specifically designed for that purpose and (2) adequately braced where not encased in concrete. Forms must be designed to prevent excessive distortion of the structure during the jacking operation.

9. Jacks and vertical supports must be positioned in such a manner that the loads do not exceed the rated capacity of the jacks.

10. The jacks of other lifting devices must be provided with mechanical dogs or other automatic holding devices to support the slip forms whenever failure of the power supply or lifting mechanisms occurs.

11. The form structure must be maintained within all design tolerances specified for plumpness during the jacking operation. The pre- determined safe rate of lift must not be exceeded.

12. All vertical slip forms must be provided with scaffolds or work platforms where employees are required to work or pass.

13. Reinforcing steel walls, piers, columns, and similar vertical structures must be adequately supported to prevent overturning and collapse.

14. Forms and shores (except those used for slabs on grade and slip forms) must not be removed until the concrete has gained sufficient strength to support its weight and that of superimposed loads. Such determination must be based on compliance with one of the following:

a) The plans and specifications stipulate conditions for removal of forms and shores, and such conditions have been followed, or

b) The concrete has been properly tested with an appropriate American Society for Testing Materials (ASTM) standard test method designed to indicate the concrete compressive strength, and the test results indicate that the concrete has gained sufficient strength to support its weight and superimposed loads.

15. Re-shoring must not be removed until the concrete being supported has attained adequate strength to support its weight and all loads in place upon it.

C. **Pre-cast Concrete:**

1. Pre-cast concrete wall units, structural framing, and tilt-up wall panels must be adequately supported to prevent overturning and to prevent collapse until permanent connections are completed.

2. Lifting insets that are embedded or otherwise attached to tilt-up wall panels must be adequately supported at least two times the maximum intended load applied or transmitted to them; lifting inserts for other pre-cast members must be capable of supporting four times the load.

3. Only essential employees are permitted under pre-cast concrete that is being lifted or tilted into position.

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SECTION 24

EXPOSURE CONTROL PROGRAM

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I. Exposure Control Plan for Modern Electric Co. Personnel with Occupational Exposure to Bloodborne Pathogens and Other Infectious Materials

A. **Purpose:** The instruction provides for uniform policy for protection of Modern Electric Co. personnel who, as part of their job, face reasonably anticipated exposure to bloodborne pathogens and/or other infectious materials.

B. **Scope** This instruction applies to all Modern Electric Co. Employees.

C. **References**: 29 CFR 1910.1030, Occupational Exposure to Bloodborne Pathogens. 29 CFR 1910.20, Access to Employee Exposure and Medical Records.

D. **Action**: Modern Electric Co. Administrators shall use this Plan to ensure that Modern Electric Co. personnel who have occupational exposure to Bloodborne Pathogens are afforded protection in accordance with 29 CFR 1910.1030.

EXPOSURE CONTROL PLAN FOR MODERN ELECTRIC CO. PERSONNEL WITH OCCUPATIONAL EXPOSURE TO BLOODBORNE PATHOGENS

Modern Electric Co. shall ensure that a copy of the Exposure Control Plan is accessible to employees in accordance with 29 CFR 1910.1020(e).

II. Exposure Determination

All Modern Electric Co. employees who, as a result of performing their job duties, must engage in activities where exposure to blood or other potentially infectious materials is reasonably anticipated are considered to have occupational exposure.

Modern Electric Co. employees designated as First Aid Responders are considered at risk of occupational exposure due to the nature of these duties (e.g., assisting bleeding victims, resuscitation) and are included in this Plan.

Field personnel shall take necessary precautions to avoid direct contact with body fluids and shall, except when absolutely necessary for the performance of duties, not participate in activities nor enter areas that will require them to come into contact with body fluids, needles, or other instruments or surfaces that are contaminated with blood or other potentially infectious materials. Any procedure that can be avoided is not to be undertaken. Any employees who come in contact with potentially infectious materials are considered at risk regardless of the use of personal protective equipment.

III. Methods of Implementation

A. **Methods of Compliance**

1. Universal Precautions: Modern Electric Co. personnel are not to handle Contaminated objects unless absolutely necessary for performance of their duties.

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Modern Electric Co. personnel shall use universal precautions (see standard for definition) when contact with any blood or other potentially infectious materials are absolutely necessary (e.g. removing a sampling device that has become contaminated with blood.)

B. **Work Practice Controls:**

1. **Hand Washing Facilities**

a) Antiseptic wipes will be provided to personnel with duties in Section I of this plan. These wipes are to be carried by First Aid Responders on sites where soap and running water may not be immediately available and used if contact of any skin surface with blood or other potentially infectious material occurs. Such wipes should be disposed of as would any other trash except in a very rare circumstance where they would become contaminated to the extent (see standard) that they would be considered regulated waste. In such case, see Section 2 of this plan.

b) When such wipes are used, hands, or other skin surfaces cleansed using wipes are to be washed as soon as feasible with soap and running water.

c) Employees are to wash hands with soap and water as soon as feasible after removal of gloves.

d) Employees are to wash hands and any other skin with soap and water, and flush mucous membranes with water, immediately or as soon as feasible following contact of those body areas with blood or any other potentially infectious material.

2. **Contaminated Equipment** - In order to prevent occupational exposure to personnel, equipment that may become contaminated with blood or other potentially infectious materials are to be examined prior to servicing or shipping and decontaminated (e.g., wiped off with bleach or other disinfectant) as necessary. All equipment that can be easily decontaminated at the Office level (e.g., wiped off) should be decontaminated there.

Specimens of blood or other potentially infectious materials such as blood-soaked bandages, etc. must be placed in leak proof bags for handling, storage, & transport.

Contaminated equipment or other contaminated items are not to be placed or stored in areas where food is kept, and decontamination should be accomplished as soon as possible following the incident where contamination occurred. Decontamination is not to take place in any area where food or drink is consumed. Cloths used to wipe contaminated equipment can be discarded as refuse unless they would somehow become contaminated to the extent that they would be considered regulated waste (see standard). In that case, see Section 2 of this Plan

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3. **Personal Protective Equipment** - Although field personnel are expected to avoid the handling of blood or other potentially infectious materials as well as contact with surfaces or items contaminated with such materials, some duties may make contact with such items unavoidable (See Section 1).Modern Electric Co. will provide appropriate gloves of proper size, which the Safety Officer and field personnel will carry for those activities, tasks, or procedures are likely to take place. Such gloves are to be replaced as soon as practical when contaminated or as soon as feasible if they become torn, punctured or when their ability to function as a barrier appears to be compromised. These gloves are not to be washed or decontaminated for reuse.

The Safety Officer or field person is to determine the extent of contamination of gloves prior to their removal. If gloves can be considered regulated waste as defined in the Standard (a very rare circumstance), they are to be placed in a regulated waste container. It is possible that such a container may not be available. In this instance, see Section 2.

First Aid supplies to be used by designated First Aid Responders are to include disposable resuscitation masks as well as gloves. Such gloves will be available in the size(s) needed by those expected to function as First Aid Responders. Such equipment is to be used for the employee's protection in cases where the employee is expected to provide ventilator assistance. It is not anticipated that Safety Officer or other Modern Electric Co. personnel will require personal protective equipment other than gloves.

In situations where other equipment would be needed, it is expected that the Safety Officer or field person will avoid such areas. Should situations occur where such exposure would be necessary for one's job performance; this Plan will be revisited and appropriately amended.

When the possibility of occupational exposure is present, PPE is to be provided at no cost to the employee such as gloves, gowns, etc. PPE shall be used unless the employer shows that employees temporarily declined to use PPE under rare circumstances. The employer shall ensure that appropriate PPE in the appropriate sizes is readily accessible. PPE should be cleaned, laundered & properly disposed. The employer shall repair & replace PPE as needed to maintain its effectiveness.

4. **Regulated Waste** - Only in rare circumstances is it anticipated that the duties of field personnel will generate regulated waste.

First Aid supplies to be used by designated First Aid Responders are to include a bag to be used for containment of any regulated waste generated by the employee in the performance of First Aid duties.

Disposal of such waste is to be accomplished in accordance with applicable State and Local laws. Where such laws require that the particular waste item be handled by a medical waste disposal company, Modern Electric Co. designee will arrange for such disposal.

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5. **Hepatitis B Vaccination and Post-Exposure Evaluation and Follow-up** Modern Electric Co. offers the Hepatitis B vaccine and vaccination series to personnel with duties specified in Section 1. Modern Electric Co. offers post-exposure evaluation and follow-up following an exposure incident to any employee who suffers an exposure incident while performing duties on the job at Modern Electric Co. All medical evaluations and procedures are to be made available at no cost to Modern Electric Co. personnel, at a reasonable time and place, and under the other conditions set forth in 29 CFR 1910.1030(f).

6. **Hepatitis B Vaccination** Modern Electric Co. will make the Hepatitis B vaccine available to employees at a local Health Service Facility.

All Modern Electric Co. employees whose job duties involve occupational exposure (see Section 1 of this Plan) are to be offered the Hepatitis B vaccination. The vaccine will be made available after the training required in 29 CFR 1910.1030 has been accomplished, and within 10 days of initial assignment of the employee to duties with occupational exposure. It is desirable that all employees with duties such as those described in Section 1 be immunized against Hepatitis B. However, Modern Electric Co. realizes that some personnel, even after training, may decline to receive the Hepatitis B vaccine. In such case, the declining Modern Electric Co. employee is to sign the declination statement at the end of Section 24.

The employee can receive the vaccine after signing the declination statement if a change of mind occurs and if duties still involve those with occupational exposure.

The First Aid provider should obtain a copy of medical records related to Hepatitis B vaccination before departing the facility where vaccination takes place. Field personnel should insert this copy of such records in Appendix C.

7. **Post-exposure Evaluation and Follow-up** - The Office Manager or designee will provide materials for the evaluating physician to each field person assigned duties discussed in Section 1. Prior to each work activity involving such tasks, the field person is to ensure that the materials to be taken on the jobsite include the Materials for the Evaluating Physician (containing the Hepatitis B vaccination-related records inserted by the field person). This information is vital should an exposure incident occur.

In anticipation of possible exposure incidents, the Office Manager or designee shall instruct the field personnel to seek medical attention in the same manner that it would be sought should any injury occur during work activities (e.g., emergency room, physician's office, and urgent care clinic)In the event of an exposure incident (as defined in 29 CFR 1910.1030), the Modern Electric Co. employee is to immediately wash any skin with soap and water and flush mucous membranes with water when such areas have had contact with blood or other potentially infectious materials.

The employee should seek medical attention. It must be realized that any exposure incident is an event for which immediate attention must be sought, as the effectiveness of prophylaxis depends on immediacy of its delivery. In addition, employee who has had an exposure incident is to report such incident to his or her supervisor as soon as possible.

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The supervisor will inform the Office Manager or designee who will contact the facility where the exposure incident occurred. The Office Manager or designee is to work together with the facility to ascertain the source individual's identity, arrange for testing of the source individual, and communicate with the physician evaluating the Modern Electric Co. employee. Following an exposure incident, an Exposure Incident Report (see Appendix E) will be completed by the Modern Electric Co. employee. The completion of this report should be done in consultation with the supervisor when the supervisor is immediately available by telephone. In no instance should report completion and physician evaluation be delayed.

The report is to be given by the employee to the evaluating physician.
Report information will include:

a) A description of the exposed employee's duties as they relate to the exposure incident

b) Documentation of route(s) of exposure and circumstances under which exposure occurred. Through direct input by the employee, the evaluating physician is best able to understand exactly what exposure occurred and therefore direct treatment appropriately.

8. **Information Provided to the Evaluating Physician** - Post-exposure evaluation and follow-up are to be provided to the employee consistent with the requirements of 29 CFR 1910.1030. Therefore, upon presenting for evaluation, the employee will give to the physician the Materials for the Evaluating Physician. The instructions for the physician describe the requirements of 29 CFR 1910.1030 and instruct the physician to give the physician's written opinion to the employee to return to the supervisor. The office to which the employee is assigned will maintain the physician's written opinion. A copy of the actual evaluation results is to be returned by the physician to Wade Ray & Associate's Main Office. The evaluation results will become a part of the field personnel's confidential medical record maintained in their personnel in the Medical Records Section. Records regarding any exposure incidents of personnel will be maintained in a confidential manner.

C. **Communication of Hazards to Employees:**

1. **Labels and Bags** - MEC will provide biohazard labels to be affixed to bags containing any contaminated equipment. A bag and biohazard labels are to be carried by First Aid Responders when contamination of equipment is reasonably anticipated. Bags will be disposed of as ordinary refuse unless in the rare instance when they are contaminated to the extent that they are considered regulated waste as defined by the standard. In such case, see Section 2 of this Plan

2. **Information and Training -** Personnel whose job duties involve occupational exposure, as specified in Section 1 of this Plan are to participate in Wade Ray & Associate's training program for Bloodborne Pathogens at the time of initial assignment to tasks where occupational exposure occur. The training program contains all the elements specified in 29 CFR 1910.1030(g) (2). Training will be conducted on an annual basis, and the Office Manager or designated person will ensure that updates are given when there are changes in duties or procedures.

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3. **Recordkeeping:**

a) **Medical Records -** Medical records are to be maintained in the main office, as part of the medical files of field personnel. Such records are maintained in accordance with 29 CFR 1910.1020 and are kept confidential. Records are to be kept 30 years past employment date.

b) **Training Records -** Training records to contain all information specified in 29 CFR 1910.1030(h) (2) and will be maintained for 3 years from the date on which the training occurred. Training records will be held at the main office.

c) **Transfer of Records -** MEC will comply with the requirements of 29 CFR 1910.1020(h) involving any transfer of records. Exposure incident records will remain at the Main Office. The employee may request and receive a copy of such records when transferring to another assignment

IV. Evaluation of Circumstances Surrounding an Exposure Incident

A. The evaluation of circumstances surrounding an exposure incident is to be done by the designated safety person. This evaluation will consist of at least:

1. A review of the Exposure Incident Report completed by MEC employee;

2. Documentation regarding a plan to reduce the likelihood of a future similar exposure incident;

3. Notification of the Main Office and discussion of any similar incidents and planned precautions.

4. Such reports will be maintained at the Main Office. The Main Office will review these reports on a periodic basis so that reported information can be considered in the review and update of this Plan. In addition, Modern Electric Co. will issue an alert to the other jobsites should similar incidents or trends among our various work sites be noted so that further incidents can be anticipated and prevented.

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SECTION 25

RIGGING AND HOISTING EQUIPMENT

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I. Rigging and Hoisting

These rules apply to all Modern Electric Co. employees and subcontractors. Note: Modern Electric Co. employees will utilize mechanical means of lifting if at all possible. Manual Lifting is the last option. Additional specific information can be obtained from the above referenced OSHA Standard.

A. **OSHA Reference**: 29 CFR 1926.251

B. **Rigging and Hoisting**:

1. The manufacturer's name and specifications applicable to the operation of the specific equipment will be attached to the equipment. Equipments shall be used per manufacture's intended use and shall never exceed the manufacture's load capacity.

2. Rated load capacities load test and recommended rules for safe operation will be conspicuously posted on all equipment at the operator's station.

3. A competent person experienced in rigging and hoisting shall be designated on all projects where rigging and hoisting is needed.

4. A competent person shall inspect all rigging and hoisting equipment prior to each use and during use to ensure that it is in safe condition. Any equipment found to be defective shall be removed from service immediately. An initial inspection following the guidelines specified in this program shall take place prior to use of any rigging and hoisting equipment. Monthly inspections are required to be completed and documented thereafter. The inspections are to be turned in to the site Supervisor or Safety Officer no later the 12 hrs after the inspection period.

5. Rigging equipment not in use shall be removed from the immediate work area so as not to present a hazard to employees and shall be properly stored.

C. **Below the Hook Structural And Mechanical Lifting Device: Suggested requirements include but are not limited to the following:**

1. Shall conform to requirements of ASME/ANSI B30.20. NOTE: Special lifting devices for shipping containers weighing 10,000 lbs or more that are used for radioactive materials maybe governed by ANSI N14.6 (Standard for Shipping Containers Weighing 10,000 Pounds or More for Nuclear Materials).

2. Shall have the rated load capacity marked on the main structure where it is visible. If the lifter is made up of several lifters, each detachable from the group, these lifters shall also be marked with their individual rated loads.

3. A load test, not to exceed 125 percent of the rated load unless otherwise recommended by a manufacturer shall be provided.

4. A load test certificate indicating the date of load test, amount of load applied, and confirmation of lifter load rating shall be supplied.

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5. Rated load should not be more than 80% of the max load sustained during test.

6. 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

7. Shall have a complete or other permanent marking affixed to the lifting device displaying the following:

a) Manufacturer's Name
b) Serial Number/Identification Number
c) Lifter Weight if over 100 lbs. (45KG)
d) Rated load Capacity

D. **General Construction:**

1. Shall be designed to withstand the forces imposed by the rated load.

2. Shall have a minimum design factor of 3 based on yield strength for all load bearing structural components.

3. Welding shall be in accordance with ANSI/AWS D1.

4. Guards for exposed moving parts such as, but not limited to gearing, projecting shafts, and chain drives that constitute a hazard under normal operating conditions should be guarded.

5. Electrical equipment and wiring shall comply with Article 610 of ANSI/NFPA 70.

E. **Wire Rope - Suggested requirements include but are not limited to the following:**

1. Wire rope shall meet or exceed the requirements of Federal Specification, RR-W-

2. 410 for wire rope, Mil Specification MIL-DTL-83420 for air craft cable and MIL-W-83140 for non-rotating stainless steel wire rope

3. Wire rope shall be made in the United States by a member of the Wire Rope Technical Board (except stainless steel and unless recommended otherwise by a crane or hoist manufacturer). Stainless steel wire rope shall be made in the United States and shall be 302 or 304 grade stainless steel unless otherwise recommended by a crane or hoist manufacturer.

4. Wire rope shall have documentation from the manufacturer traceable to the material furnished and signed by the manufacturer's authorized representative. Documentation should reference as a minimum the diameter, number of strands, core, lay, grade, manufacturer's lot/run number, material number, and the nominal breaking strength of a sample.

5. Shall be shipped lubricated and with a protective covering, e.g. plastic or cardboard.

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F. **Chain Slings – Suggested requirements include but are not limited to the following**;

1. Shall meet or exceed requirements of ASME/ANSI B30.9 and 29 CFR 1910.184.

2. Alloy steel chain slings shall have permanently affixed durable identification; stating size, manufacturer's grade, rated load, and angle upon which the rating is based, reach, number of legs, and sling manufacturer.

3. Hooks, rings, oblong links, pear-shaped links, welded, or mechanical coupling links or other attachments shall have a rated load of at least equal to that of alloy steel chain with which they are used.

4. All welded components in the sling assembly shall be proof load tested as components or as part of the sling assembly.

5. Hooks attached to chain slings shall meet requirements of ASME/ANSI B30.10.

6. The welded components of all new slings shall be proof tested by the component or sling manufacturer to 200 percent of the rated load.

7. The proof load for multiple leg slings shall be applied to the individual legs and shall be 200 percent of the rated load of a single leg sling.

8. A certificate of proof test shall be provided by the manufacturer or supplier referencing the specific sling identification number, date of test, and amount of load applied. (Employer shall retain a certificate of the proof test and shall make it available for examination.)

G. **Synthetic Slings - Suggested requirements include but are not limited to the following**:

1. Shall meet or exceed the requirements of 29 CFR 1910.184 and ASME/ANSI B30.9.

2. Should be manufactured from webbing specifically constructed for overhead lifting, featuring red core yarns.

3. Webbing shall have the following characteristics:

a) Sufficient certified tensile strength to meet the sling manufacturer's requirements;

b) Uniform thickness and width;

c) Full woven width, including selvage edges;

d) Webbing ends shall be sealed by heat, or other suitable means, to prevent raveling.

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e) Thread used in manufacture of synthetic web slings shall be same generic type yarn as sling webbing.

f) Stitches shall be lock-stitched and preferably continuous. When not continuous, it shall be back stitched at the ends to prevent raveling.

g) The load carrying splice shall be sewn with a pattern of sufficient strength to justify the manufacturer's rated capacities.

h) Shall have a minimum design factor of 5.

i) End fittings shall have sufficient strength to sustain twice the rated load of the sling without permanent deformation.

j) EACH SLING SHALL BE PERMANENTLY MARKED WITH THE FOLLOWING:

(1) Manufacturer's name or trademark.
(2) Manufacturer's code or stock number.
(3) Type of synthetic web material.
(4) Rated loads for the type of hitches used.

Note Hand written or ink embossed markings are not acceptable. Sling tags shall be indelibly marked and the lettering shall not wear off with use. The markings shall remain legible for the life of the sling.

k) The manufacturer shall have on file a written system of sling traceability as well as a quality control procedure. Traceability should be specific mill lots.

l) Fabric wear pads should be sewn into the bearing points of the sling eyes. Leatherwear pads are not recommended

m) Product warnings relative to the proper use, care, and maintenance shall accompany the shipment.

n) Single leg and endless synthetic-web slings shall be proof tested to 200 percent of the rated load.

o) Multiple leg bridle slings shall have the proof load applied to the individual legs. The proof load shall be two times the vertical rated load of a single leg sling.

p) A load test certificate (LTC) shall be provided for each lot of slings supplied. The LTC shall reference as a minimum the date of proof test, amount of load applied, sling capacity, and lot/run number. The manufacturers authorized representative shall sign the LTC.

NOTE: Sling lengths shall be within a specified tolerance. Synthetic sling manufacturer's normal length is ±1percent of the sling length.

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H. **Synthetic Polyester Round Slings – Suggested requirements include, but are not limited to the following**:

1. Slings should meet or exceed requirements of the Web Sling and Tie Down Association, recommended specification for round slings made of polyester fibers used for general lifting purposes.

2. Polyester round slings including those incorporating welded fittings shall be proof tested to 200 percent of the vertical rated capacity.

3. A load test certificate (LTC) shall be provided for each lot of slings supplied. LTC shall reference at a minimum the date of proof test, amount of load applied, sling capacity and lot/run number. The manufacturers authorized representative shall sign the LTC.

4. The core(s) shall be formed from one or more ends of yarn, wound together on a plurality of turns. The core(s) should be uniformly wound to ensure even distribution of the load.

5. The cover(s) should be of the same fiber type as the load bearing core(s). When the cover is a different fiber type than the load- bearing core, follow the manufacturer's recommendations for use.

6. The cover should be made from one length of material.

7. When the core and cover are of the same fiber, the thread shall also be of that fiber type. When the core and cover are of different fiber types, the thread should be of the same fiber type as the cover.

8. All stitching shall be lock-stitched type and should be continuous. When not continuous, they shall be backstitched or overstitched to prevent raveling.

9. The design factor for new polyester round slings and polyester round slings incorporating fittings shall be a minimum of five (5).

10. Each polyester round sling shall be permanently marked or labeled showing:

    a) Name or trademark of manufacturer.

    b) Manufacturer's code or stock number.

    c) Rated capacities for the 3 basic hitches. (vertical, choker, vertical basket)

    d) Core fiber type - if cover(s) is of a different fiber type, both fiber types shall be identified.

    e) Length (reach) - bearing point to bearing point.

11. Each manufacturer shall internally identify their product with name or trademark for traceability.

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I. **Wire Rope Slings – Suggested requirements include, but are not limited to the following**:

1. Shall meet or exceed the requirements of 29 CFR 1910.184 and ASME/ANSI B30.9

2. Wire rope purchased to fabricate slings shall be made in the United States by a member of Wire Rope Technical Board (Except stainless steel). Stainless steel wire rope shall be made in the United States and shall be 302 or 304 Grade stainless steel.

3. Wire rope shall meet the requirements of Federal Specification RR- W-410D or Military Specification MIL-W-83420.

4. Wire rope shall have documentation from the manufacturer traceable to the material furnished and signed by the manufacturer's authorized representative. Documentation shall reference as a minimum the diameter, number of strands, core, lay, grade, manufacturing lot/run number, master reel number and nominal breaking strength of sample.

5. Shall be shipped lubricated and with a protective covering, e.g. plastic or cardboard.

6. Slings should be either 6 x 19 or 6 x 37 classification.

7. Slings should be made of wire rope produced from EXIPS (Extra Improved Plow Steel) with an IWRC (Independent Wire Rope Center). Consideration may be given to other grades or types of wire rope, dependent upon the type of expected service due to the type of load, hitch, or environment.

8. Shall have a minimum of 5 to 1 safety factor.

9. Mechanical spliced single leg and endless wire rope slings, and swaged socket or poured socket assemblies shall be load tested to 200 percent of the rated vertical load.

10. Shall be individually tagged with a durable tag including the following information:

   a) WLL (Working Load Limit)

   b) Purchase order number or serial number

   c) Manufacturer's name or ID

11. Shall have a load test certificate (LTC) for each lot of slings supplied. The LTC shall reference as a minimum the date of proof test, amount of load applied, sling capacity, & lot/run number, the manufacturers authorized representative shall sign the LTC.

12. Single leg hand tucked slings shall have a proof load equal to the rated load but shall not exceed 125 percent of the rated load

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13. The proof load for multiple leg bridle slings shall be applied to the individual legs and shall be either 125 percent for hand tucked splice or 200 percent for mechanical splice, times the vertical rated load of a single leg sling of the same size, grade, and construction of rope. Any master link to which multiple leg slings are connected shall be proof loaded to 200 percent of the force applied by the combined legs

14. Multiple leg bridle slings shall be tagged with a durable tag on the master link indicating the working load limit for the total combined legs for each individual sling in a vertical configuration. The purchase order number or serial number and the manufacturer's ID should be supplied

J. **Shackles - Suggested requirements include but are not limited to the following:**

1. Shackles shall meet or exceed requirements of Federal Specification RR-C-271D.

2. Types of shackles covered by this specification include:

   a) Class 1, Round Pin Anchor
   b) Class 2, Screw Pin Anchor
   c) Class 3, Safety Anchor
   d) Class 1, Round Pin Chain
   e) Class 2, Screw Pin Chain
   f) Class 3, Safety Chain shackles.

3. Each shackle body shall be permanently and legibly marked in raised or stamped letters on the side of the shackle bow with the identifying manufacturer's name or trademark, shackle size, and the recommended safe working load.

   a) Grade A regular strength shackle pins and bolts shall be unmarked;

   b) Grade B high strength shackle pins and bolts shall be marked by the raised or stamped letters "HS" on the head.

   c) Shackle markings shall be raised or stamped letters of the maximum height permitted by the size of the shackle component being marked.

   d) Grade A shackles (Regular Strength), together with their pins and bolts shall be forged from carbon steel.

   e) Grade B shackles (High Strength) together with their pins and bolts shall be forged from alloy steel.

4. Shackles shall have minimum 5 to 1 safety factor.

5. Shackle samples shall be subjected to proof loads of 200% of the rated capacity.

6. Shackle pins shall fit freely without binding and seat properly.

7. Shackles shall be sufficiently ductile so that, when fractured, the fractured member shall show a permanent distortion before breaking

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K. **Turnbuckles - Type III Rigging - Suggested requirements include but are not limited to the following:**

1. Turnbuckles used for rigging applications shall meet or exceed the requirements of Federal Specification FF-T-791B, Section 3.9.3.

2. Shall be fabricated from forged alloy steel.

3. Shall be provided with a jam nut of a type, which does not depend upon deformation of the threads for security.

4. Certificate of proof test shall be provided by the manufacturer for selected samples from each lot. Certificate shall indicate as a minimum the size, WLL, test weight, and date of test.

5. Proof test loads shall be one-half the specified breaking strength for the end pull.

6. Turnbuckles shall have a minimum safety factor of 5 based on ultimate breaking strength.

7. Manufacturer's name or trademark and turnbuckle size shall be permanently marked on the body of the turnbuckle.

L. **Wire Rope Clips (Clamps) - Suggested requirements include but are not limited to the following:**

1. Shall meet or exceed requirements of Federal Specification FF-C- 450D.

2. Shall be permanently and legibly marked with the size and manufacturer's identifying mark.

3. Wire rope clips should be shipped with application instructions and product warnings for each type or size clip.

M. **Eye Bolts - Suggested requirements include but are not limited to the following:**

1. Shall be fabricated from forged carbon or alloy steel and shall meet or exceed the requirements of ASTM specification A489 for "Carbon Steel Eye Bolts" or ASTM F541 "Standard Specification for Alloy Steel Eyebolts." and ANSI/ASME B18.15 "Forged Eye Bolts".

2. Eye bolts used for lifting service shall have the manufacturer’s name or identification mark forged in raised characters on the surface of the eyebolt. Alloy steel eyebolts shall have the symbol "A" (denoting alloy) and the manufacturer's name or identification forged in raised letters on the surface of the eyebolt.

3. The safe working load shall have a safety factor of 5.

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N. **Hooks – Suggested requirements include but are not limited to the following**:

1. Hooks used for lifting service shall meet or exceed the requirements of ANSI/ASME B30.10.

2. Manufacturer's identification shall be forged cast, or die stamped on a low stress non-wearing area of the hook.

3. When proof tests are used to verify manufacturing process, material, or configuration, hooks shall be able to withstand proof load application, without permanent deformation when a load is applied for a minimum of 15 seconds. Proof loads for hooks up to 50-ton capacity shall be 200 percent of the rated capacity.

4. Performance testing of hooks shall not be required except where necessary to conform to requirements for the equipment of which they are a part of.

O. **Swivel Hoist Rings - Suggested requirements include but are not limited to the following:**

1. All hoist rings shall be individually proof load tested to a minimum of 200 percent of the rated capacity, but no more than 250 percent of the rated capacity.

2. Shall have proof load certificate supplied from manufacturer with each swivel Hoist ring.

3. Shall have the manufacturer's name or trademark permanently marked on the swivel Hoist ring.

4. Shall have a minimum safety factor of 4, based on ultimate breaking strength.

5. Shall be permanently marked by the manufacturer with the WLL and recommended Torque value.

6. Shall be packaged with proper application instructions and warning information.

P. **Hoist Rings, Pear Shaped Links - Suggested requirements include but are not limited to the following:**

1. Shall meet or exceed the requirements of RR-C-271-D.

2. Welded rings or links shall be subjected to a nondestructive weld test (NDT) and have documentation provided. Note: NDT is not required for forged rings or links.

3. Shall have a minimum safety factor of 5, based on ultimate breaking strength.

4. Rings shall be forged or welded from low alloy steel.

5. Should be marked by the manufacturer with the manufacturer's name or trademark and ring or link size.

Taglines shall be used for all lifts unless it creates an unsafe condition to assist in maintaining control of the load.

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

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SECTION 26

HAZARD COMMUNICATION PROGRAM

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I. Scope

This is the Hazard Communication Program concerning the acquisition and dissemination of information for potentially hazardous chemical materials to be used at all Modern Electric Company facilities and job sites. This is a mandatory program for Modern Electric Company and its affiliated companies. The program is designed to communicate hazards associated with chemical materials that employees may potentially be exposed, by any means, during normal activities, or during foreseeable emergencies.

This program has been developed to comply with the following standards:

A. OSHA Hazard Communication

1. General Industry (29 CFR 1910.1200)
2. Construction (29 CFR 1926.59)

B. The Safety Director will be responsible for ensuring that this program is implemented in accordance with applicable regulations.

II. Chemical Hazard Evaluation Procedures

All chemical materials purchased, used, stored, handled, or distributed by Modern Electric Company employees will be evaluated for potential hazards in accordance with OSHA requirements. All chemical materials will have their respective safety data sheets (SDS) stored in a binder within easy access for all employees to review. The term "*chemical material*" includes, but is not limited to, products, raw materials, maintenance, and custodial/janitorial chemicals, compressed gases, solvents, reagents, packaging support chemicals (e.g., inks, dyes, coatings, wrappings, etc.), reprographic chemicals, and office chemicals; whether in pure form, mixtures of more than one material, or compounds formed by the chemical reaction of more than one chemical.

III. Evaluating Hazard of Materials Received from an Outside Supplier

This section applies to all chemical materials that are received from an outside organization for use by Modern Electric Company employees or for reshipment to Modern Electric Company work sites. This part also applies to chemicals used by contractors performing work within Modern Electric Company facilities, even though Modern Electric Company may not have supplied those materials.

Modern Electric Company will rely on the hazard evaluations performed by its chemical manufacturers or suppliers. Therefore, all individuals are responsible for obtaining a *Safety Data Sheet (SDS)* for each new chemical material brought on a site. Normally, additional research on the potential hazards of a chemical will not be performed unless the information presented on the supplier's SDS is questionable

The Safety Director will ensure that the current chemical inventories for all areas are obtained and updated on a periodic basis. Performing and actual chemical inventory will be the direct responsibility of the project manager, or superintendent, for each facility, work site and/or vessel that obtains or utilizes chemical materials. Each facility's current chemical inventory of "hazardous" materials will be maintained within the SDS binder(s) for that location. A copy of All SDS's received will be forwarded to the Safety Director for inclusion into Modern Electric Company Corporate SDS records.

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When a chemical material is purchased at a retail establishment (e.g., paints, thinners, cleaners, etc.), and when it is used significantly more than the normal consumer would be expected, or when the material is used differently from the intended consumer use, the purchaser will request an SDS from the retail establishment. If they are unable to provide an SDS for the product purchased, a request for the SDS must be made in writing to the manufacturer. A form letter for requesting an SDS can be found at the end of this program. Forward a copy of any SDS request to the Safety Director.

If a SDS is requested by a purchaser of a chemical and an SDS (or a statement about its non-hazardous nature) is not received within 30 days of a request, or if the received SDS is obviously unacceptable, contact the Safety Director who will send a follow-up written request to the supplier for additional information.

IV. Safety Data Sheets

A Safety Data Sheet (SDS) must be obtained for each chemical material determined to be "hazardous" by OSHA criteria. The SDS's must be written in English as required by OSHA. All SDS's will be reviewed by the Safety Director for adequacy and completeness under the Hazard Communication Standard.

The Safety Director and Site Supervisors will maintain SDS files. These files will remain accessible to all employees that handle the material during their normal working hours. No employee may be denied access to an SDS or be required to view its information during shifts other than normal for that individual. If an employee desires, viewing of the SDS can be performed without management supervision. However, no SDS may be removed from the file. Copies are permitted after a Supervisor has explained the contents.

SDS's will be maintained within Hazard Communication binders at each site in a location, which affords all employees easy access

V. Container Labeling

It is the responsibility of each employee to ensure that, prior to use, all containers of potentially hazardous chemicals used are labeled, tagged or marker with:

A. The identity of the hazardous material, e.g., common and/or chemical name, and Chemical Abstract Service (CAS) Registry Number, including the name that appears on the SDS, and;

B. An appropriate hazard warning which gives an immediate warning and summary of the more important information from the SDS. In those cases where non-English speaking employees are working at jobsites information will be presented in their language also.

Note: Chemical materials supplied to outside contractors by Modern Electric Company must be labeled, tagged, or marked as identified above.

The outside shipping container label may contain the same information as the immediate chemical container, unless that label conflicts with the label(s) required by the Department of Transportation (DOT) for the transportation of hazardous materials

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An employee may transfer or place a hazardous chemical into another "secondary use" container and not label that container as long as it intended for immediate use by the employee who performs the transfer. If another employee is also to use the container or it will be used for more than one shift, then that new chemical container must be labeled, as above, by the employee who transfers the product.

The contents of a chemical container that is not labeled appropriately may not be used or put into service, unless it is relabeled appropriately or the user is given specific approval from a responsible person. Labels already on any chemical container at any location, and used for any purpose, may not be removed, or defaced unless the contents of the container changes.

Signs, placards, standard operating procedures (SOP's), or similar written material may be used instead of actually placing a label on stationary containers, as long as the written document conveys the same information as is required on a label, and is readily accessible to each applicable employee during their normal working shift. This alternate labeling procedure will only be used after review by the Safety Director for each individual situation. Labels shall be legible, in English. However, for non-English speaking employees, information may be presented in their language as well.

The Purchasing Department will request that suppliers comply with all of the labeling and Safety Data Sheet provisions of the Hazard Communication Standard.

VI. Hazard Communication Training

The Safety Director will ensure that initial (at the time of assignment) and periodic Hazard Communication Training is provided to all applicable employees regarding the hazardous chemicals in their workplace. However, whenever a chemical that poses a new or different type of hazard enters the workplace, it is the responsibility of each supervisor to ensure employees are trained. This training will include (but is not limited to) Requirements of this program and a review of the SDS for that product for the following information:

A. Methods of detection and monitoring of the compound (including monitoring devices, appearance and odor);

B. Each physical and health hazard that the material presents;

C. Personal protective equipment, work practices, and emergency procedures (e.g., fire, first aid, chemical spill, etc.) to be followed while handling;

D. The labeling system for hazardous materials will be legible and in English, but for non-English speaking employees the information will be presented in their language, as it relates to the material;

E. Location of the hazard communication program, listing of hazardous materials present, SDS's and those employees who can obtain and use the appropriate hazard information

Procedures for informing employees of the hazards of non-routine tasks, such as equipment maintenance or trailer pesticide application, etc., will be implemented whenever that task involves a hazardous chemical. Each supervisor is responsible for either training each employee or scheduling such training with a responsible person prior to performing any non-routine task.

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Training for non-routine tasks will include:

A. A through E above

B. Special precautions for the non routine task

C. Other company safety procedures which are relevant to the operations, such as Lockout/Tagout and hot Work Permit, etc.

It is the responsibility of the supervisor in charge of a project to ensure that all employees working in multiple facilities are informed of any hazardous chemicals that they may be exposed to while working in the area. A 'traveling' hard copy of SDS's may be required. This information will include:

A. Existing hazardous chemicals and labeling reference(s)

B. Hazardous chemical emissions for processes involved in the work

C. Precautions and personal protective equipment which must be worn in the area.

The Project Manager will be responsible for all actions of the contract employees and will ensure that the outside employees follow all safety precautions that would be used by Modern Electric Company industrial employees

Modifications to the content of the training program may be made to best reflect the needs of the needs of the employees at any given facility, or site. Coordination with the Safety Manager is highly recommended to ensure correct and consistent training throughout Modern Electric Company

VII. Documentation of Training

Whenever training is provided to employees or contractors in accordance with this policy, the individual(s) responsible for providing this training will collect the names (printed), signatures and Social Security numbers of all attending individuals, and the dates and times of the training. Utilize the training roster located at the end of this program. Note that OSHA requires the employee's SSN.

Equipment operators, general laborers, supervisors and management, etc., must be trained prior to being allowed to participate in or supervise field activities. The training should cover the use of personal protective equipment. The training should also cover work practices which minimize hazardous risks and safe use of engineering controls & equipment.

Upon completion of training, forward a copy of the training roster and copies of any additional training material used to the Safety Director. Certificates of training and/or wallet cards will be produced and sent back to the location where the training was performed. These should be presented to the employees for their personal records. Documentation of all training performed will be submitted to human resources for inclusion into the individual's personnel records. Maintain a copy of all training records and certificates at the facility or job site, as a record that training was performed as required by OSHA

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SECTION 27

STEEL ERECTION

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I. Steel Erection

On July 13, 2001, OSHA announced that its final steel erection rule will go into effect on January 18, 2002. The following rules apply to all Modern Electric Co. employees and subcontractors. Additional specific information can be obtained from the above referenced OSHA standard.

A. **OSHA Reference**: 29 CFR 1926. Subpart R (750 through 761) Appendix A through H.

B. **Definitions**:

1. **Anchored Bridging** - steel joist bridging is connected to bridging terminus point.

2. **Bolted Diagonal Bridging** - diagonal bridging that's bolted to a steel joist(s).

3. **Bridging Clip** - a device that is attached to the steel joist to allow bolting of the bridging to the steel joist.

4. **Bridging Terminus Point** - is a wall, beam, tandem joists (with all bridging installed and a horizontal truss in the plane of the top chord) or other element at an end or intermediate point(s) of a line of bridging that provides an anchor point for the steel joist bridging.

5. **Choker** - wire rope or synthetic fiber rigging assembly that is used to attach a load to a hoisting device.

6. **Cold Forming** - the process of using press brakes, rolls, or other methods to shape steel into desired cross sections at room temperature.

7. **Column** - a load-carrying vertical member that is part of the primary skeletal framing system. Columns do not include posts.

8. **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.

9. **Connector** - an employee who, working with hoisting equipment, is placing and connecting structural members and/or components.

10. **Constructability** - the ability to erect structural steel members in accordance with subpart R without having to alter the over-all structural design.

11. **Construction Load** (for joist erection) - any load other than the weight of the employee(s), the joists and the bridging bundle.

12. **Controlled Decking Zone (CDZ)** - an area in which certain work (for example, initial installation and placement of metal decking) may take place without the use of guardrail systems, personal fall arrest systems, fall restraint systems, or safety net systems and where access to the zone is controlled.

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13. **Controlled Load Lowering** - lowering a load by means of a mechanical hoist drum device that allows a hoisted load to be lowered with maximum control using the gear train or hydraulic components of the hoist mechanism. Controlled load lowering requires the use of the hoist drive motor, rather than the load hoist brake, to a lower the load.

14. **Controlling Contractor** – a prime contractor, general contractor, construction manager or any other legal entity which has the overall responsibility for the construction of the project planning, quality and completion.

15. **Critical Lift** – a lift that either exceeds 75% of the rated capacity of the crane or derrick, or requires the use of more than one crane or derrick.

16. **Decking Hole** – a gap or void more than 2” (5.1 cm) in its leas t dimension and less than 12” (30.5) in its greatest dimension in a floor, roof or other walking/working surface. Pre-engineered holes in cellular decking (for wires, cables, etc.) are not included in this definition.

17. **Derrick Floor** – an elevated floor of a building or structure that has been designated to receive a hoisted piece of steel prior to final placement.

18. **Double Connection** – an attachment method where the connection point is intended for two pieces of steel which share common bolts on either side of a central piece.

19. **Double Connection Seat** – a structural attachment that, during installation of double connection, supports the first member while the second member is connected.

20. **Erection Bridging** – the bolted diagonal bridging that is required to be installed prior to releasing the hoisting cables from the steel joists.

21. **Fall Restraint System** – a fall protection system that prevents the user from falling any distance. The system is comprised of either a body belt or body harness, along with an anchorage, connectors and other necessary equipment. The other components typically include lanyard and may also include a lifeline and other devices.

22. **Final Interior Perimeter** – the perimeter of a large permanent open space within a building such as an atrium or courtyard. This does not include openings for stairways, elevator shafts, etc.

23. **Girt** (in system engineered buildings) – a “Z” or “C” shaped member formed from sheet steel spanning between primary framing and support wall material.

24. **Headache Ball** – a weighted hook that is used to attach loads to the hoist load line of the crane

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25. **Hoisting Equipment** – commercially manufactured lifting equipment designed to lift and position a load of known weight to a location at some know elevation and horizontal distance from the equipment's center of rotation. "Hoisting Equipment" includes, but is not limited to, crane, derricks, tower cranes, barge-mounted derricks or cranes, gin poles and gantry hoist systems. A "come-a-long" (a mechanical device, usually consisting of a chain or cable attached at each end, that is used to facilitate movement of materials through leverage) is not a considered hoisting equipment.

26. **Leading Edge** – the unprotected side and edge of a floor, roof or formwork for a floor or other walking/working surface (such as a deck) which changes location as additional floor, roof, decking or formwork sections are placed, formed or constructed.

27. **Metal Decking** – a commercially manufactured, structural grade, cold rolled metal panel formed into a series of parallel ribs. This includes metal floor and roof decks, standing seam metal roofs or other metal roof systems and other products such as bar gratings, checker plate, expanded metal panels and similar products. After installation and proper fastening, these decking materials serve a combination of functions including, but not limited to, a structural element designed in combination with the structure and provide a diaphragm action, a walking/working surface, a form for concrete slabs, a support for roofing and a finished floor roof.

28. **Multiple Lift Rigging** – a rigging assembly manufactured by wire rope rigging suppliers that facilitates the attachment of up to 5 independent loads to the hoist rigging of a crane.

29. **Opening** – a gap or void 12" or more in its least dimension in the floor, roof or other walking/working surface. For the purposes of this section, skylights and smoke domes that no not meet the strength requirements of 1926.754 (e)(3) will be regarded as openings.

30. **Permanent Floor** – a structurally completed floor at any level or elevation (including slab on grade)

31. **Personal Fall Arrest System** – used to arrest an employee in a fall from a working level. A personal fall arrest system consists of an anchorage, connectors, body harness and may include a lanyard, deceleration device, lifeline or suitable combination of these. The use of a body belt for fall arrest is prohibited.

32. **Positioning Device System** – a body belt or body harness rigged to allow an employee to be supported on an elevated, vertical surface, such as a wall or column and work with both hands free while leaning.

33. **Post** – a structural member with a longitudinal axis that is essentially vertical, that weights 300 lbs or less and is axially loaded (a load presses down on the top end) or is not axially loaded, but is laterally restrained by the above member. Post typically support stair landings, wall framing, mezzanines and other substructures.

34. **Project Structural Engineer of Record** – the registered, licensed, professional responsible for the design of structural steel framing and whose seal appears on the structural contract documents.

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35. **Purlin** (in systems-engineered metal buildings) is a "Z" or "C" shaped member formed from sheet steel spanning between primary framing and supporting roof materials.

36. **Qualified Person** – one who, by possession of a recognized degree, certificate or professional standing or who by extensive knowledge, training and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work or the project.

37. **Safety Deck Attachment** – an initial attachment that is used to secure an initially placed sheet of decking to keep proper alignment and bearing with structural support members.

38. **Shear Connector** – headed steel studs, steel bars, steel lugs and similar devices which are attached to a structural member for the purpose of achieving composite action with concrete.

39. **Steel Erection** – the construction, alteration or repair of steel buildings, bridges and other structures, including the installation of metal decking and all planking used during the process of erection.

40. **Steel Joist** – an open web, secondary load-carrying member of 144' or less, designed by the manufacturer, used for the support of floors and roofs. This does not include structural steel trusses or cold formed joist.

41. **Steel Joist Girder** – an open web, primary load carrying member, designed by the manufacturer, used for the support of floors and roofs. This does not include structural steel trusses.

42. **Steel Truss** – an open web member designed of structural steel components by the project structural engineer of record. For purposes of this section, a steel truss is considered equivalent to a solid web structural member.

43. **Structural Steel** - a steel member or a member made of a substitute material (such as, but not limited to, fiberglass, aluminum or composite) purlins, columns, beams trusses, splices, seats, metal decking, girts and all bridging, and cold formed metal framing which is integrated with the structural steel framing of a building.

44. **Systems-Engineered Metal Building** – a metal, field assembled building system consisting of framing, roof and wall coverings. Typically, many of these components are cold formed shapes. These individual parts are fabricated in one or more manufacturing facilities and shipped to the jobsite for assembly into the final structure. The engineering design of the system is normally the responsibility of the systems engineered metal building manufacturer.

45. **Tank** – a container for holding gases, liquids or solids.

46. **Unprotected Sides & Edges** – any side or edge (except at entrances to points of access) of a walking/working surface, (ex. Floor, roof, ramp or runway) where there is no wall or guardrail system at least 39" high.

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C. **Site Layout**: A steel erection contractor will not erect steel unless it has received written notification that the concrete in the footings, piers, and walls or the mortar in the masonry piers and walls has attained, on the basis of an appropriate ASTM standard test method of field- cured samples, either 75% of the intended minimum compressive design strength or sufficient strength to support the loads imposed during steel erection. The controlling contractor will ensure that the following is provided and maintained:

1. Adequate access roads into and through the site for the safe delivery and movement of derricks, cranes, trucks, other necessary equipment, and the material to be erected and means and methods for pedestrian and vehicular control. This requirement does not apply to roads outside the construction site.

2. A firm, properly graded, drained area, readily accessible to the work with adequate space for the safe storage of materials and the safe operation of the erector's equipment.

3. All hoisting operations in steel erection will be pre-planned.

4. A site-specific steel erection plan will be developed by a qualified person and be available at the work site when alternate means and methods are developed due to conditions specific to the site

D. **Hoisting and Rigging**:

1. Cranes being used in steel erection activities must be visually inspected prior to each shift by a competent person.

2. The inspection will include observations for deficiencies during operation and at minimum the following:

3. All control mechanisms for maladjustments.

4. The control and drive mechanism for excessive wear of components and contamination by lubricants, water or other foreign matter.

5. Safety devices, including but not limited to boom angle indicators, boom stops, boom kick out devices, anti-two block devices, and load movement indicators where required.

6. Air, hydraulic, and other pressurized lines for deterioration or leakage, particularly those that flex in normal operation

7. Hooks and latches for deformation, chemical damage, cracks, or wear.

8. Wire rope revving for compliance with hoisting equipment manufacturer's specifications.

9. Electrical apparatus for malfunctioning, signs of excessive deterioration, dirt, or moisture accumulation.

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10. Hydraulic system for proper fluid level

11. Tires for proper inflation and condition.

12. Ground conditions for proper support, including ground settling under and around outriggers, ground water accumulation, or similar conditions.

13. The hoisting equipment must be level prior to, and after each move and setup.

14. If any deficiency is identified, an immediate determination will be made by the competent person as to whether the deficiency constitutes a hazard.

15. If the deficiency is determined to constitute a hazard, the hoisting equipment must be removed from service until the deficiency has been corrected.

16. The operator will be responsible for those operations under the operator's direct control. Whenever there is any doubt as to safety, the operator will have the authority to stop and refuse to handle loads until safety has been assured.

17. A qualified rigger (a rigger who is also a qualified person) must inspect the rigging prior to each shift in accordance with 29 CFR 1926.251.

18. The headache ball, hook or load must not be used to transport personnel unless all the provisions of Subpart N Cranes, Derricks, Elevators, and conveyors are met except when the erection, use, and dismantling of conventional means of reaching the work site would be more hazardous or is not possible because of structural design or worksite conditions.

19. Cranes or derricks may be used to hoist employees on a personnel platform during steel erection work provided that provisions of Subpart N Cranes, Derricks, Elevators, and Conveyors are met except when the erection, use, and dismantling of conventional means of reaching the work site would be more hazardous or is not possible because of structural design or worksite conditions.

20. Safety latches on hooks will not be deactivated or made inoperable except when a qualified rigger has determined that the hoisting and placing of purlins and single joists can be performed more safely by doing so, or when equivalent protection is provided in a site-specific erection plan

E. **Working under Loads:**

1. Routes for suspended loads must be pre-planned to ensure that no employee is required to work directly below a suspended load except for employees engaged in the initial connection of the steel, or employees necessary for the hooking or unhooking of the load.

2. Materials being hoisted will be rigged to prevent unintentional displacement.

3. Hooks with self-closing safety latches or their equivalent must be used to prevent components from slipping out of the hook

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4. All loads are to be rigged by a qualified rigger.

5. Multiple lifts will only be performed if a multiple lift rigging assembly is used.

6. A maximum of five members will be allowed during multiple lifts.

7. Only beams and similar structural members will be lifted during multiple lifts.

8. All employees engaged in the multiple lift must be trained in multiple lift procedures in accordance with 29 CFR 1926.761 (c) (1).

9. No crane is permitted to be used for a multiple lift where such use is contrary to the manufacturer's specifications and limitations.

10. Components of the multiple lift rigging assembly must be specifically designed and assembled with a maximum capacity for total assembly and for each individual attachment point. This capacity, certified by a manufacturer or a qualified rigger, must be based on the manufacturer's specifications with a 5 to 1 safety factor for all components.

11. The total load may not exceed the rated capacity of the hoisting equipment specified in the hoisting equipment load charts or the rigging capacity specified in the rigging chart.

12. The multiple lift rigging assembly must be rigged with members attached at their center of gravity and maintained reasonably level.

13. Multiple lift rigging assemblies must be rigged from the top down and rigged at least 7 feet (2.1m) apart.

14. The members on multiple lift rigging assembly must be set from the bottom up.

15. Controlled load lowering must be used whenever the load is over the connectors

II. Structural Steel Assembly

A. **Structural Stability:** must be maintained at all times during the erection process. The following additional requirements will apply for multi-story structures:

1. For multi-story structures, the permanent floors must be installed as the erection of structural member's progresses and there can be no more than 8 stories between the erection floor and the upper most permanent floor, except where the structural integrity is maintained as a result of the design.

2. At no time can there be more than 4 floors or 48 ft (14.6 m), whichever is less, of unfinished bolting or welding above the foundation or uppermost permanently secured floor, except where the structural integrity is maintained as a result of the design.

3. A fully planked or decked floor or nets must be maintained within 2 stories or 30 ft (9.1 m), whichever is less, directly under any erection work being performed.

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B. **Walking/Working Surfaces:**

1. Sheer Connectors and Other Similar Devices.

a) Tripping Hazards. Shear connectors (such as headed steel studs, steel bars or steel lugs), reinforcing bars, deformed anchors or threaded studs must not be attached to the top flanges of beams, joists or beam attachments so that they project vertically from or horizontally across the top flange of the member until after the metal decking, or other walking/working surface, has been installed.

b) Installation of Shear Connectors on Composite Floors when shear connectors are used in construction of composite floors, roofs and bridge decks, employees must lay out and install the shear connectors after the metal decking has been installed, using the metal decking as a working platform. Shear connectors must not be installed from within a controlled decking zone (CDZ), as specified in 29 CFR 1926.760 (c) (8).

C. **Plumbing-Up:**

1. When deemed necessary by competent person, plumbing-up equipment must be installed in conjunction with the steel erection process to ensure stability of the structure.

2. When used, plumbing-up equipment must be in place and properly installed before the structure is loaded with construction material such as loads of joists, bundles of decking or bundles of bridging.

3. Plumbing-up equipment will be removed only with approval of competent person.

D. **Metal Decking:**

1. Metal decking bundle packaging and strapping must not be used for hoisting unless specifically designed for that purpose.

2. Secure loose items such as dunnage, flashing, or other materials placed on the top of the metal decking bundles to be hoisted.

3. Bundles of metal decking must be landed in accordance with the Open Web Steel Joist portion of this section.

4. Metal decking bundles will be landed on framing members so that enough support is provided to allow the bundles to be un-banded without dislodging the bundles from the supports.

5. At the end of each shift or when environmental or jobsite conditions require, metal decking must be secured against displacement

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E. **Roof and Floor Holes and Openings**:

1. Framed metal deck openings must have structural members turned down to allow continuous deck installation except where not allowed by structural design constraints or constructability.

2. Roof and floor holes and openings must be decked over. Where large size, configuration or other structural design does not allow openings to be decked over (such as elevator shafts, stair wells, etc.) each employee who is on a walking/working

3. Surface with an unprotected edge or side more than 15 feet (4.6m) above a lower level must be protected from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, positioning device systems or fall restraint systems

4. Metal decking holes and openings must not be cut until immediately prior to being permanently filled with the equipment or structure needed or intended to fulfill its specific use and which meets specified strength requirements of the following section, or must be covered immediately.

F. **Covering Roof and Floor Openings**:

1. Covers for roof and floor openings must be capable of supporting, without failure, twice the weight of the employees, equipment and materials that may be imposed on the cover at any one time.

2. All covers must be secured when installed to prevent accidental displacement by the wind, equipment or employees.

3. All covers must be painted with high-visibility paint or must be marked with the word “HOLE” or “COVER” to provide warning of the hazard

4. Smoke or skylight fixtures that have been installed are not considered covers for the purposes of this section, unless they are capable of supporting, without failure, twice the weight of the employees, equipment and materials that may be imposed on the cover at any one time.

G. **Decking Gaps around Columns**:

1. Wire mesh, exterior plywood, or equivalent, must be installed around columns where planks or metal decking do not fit tightly. The materials used must be of sufficient strength to provide fall protection for personnel and prevent objects from falling through.

H. **Installation of Metal Decking:**

1. Metal decking must be laid tightly and immediately secured upon placement to prevent accidental movement or displacement. However, a controlled decking zone (CDZ) may be established in that area of structure over 15’ and up to 30’ above a lower level where metal decking is initially being installed and forms the leading edge of a work area

2. During initial placement, metal decking panels must be placed to ensure full support by structural members.

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I. **Derrick Floors:**

1. A derrick floor must be fully decked and/or planked and the steel member connections completed to support the intended floor loading.

2. Temporary loads placed on a derrick floor must be distributed over the underlying support members so as to prevent local overloading of the decking material.

III. Column Anchorage

A. **General Requirements for Erection Stability:**

1. All Columns must be anchored by a minimum of 4 anchor rods (anchor bolts).

2. Each column anchor rod (anchor bolt) assembly, including the column-to-base plate weld and the column foundation, must be designed to resist a minimum eccentric gravity load of 300 pounds (136.2kg) located 18 inches (.46m) from the extreme outer face of the column in each direction at the top of the column shaft.

3. Columns must be set on level finished floors, pre-grouted leveling plates, leveling nuts, or shim packs which are adequate to transfer the construction loads

4. All columns must be evaluated by a competent person to determine whether guying or bracing is needed. Guying or bracing must be installed if it is needed.

B. **Repair, Replacement, Field Modifications of Anchor Rods (Anchor Bolts)**

IV. Beams and Columns

A. **General:**

1. During the final placing of solid web structural members, the load must not be released from the hoisting line until the members are secured with at least two bolts per connection, of the same size and strength as shown in the erection drawings, drawn up wrench-tight or the equivalent as specified by the project structural engineer of record. Solid web structural members used as diagonal bracing must be secured by at least one bolt per connection drawn up wrench- tight or the equivalent as specified by the project structural engineer of record.

2. A competent person must determine if more than two bolts are necessary to ensure the stability of cantilevered members. Install additional bolts as needed.

B. **Diagonal Bracing:**

1. Solid web structural members used as diagonal bracing must be secured by at least one bolt per connection drawn up wrench tight or the equivalent as specified by the project structural engineer of records.

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C. **Double Connections at Columns/Beam Webs over a Column**

1. When two (2) structural members on opposite sides of a column web or a beam web over a column are connected sharing common connections holes, at least one bolt with its wrench-tight nut must remain connected to the first member unless a shop attached or field attached seat or equivalent connection device is supplied with the member (see Appendix H to Subpart R for examples of equivalent connection devices)

2. If a seat or equivalent device is used, the seat or device must be designed to support the load during the double connection process. It shall be adequately bolted or welded to both a supporting member and the first ember before the nuts on the shared bolts are removed to make a double connection.

D. **Column Splices**

1. Each column splice must be designed to resist a minimum eccentric gravity load of 300 lbs. (136.2 kg) located 18" (.46 m) from the extreme outer face of the column in each direction at the top of the column shaft.

E. **Perimeter Columns**:

1. Perimeter columns must not be erected unless they extend a minimum of 48" (1.2 m) above the finished floor to permit installation of perimeter safety cables prior to erection the next tier (see Appendix F to Subpart R for exceptions)

2. Perimeter columns must not be erected if they have holes or other devices in or attached to perimeter columns at 42-45" (107-114 cm) above the finished floor and the midpoint between the finished floor and the top cable for installation of perimeter safety cables (see Appendix F to Subpart F for exceptions)

V. Open Web Steel Joists

A. **General**

1. Where steel joists are used and columns are not framed in at least 2 directions with solid web structural steel members, a steel joist must be field bolted at the column. Procedures for the installation of this joist can be found in 29 CFR 1926.757 (a)(1)

2. Where constructability doesn't allow steel joist to be installed at column, alternate means of stabilizing joists must be installed on both sides near column and must:

a) Provide stability equivalent to (a)(1) of this section

b) Be designed by a qualified person.

c) Be shop installed

d) Be included in the erection drawings

e) Hoisting cables must not be released until the seat at each end of the steel joist is field bolted and the joist is stabilized.

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3. Where steel joists or near columns span 60' (18.3 m) or less, the joist must be designed with sufficient strength to allow one employee to release the hoisting cable without the need for erection bridging.

4. Where steel joists at or near columns span more than 60' (18.3 m), the joists erection, which provides equivalent stability to the steel joist, is designed by a qualified person and is included in the site specific erection plan.

5. A steel joist or steel joist girder must not be placed on any support structure, unless such structure is stabilized.

6. When steel joist(s) are landed on a structure, they must be secured to prevent unintentional displacement prior to installation.

7. No modification that affects the strength of a steel joist or steel joist girder will be made without the approval of the project structural engineer of record.

8. Field bolted joists, except for steel joists that have been pre-assembled into panels, connections of individual steel joists to steel joists to steel structures in bays of 40' (12.2 m) or more must be fabricated to allow for field bolting during erection. These connections must be field bolted unless constructability does not allow.

9. Steel joists and steel joist girders must not be used as anchorage points for a fall arrest system unless written approval to do so is obtained from a qualified person.

10. A bridging terminus point must be established before bridging is installed.

B. **Attachment of Steel Joists/Steel Joist Girders**

1. Each end of "K" series steel joist must be attached to the support structure with a minimum of 2" (3 mm) fillet welds 1" (25 mm) long or with 2 1/2 " (13 mm) bolts or the equivalent.

2. Each end of "LH" and "DLH" series steel joists and steel joist girders must be attached to the support structure with a minimum of 2 ¼" (6 mm) long or with 2 3/4 " (19 mm) bolts or the equivalent.

3. Except for panels that have been pre-assembled from steel joists with bridging, each steel joist must be attached to the support structure, at least 1 end on both sides of the seat immediately upon placement in the final erection position and before additional joists are placed.

4. Panels that have been pre-assembled from steel joists with bridging must be attached to the structure at each corner before the hoisting cables are released.

C. **Steel Joist Erection**

1. Both sides of the seat of one end of each steel joist that requires bridging under Tables A and B must be attached to the support structure before hoisting cables are released.

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2. For joists over 60 feet, both ends of the joist must be attached as described in Paragraph B of this section and the provisions of paragraph D of this section before the hoisting cables are released.

3. On steel joists that do not require erection bridging under Tables A and B, only one employee must be allowed on the joist until all bridging is installed and anchored.

4. Modern Electric Co. or subcontractor employees must not be allowed on steel joists where the span of the steel joist is equal to or greater than the span shown in Tables A and B except in accordance with 1926.757 (d).

5. When permanent bridging terminus points cannot be used during erection, additional temporary bridging terminus points are required to provide stability.

D. **Erection Bridging**

1. Where the span of the steel joist is equal to or greater than the span shown in Tables A and B, the following will apply:

a) A row of bolted diagonal erection bridging must be installed near the midspan of the steel joist.

b) Hoisting cables must not be released until bolted diagonal erection bridging is installed and anchored.

c) No more than one (1) employee must be allowed on these spans until all other bridging is installed and anchored.

2. Where the span of the steel joist is over 60’ (18.3 m) through 100’ (30.5 m), the following will apply:

a) All rows of bridging must be bolted diagonal bridging

b) Two (2) rows of bolted diagonal erection bridging must be installed near the 3rd points on the steel joists

c) Hoisting cables must not be released until this bolted diagonal erection bridging is installed and anchored.

d) No more than two (2) MEC or subcontractor employees will be allowed on these spans until all other bridging is installed and anchored.

3. Where the span of the steel joist is over 100’ (30.5 m) through 144’ (43.9 m), the following will apply:

a) All rows of bridging must be bolted diagonal bridging.

b) Hoisting cables must not be released until all bridging is installed and anchored.

c) No more than 2 MEC or subcontractor employees will be allowed on these spans until all bridging in installed and anchored.

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4. For steel members spanning over 144' (43.9 m), the erection methods used must be in accordance with 1926.756

5. Where any steel joists specified in paragraphs (C2), (D1), (D2), and (D3) of this section is a bottom chord bearing joist, a row of bolted diagonal bridging must be provided near the support(s). This bridging must be installed and anchored before the hoisting cable(s) is released.

6. When bolted diagonal erection bridging is required, the following will apply:

   a) The bridging must be indicated on the erection drawing.

   b) The erection drawing must be the exclusive indicator of the proper placement of this bridging.

7. Shop installed bridging clips or functional equivalents shall be used where the bridging bolts to the steel joists.

8. When 2 pieces of bridging are attached to the steel joist by a common bolt, the nut that secures the first piece of bridging must not be removed from the bolt for the attachment of the second.

9. Bridging attachments must not protrude above the top of the steel joists.

VI. Landscaping/Placing Loads

A. During the construction period, the MEC or subcontractors placing a load on steel joists must ensure that the load is distributed so as not to exceed the carrying capacity of any steel joist.

B. Except for paragraph (e4) of this section, no construction loads are allowed on the steel joists until all bridging is installed and anchored and all joist bearing ends are attached.

C. The weight of a bundle of joist bridging must not exceed a total of 1,000 lbs (454 kg). A bundle of joist bridging must be placed on a minimum of 3 steel joists that are secured at one end. The edge of the bridging bundle must be positioned with 1' (.30 m) of the secured end.

D. No bundle of decking may be placed on steel joists until all bridging has been installed and anchored and all joist bearing ends attached, unless all of the following conditions are met:

1. MEC has first determined from a qualified person and documented in a site specific erection plan that the structure or portion of the structure is capable of supporting the load.

2. The bundle of decking is placed on a minimum of 3 steel joists.

3. The joists supporting the bundle of decking are attached at both ends.

4. At least 1 row of bridging is installed and anchored.

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5. The total weight of the bundle of decking does not exceed 4,000 lbs (1,816 kg).

6. Placement of the bundle of decking must be in accordance with paragraph E5 of this section.

E. The edge of the construction load must be placed within 1' (.30 m) of the bearing surface of the joist end.

VII. System Engineered Metal Buildings

A. All the requirements of this section apply to the erection of systems engineered metal building except for the requirements in the Column Anchorage and Open Web Steel Joists.

B. Each structural column must be anchored by a minimum of 4 anchor rods (anchor bolts).

C. Rigid frames must have 50% of their bolts or the number of bolts specified by the manufacturer (whichever is greater) installed and tightened on both sides of the web adjacent to each flange before the hoisting equipment is released.

D. Construction loads must not be placed on any structural steel framework unless such framework is safely bolted, welded or otherwise adequately secured.

E. In girt and eave strut to frame connections, when girts or eave struts share common connection holes, at least 1 bolt with its wrench tight nut must remain connected to the 1st member unless a manufacturer supplied, field attached seat or similar connection device is present to secure the first member so that the girt or eave strut is always secured against displacement.

F. Both ends of all steel joists or cold frame joists must be fully bolted and/or welded to the support structure before:

1. Releasing the hoisting cables.
2. Allowing an employee on the joists.
3. Allowing any construction loads on the joists.

G. Purlins and girts must not be used as an anchorage point for all arrest systems unless written approval is obtained from a qualified person.

H. Purlins may only be used as a walking/working surface when installing safety systems, after all permanent bridging has been installed and fall protection is provided.

I. Construction loads may be placed only within a zone that is within 8' (2.5 m) of the center line of the primary support member.

VIII. Falling Object Protection

A. **Securing loose items aloft**

1. All materials, equipment and tools which are not in use while aloft, shall be secured against accidental displacement.

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B. **Protection for falling objects**

1. For falling objects other than materials being hoisted, MEC must bar other construction processes below steel erection unless overhead protection for the employee below is provided.

IX. Fall Protection

A. **General Requirements:**

1. Except as provided by paragraph A3 of this section, each employee engaged in a steel erection activity who is on a walking/working surface with an unprotected side or edge more than 15’ (4.6 m) above a lower level must be protected from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, positioning device systems or fall restraint systems.

2. On multi story structures, perimeter safety cables must be installed at the final interior and exterior perimeters of the floors as soon as the metal decking has been installed.

3. Connectors and employees working in controlled decking zones must be protected from fall hazards as provided in paragraphs B and C of this section.

B. **Connectors**

1. Each connector must be protected in accordance with paragraph A of this section from fall hazards of more than 2 stories or 30’ (9.1 m) above a lower level, whichever is less.

2. Connectors must have completed connector training In accordance with 1926.761.

3. Connectors must be provided with a personal fall arrest system, positioning device system or fall restraint system and war the equipment necessary to be able to be tied off or be provided with other means of protection from fall hazards at heights over 15’ and up to 30’ above a lower level.

C. **Controlled Decking Zone (CDZ)**

1. A controlled decking zone may be established in that area of the structure over 15’ and up to 30’ above a lower level where metal decking is initially being installed and forms the leading edge of a work area. In each CDZ, the following will apply.

a) Each employee working at the leading edge in a CDZ must be protected from fall hazards of more than 2 stories or 30’ (9.1 m) whichever is less

b) Access to a CDZ must be limited to only those employees engaged in leading edge work.

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c) The boundaries of a CDZ must be designated and clearly marked. The CDZ must not be more than 90' (27.4 m) deep from any leading edge. The CDZ must be marked by the use of control lines or the equivalent.

d) Each employee working in a CDZ must have completed CDZ training in accordance with 1926.761

e) Unsecured decking in a CDZ must not exceed 3,000 sq. ft.

f) Safety deck attachments must be performed in the CDZ from the leading edge back to the control line and must have at least 2 attachments for each metal decking panel.

g) Final deck attachments and installation of shear connectors must not be performed in the CDZ.

D. **Criteria for Fall Protection Equipment**

1. Guardrail systems, safety net systems, personal fall arrest systems, positioning device system sand their components must conform to the criteria in 1926.502 appendix G

2. Fall arrest system components must be used in fall restraint systems and must conform to the criteria in 1926.502 appendix G. Body belts or body harnesses must be used in fall restraint systems

3. Perimeter safety cables must meet the criteria for guardrail systems in 1926.502 appendix G.

E. **Custody of Fall Protection**

1. Fall protection provided by the steel erector must remain in the area where steel erection activity has been completed, to be used by other trades, only if Modern Electric Co., or its authorized representative have done the following:

a) Directed the steel erector to leave fall protection in place.

b) Inspected and accepted control and responsibility of the fall protection prior to authorizing persons other than steel erectors to work in the area

X. Training

A. **Training personnel**

1. Training personnel required by this section must be provided by a qualified person(s).

B. **Fall Hazard Training**

1. MEC shall provide a training program for all employees exposed to fall hazards. The program will include training and instruction in the following areas:

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a) The recognition and identification of fall hazards in the work area.

b) The use and operation of guardrail systems (including perimeter safety cable systems), personal fall arrest systems, positioning device systems, fall restraint systems, safety net system and other protection to be used.

c) The correct procedures for erecting, maintain, disassembling and inspecting the fall protection used.

d) The procedures to be followed to prevent falls to lower levels and through or into holes and openings in walking/working surfaces and walls. The fall protecting requirements of this steel erection standard.

C. **Special Training Programs**

1. In addition to the training required in paragraphs A & B of this section, MEC will provide special training to employees engaged in the following activities:

a) Multiple Lift Rigging Procedure – The employer must ensure that each employee who performs multiple lift rigging has been provided training in the following areas.

(1) The nature of the hazards associates with multiple lifts.

(2) The proper procedures and equipment to perform multiple lifts required by 1926.753

b) Connector Procedure – MEC must ensure that each connector has been provided training in the following areas:

(1) The nature of the hazards associated with connecting.

(2) The establishment, access, proper connecting techniques and work practices required.

c) Controlled Decking Zone Procedure

(1) The nature of the hazards associated with work within a controlled decking

(2) The establishment, access, proper installation techniques and work practices required by 1926.760 and 1926.754

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Appendix A to Subpart R – Guidelines for Establishing the Components of a Site– Specific Erection Plan: Non-Mandatory Guidelines for complying with 1926.752(e).

This appendix serves as a guideline to assist employers who elect to develop a site-specific erection plan in accordance with 1926.752(e) with alternate means and methods to provide employee protection in accordance with 1926.752(e), 1926.753©(5), 1926.757(a)(4) and 1926.757(e)(4).

A. Development of a Site-Specific Erection Plan. Pre-Construction conference(s) and site inspection(s) are held between the erector and the controlling contractor, and others such as the project engineer and fabricator before the start of steel erection. The purpose of such conference(s) is to develop and review the site-specific erection plan that will meet the requirements of this section.

B. Components of a Site-Specific Erection Plan - In developing a site-specific erection plan, a steel erector considers the following elements:

C. The sequence of erection activity, developed in coordination with the controlling contractor that includes the following:

1. Material deliveries.

2. Material staging and storage.

3. Coordination with other trades and construction activities.

D. A description of the crane and derrick selection and placement procedures, including the following:

1. Site preparation.

2. Path for overhead loads.

3. Critical Lifts, including rigging supplies and equipment.

E. A description of steel erection activities and procedures, including the following:

1. Stability considerations requiring temporary bracing and guying.

2. Erection bridging terminus point.

3. Anchor rod (anchor bolt) notifications regarding repair, replacement and modifications.

4. Columns and beams (including joists and purlins).

a) Connections.
b) Decking.
c) *Ornamental and miscellaneous iron*

5. A description of the fall protection procedures that will be used to comply with 1926.760

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6. A description of the procedures that will be used to comply with 1926.759

7. A description of the procedures required for hazardous non-routine tasks.

8. A certificate for each employee who has received training for performing steel erection operations as required by 1926.761

9. A list of qualified and competent persons.

10. A description of the procedures that will be utilized in the event of rescue or emergency response.

F. Other Plan Information

1. Includes the identification of the site and the project.

2. Is signed and dated by the qualified person(s) responsible for its preparation and modification.

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Appendix B to Subpart R – Acceptable Test Methods for Testing Slip-resistance of Walking/working Surfaces (1926.754 (c) (3). Non-mandatory Guidelines for Complying with 1926.754 (C) (3).

A. The following references provide acceptable test methods for complying with the requirements of 1926.754 (c) (3).

1. Standard Test Method for Using a Portable Inclinable Articulated Strut Slip Tester (PIAST) (ASTM) F1677-96)

2. Standard Test Method for Using a Variable Incidence Tribometer (VIT)(ASTM F1679-96)

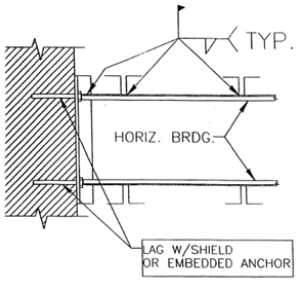
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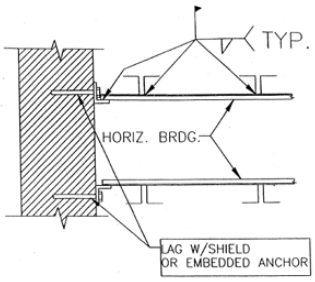
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Appendix C to Subpart R – Illustrations of Bridging terminus Points: Non- mandatory Guidelines for Complying with 1926.757 (a) (10) and 1926.757 (c) (5).

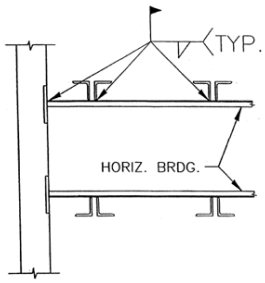
HORIZONTAL BRIDGING
TERMINUS AT WALL



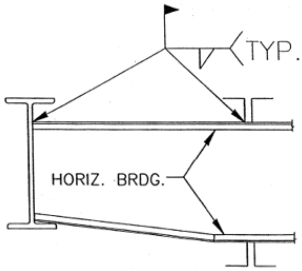
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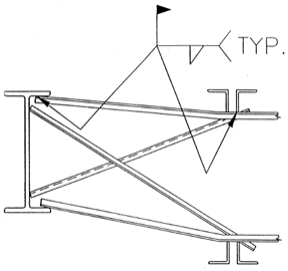
HORIZONTAL BRIDGING
TERMINUS AT PANEL WALL



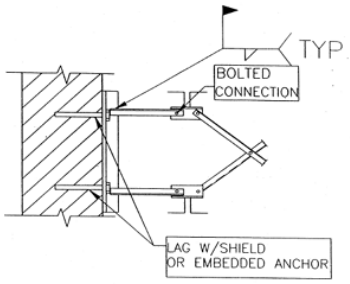
HORIZONTAL BRIDGING
TERMINUS AT STRUCTURAL SHAPE



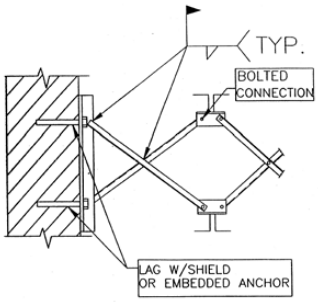
HORIZONTAL BRIDGING
TERMINUS AT STRUCTURAL SHAPE
WITH OPTIONAL "X" BRIDGING



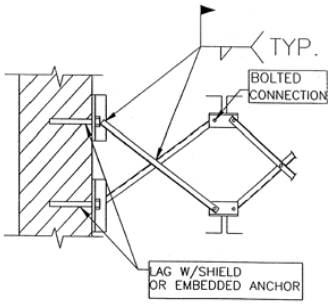
BOLTED DIAGONAL BRIDGING
TERMINUS AT WALL



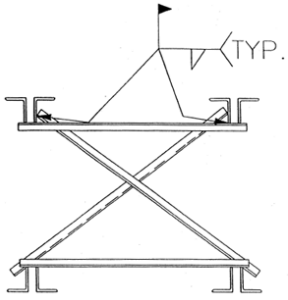
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TERMINUS AT WALL



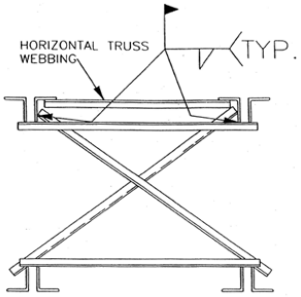
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TERMINUS AT WALL



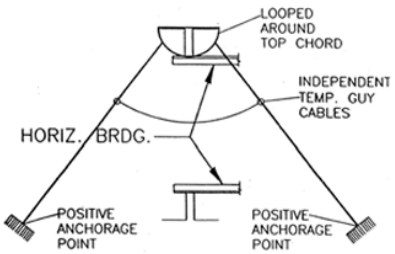
JOISTS PAIR BRIDGING
TERMINUS POINT



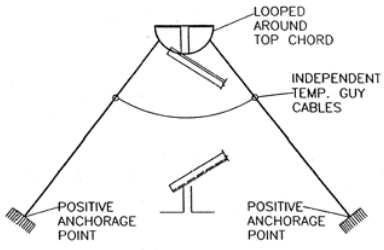
JOISTS PAIR BRIDGING
TERMINUS POINT WITH HORZ. TRUSS



HORIZONTAL BRIDGING
TERMINUS POINT SECURED BY TEMP. GUY
CABLES



DIAGONAL BRIDGING
TERMINUS POINT SECURED BY TEMP. GUY
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Appendix D to Subpart R – Illustration of the Use of Control Lines to Demarcate Controlled Decking Zones (CDZs): Non-mandatory Guidelines for Complying with 1926.760(c) (3).

A. When used to control access to areas where leading edge and initial securement of metal deck and other operations connected with leading edge work are taking place, the controlled decking zone (CDZ) is defined by a control line or by any other means that restricts access.

1. A control line for a CDZ is erected not less than 6 feet nor more than 90 feet from the leading edge.

2. Control lines extend along the entire length of the unprotected or leading edge and are approximately parallel to the unprotected or leading edge.

3. Control lines consist of ropes, wires, tapes, or equivalent materials, and supporting stanchions as follows:

a) Each line is rigged and supported in such a way that its lowest point (including sag) is not less than 39 inches from the walking/working surface and its highest point is not more than 45 inches from the walking/working surface.

b) Each line has a minimum breaking strength of 200 pounds

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Appendix E to Subpart R – Training: Non-mandatory Guidelines for Complying with 1926.761.

The training requirements of 1926.761 will be deemed to have met if employees have completed a training course on steel erection, including instruction in the provisions of this standard that has been approved by the U.S. Department of labor Bureau of Apprenticeship.

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Appendix F to Subpart R – Perimeter Columns: Non-mandatory Guidelines for complying with 1926.756(e) to protect the Unprotected Side or Edge of a walking/Working Surface.

In multi-story structures, when holes in the column web are used for perimeter safety cables, the column splice must be placed sufficiently high so as not to interfere with any attachments to the column necessary for the column splice. Column splices are recommended to be placed at every other or fourth levels as design allows. Column splices at third levels are detrimental to the erection process and should be avoided if possible.

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Appendix G to Subpart R – 1926.502 (b) – (e) Fall Protection Systems Criteria and Practices

A. **Guardrail systems and their use must comply with the following provisions:**

1. Top edge height of rails, or equivalent guardrail system members, must be 42 inches plus or minus 3 inches above the walking/working level. When conditions warrant, the height of the top edge may exceed the 45-inch height, provided the guardrail system meets all other criteria of this paragraph 1926.502 (b).

Note: When employees are using stilts, the top edge height of the top rail, or equivalent member, shall be increased an amount equal to the height of the stilts.

2. Mid-rails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members must be installed between the top edge of the guardrail system and the walking/working surface when there is no wall or parapet wall at least 21" high.

3. Mid-rails, when used, must be installed at a height midway between the top edge of the guardrail system and the walking/working level.

4. Screens and mesh, when used, must extend from the top rail to the walking/working level and along the entire opening between top rail supports.

5. Intermediate members (such as balusters), when used between posts, must be not more than 19" apart.

6. Other structural members (such as additional mid-rails and architectural panels) must be installed such that there are no openings in the guardrail system that are more than 19" wide.

7. Guardrail systems must be capable of withstanding, without failure, a force of at least 200 lbs. applied within 2" of the top edge, in any outward or downward direction, at any point along the top edge.

8. When the 200 lb test load specified in paragraph (b) (3) of this section (1926.502) is applied in a downward direction, the top edge of the guardrail must not deflect to a height less than 39" above the walking/working level. Guardrail system components selected and constructed in accordance with the Appendix B to Subpart m of this part will be deemed to meet this requirement.

9. Mid-rails, screens, mesh, intermediate vertical members, solid panels, and equivalent structural members must be capable of withstanding, without failure, a force of at least 150 lbs. applied in any downward or outward direction at any point along the mid-rail or other member.

10. Guardrail systems must be so surfaced as to prevent injury to an employee from puncture or lacerations and to prevent snagging of clothing

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11. The ends of all top rails and mid-rails must not overhand the terminal posts, except where such overhang does not constitute a projection hazard.

12. Steel banding and plastic banding must not be used as top rails or mid-rails.

13. Top rails and mid-rails must be at least ¼" nominal diameter or thickness to prevent cuts and lacerations. If wire rope is used for top rails, it must be flagged at not more than 6 foot intervals with high visibility material.

14. When guardrail systems are used at hoisting areas, a chain, gate or removable guardrail section must be placed across the access opening between guardrail sections when hoisting operations are not taking place.

15. When guardrail systems are used at holes, they must be erected on all unprotected sides or edges of the hole.

16. When guardrail systems are used around holes used for the passage of materials, the hole must have not more than two sides provided with removable guardrail sections to allow the passage of materials. When the hole is not in use, it must be closed over with cover or a guardrail system must be provided along all unprotected sides and edges.

17. When guardrail systems are used around holes which are used as points of access (such as ladder ways), they must be provided with a gate or be so offset that a person cannot walk directly into the hole.

18. Guardrail systems used on ramps and runways must be erected along each unprotected side or edge.

19. Manila, plastic or synthetic rope being used for top rails or mid-rails must be inspected as frequently as necessary to ensure that it continues to meet the strength requirements of paragraph B2 of this section 1926.502

B. **Safety Net Systems and their use must comply with the following provisions:**

1. Safety nets must be installed as close as practicable under the walking/working surface on which employees are working, but in case, more than 30' below such level. When nets are used on bridges, the potential fall area from the walking/working surface to the net must be unobstructed.

2. Safety nets must extend outward from the outermost projection of the work surface as follows:

Vertical Distance from working level to horizontal plane of net	**Minimum required horizontal distance of outer edge of net from the edge of the working surface**
Up to 5 feet	8 feet
More than 5 feet up to 10 feet	10 feet
More than 10 feet	13 feet

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3. Safety nets must be installed with sufficient clearance under them to prevent contact with the surface or structures below when subjected to an impact force equal to the drop test specified in paragraph 4 of this section 1926.502.

4. Safety nets and their installations must be capable of absorbing an impact force equal to that produced by the drop test specified in paragraph C4 of this section 1926.502

a) Except as provided in paragraph (c) (4) of this section [1926.502], safety net and safety net installation must be drop-tested at the jobsite after initial installation and before being used as a fall protection system, whenever relocated, after major repair, and at 6-month intervals if left in one place. The drop-test must consist of a 400 lb. bag of sand 30 + or – 2” in diameter dropped into the net from the highest walking/working surface at which employees are exposed to fall hazards, but not from less than 42” above that level.

b) When the employer can demonstrate that it is unreasonable to perform the drop-test required of this section, the employer or designated competent person must certify that the net and net installation is in compliance with the provisions of this section (OSHA 1926.502), by preparing a certification record prior to the net being used as a fall protection system. The certification record must include an identification of the net and net installation for which the certification record is being prepared, the date that it was determined that the identified net and net installation were in compliance with paragraph (c) (3) of this section [1926.502] and the signature of the person making the determination and certification.

The most recent certification for each net and net installation must be available at the jobsite for inspection.

5. Defective nets must not be used. Safety nets must be inspected at least once a week for wear, damage and other deterioration. Defective components must be removed from service. Safety nets must also be inspected after any occurrence which could affect the integrity of the safety net system.

6. Materials, scrap pieces, equipment and tools which have fallen into the safety net must be removed as soon as possible from the net and at least before the next work shift.

7. The maximum size of each safety net mesh opening must not exceed 36 square inches nor be longer than 6 inches on any side, and the opening, measured center-to-center of mesh ropes or webbing, must not be longer than 6”. All mesh crossings must be secured to prevent enlargement of the net opening.

8. Each safety net (or section of it) must have a border rope for webbing with a minimum breaking strength of 5,000 lbs.

9. Connections between safety net panels must be as strong as integral net components and must be spaced not more than 6” apart

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C. **Personal Fall Arrest Systems: Personal fall arrest systems and their use must comply with the provisions set forth below.**

Effective January 1, 1998, body belts are not acceptable as part of a personal fall arrest system. Note: The use of a body belt in a positioning device system is acceptable and is regulated under paragraph (e) of this section [1926.502].

1. Connectors must be dropped forged, pressed or formed steel, or made of equivalent materials.

2. Connectors must have a corrosion-resistant finish, and all surfaces and edges must be smooth to prevent damage to interfacing parts of the system.

3. Dee-rings and snaphooks must have a minimum tensile strength of 5,000 lbs.

4. Dee-rings and snaphooks must be proof-tested to a minimum tensile load of 3,600 pounds without cracking, breaking, or taking permanent deformation.

5. Snaphooks must be sized to be compatible with the member to which they are connected to prevent unintentional disengagement of the snaphook by depression of the snaphook keeper by the connected member, or shall be a locking type snaphook designed and used to prevent disengagement of the snaphook by the contact of the snaphook keeper by the connected member. Effective January 1, 1998, only locking type snaphooks shall be used

6. Unless the snaphook is a locking type and designed for the following connections, snaphooks must not be engaged:

   a) Directly to webbing, rope or wire rope.

   b) To each other.

   c) To a D-ring to which another snaphook or other connector is attached.

   d) To a horizontal lifeline.

   e) To any object which is incompatibly shaped or dimensioned in relation to the snaphook such that unintentional disengagement could occur by the connected object being able to depress the snaphook keeper and release itself

7. On suspended scaffolds or similar work platforms with horizontal lifelines which may become vertical lifelines, the devices used to connect to a horizontal lifeline must be capable of locking in both directions on the lifeline.

8. Horizontal lifelines must be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.

9. Lanyards & vertical lifelines must have minimum breaking strength of 5,000 lbs.

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10. Except as provided in paragraph (d) (10) (ii) of this section [1926.502], when vertical lifelines are used, each employee must be attached to a separate lifeline.

a) During the construction of elevator shafts, two employees may be attached to the same lifeline in the hoistway, provided both employees are working atop a false car that is equipped with guardrails; the strength of the lifeline is 10,000 lbs. pounds [5,000 lbs. per employee attached]; and all other

b) Criteria specified in this paragraph for lifelines have been met.

11. Lifelines must be protected against being cut or abraded.

12. Self – retracting lifelines and lanyards which automatically limit free fall distance to 2' or less must be capable of sustaining a minimum tensile load of 3,000 lbs pounds applied to the device with the lifeline or lanyard in the fully extended position.

13. Self-retracting lifelines and lanyards which do not limit free fall distance to 2 feet or less, ripstitch lanyards, and tearing and deforming lanyards must be capable of sustaining a minimum tensile load of 5000 lbs. applied to the device with the lifeline or lanyard in the fully extended position.

14. Ropes and straps (webbing) used in lanyards, lifelines and strength components of body belts and body harnesses must be made from synthetic fibers.

15. Anchorages used for attachment of personal fall arrest equipment must be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 lbs. per employee attached or shall be designed, installed and used as follows:

a) As part of a complete personal fall arrest system which maintains a safety factor of at least 2.

b) Under the supervision of a qualified person

16. Personal fall arrest systems, when stopping a fall, must:

a) Limit max arresting force on an employee to 900 lbs. when used with a body belt.

b) Limit max arresting force on an employee to 1,800 lbs. when used with a body harness.

c) Be rigged such that an employee can neither free fall more than 6', nor contact any lower level.

d) Bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5'

e) Have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6' or the free fall distance permitted by the system, whichever is less.

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Note: If the personal fall arrest system meets the criteria and protocols contained in Appendix C to subpart M, and if the system is being used by an employee having a combined person and tool weight of less than 310 pounds, the system will be considered to be in compliance with the provisions of paragraph (d) (16) of this section [1926.502]. If the system is used by an employee having a combined tool and body weight of 310 pounds or more, then the employer must appropriately modify the criteria and protocols of the Appendix to provide proper protection for such heavier weights, or the system will not be deemed to be in compliance with the requirements of paragraph (d) (16) of this section [1926.502].

17. The attachment point of the body belt must be located in the center of the wearer's back. The attachment point of the body harness must be located in the center of the wearer's back near shoulder level, or above the wearer's head.

18. Body belts, harnesses, and components must be used only for employee protection (as part of a personal fall arrest system or positioning device system) and not to hoist materials.

19. Personal fall arrest systems and components subjected to impact loading must be immediately removed from service and must not be used again for employee protection until inspected and determined by a competent person to be undamaged and suitable for reuse.

20. The employer must provide for prompt rescue of employees in the event of a fall or shall assure that employees are able to rescue themselves.

21. Personal fall arrest systems must be inspected prior to each use for wear, damage and other deterioration. Defective components must be removed from service.

22. Body belts must be at least 1 5/8" wide.

23. Personal fall arrest systems must not be attached to guardrail systems, nor must they be attached to hoists except as specified in other subparts of this Part.

24. When a personal fall arrest system is used at hoist areas, it must be rigged to allow movement of the employee only as far as the edge of the walking/working surface.

D. **Positioning Device Systems**

1. Positioning devices must be rigged such that an employee cannot free fall more than 2'.

2. Positioning devices must be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or 3,000 lbs., whichever is greater.

3. Connectors must be drop forged, pressed or formed steel, or made of equivalent materials.

4. Connectors must have a corrosion-resistant finish, and all surfaces and edges must be smooth to prevent damage to interfacing parts of this system.

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5. Connecting assemblies must have a minimum tensile strength of 5,000 lbs.

6. Dee-rings and snaphooks must be proof-tested to a minimum tensile load of 3,600 lbs. without cracking, breaking, or taking permanent deformation.

7. Snaphooks must be sized to be compatible with the member to which they are connected to prevent unintentional disengagement of the snaphook by depression of the snaphook keeper by the connected member, or must be a locking type snaphook designed and used to prevent disengagement of the snaphook by the contact of the snaphook keeper by the connected member. As of January 1, 1998, only locking type snaphooks must be used.

8. Unless the snaphook is a locking type and designed for the following connections, snaphooks must not be engaged.

a) Directly to webbing, rope or wire rope

b) To each other

c) To a D-ring to which another snaphook or other connector is attached.

d) To a horizontal lifeline or to depress the snaphook keeper and release itself.

e) To any object which is incompatibly shaped or dimensioned in relation to the snap hook such that unintentional disengagement could occur by the connected object being able to depress the snaphook keeper and release itself.

9. Positioning device systems must be inspected prior to each use for wear, damage and other deterioration. Defective components must be removed from service.

10. Body belts, harnesses and components must be used only for employee protection (as part of a personal fall arrest system or positioning device system) and not to hoist materials.

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Appendix H to Subpart R --- Double Connections: Illustrations of a Clipped End Connection and a Staggered Connection: Non-Mandatory Guidelines for Complying with 1926.756 (c) (1).

Clipped end connections are connection material on the end of a structural member which has a notch at the bottom and/or top to allow the bolt(s) of the first member placed on the opposite side of the central member to remain in place. The notch (es) fits around the nut or bolt head of the opposing member to allow the second member to be bolted up without removing the bolt(s) holding the first member.

Staggered connections are connection material on a structural member in which all of the bolt holes in the common member web are not shared by the two incoming members in the final connection. The extra hole in the column web allows the erector to maintain at least a one bolt connection at all times while making the double connection.

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SECTION 28

ELECTRIC POWER GENERATION, TRANSMISSION AND DISTRIBUTION

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I. Electric Power Generation, Transmission and Distribution Policy

A. **OSHA References**: 29 CFR 1910.269

B. **Policy**: It is the policy of Modern Electric Co. to comply with control of Electrical Power Generation, Transmission, and Distribution standards established by OSHA in 29 CFR 1910.269 and client established policies and procedures for Medium and High Voltages. The client policy and procedure will supersede this policy and procedure if it meets or exceeds the OSHA and Modern Electric Co. requirements.

C. **Scope**: This procedure is intended to cover necessary safety precautions and procedures for servicing, maintaining, and operations of electric power generation, control, transformation, transmission, and distribution lines and equipment, which could cause injury to employees. This policy and procedure applies to all Modern Electric Co. employees, Modern Electric Co. subcontractors, and their employees.

D. **Purpose**: Certain safety procedures are necessary and must be followed in the operation and maintenance of electric power generation, control, transformation, transmission, and distribution lines and equipment. The types of installation covered by this section include the generation, transmission and distribution instillations of electric utilities, as well as equivalent installations of industrial establishments

E. **Training**: Training will be provided to appropriate Modern Electric Co. employees and subcontractors in the application of this policy or client policy by Modern Electric Co. or its' clients. The use of outside professional resources may apply for the purpose of training to meet the requirements of the procedure.

1. Employees shall be trained in and familiar with the safety related work practices, safety procedures, and other safety requirements that pertain to their respective job assignments. Employees shall also be trained in and familiar with any other safety practices, including applicable emergency procedures such as pole top and manhole rescue), that are not specifically addressed by the procedure but that are related to their work and are necessary for their safety.

2. Employees shall be trained and competent in the skills and techniques necessary to distinguish exposed live parts of electric equipment.

3. Employees shall be trained and competent in the skills techniques necessary to determine the nominal voltage of exposed live parts.

4. Employees shall be trained and competent in the minimum approach distance specified in 29 CFR 1910.269 corresponding to voltages to which the qualified employees will be exposed

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5. Employees shall be trained and competent in the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electric equipment.

6. An employee shall receive additional training if new technology, new types of equipment, or changes in procedure necessitate the use of safety related work practices that are different from those which the employee would normally use, or if he or she must employee safety related work practices that are not normally used during his or her regular job duties

F. **Failure to Comply**: Failure to comply with this policy and procedure or client established policy and procedure are grounds for immediate removal and subsequent discharge in accordance with the Modern Electric Co. Red Flag Violation Policy.

G. **Inspection**: An inspection for compliance with the Modern Electric Co. policy and procedures for Electric Power Generation, Transmission, and Distribution will be conducted and documented annually, by a company designated competent person.

H. **Deviations**: The Modern Electric Co. Safety Coordinator may approve Deviations to this policy and procedures only and must be approved by the President of Modern Electric Co.

II. Procedure

A. **General:** This procedure establishes the minimum requirements for working on or near Medium or High voltages whenever maintenance or servicing is done. It must be used to ensure that isolation of employees from all potentially hazardous energy sources, or where the unexpected energization or release of stored energy could cause injury.

B. **Compliance**: All employees are required to comply with the restrictions of the Policy and Procedure, as well as with the client restrictions and Policies, and with OSHA Regulation 29 CFR 1910.269 and its subparts.

C. **Enforcement**: Failure to comply with the Procedure will cause immediate removal from the work site and subsequent termination of employment.

D. **"Existing Conditions"**: Existing conditions related to the safety of the work to be performed shall be determined before work on or near electric lines or equipment is started. Such conditions include, but are not limited to, the nominal voltages of lines and equipment, the maximum switching of transient voltages, the presence of hazardous induced voltages, the presence and condition of protective grounds and equipment grounding conductors, the condition of poles, environmental conditions relative to safety, and the locations of circuits and equipment, including power and communication lines and fire protective signaling circuits.

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E. **"Job Briefing"**: Modern Electric Co. Project Manager, Foreman, or designated representative, will conduct a job briefing with the employees involved before the start of each job. The briefing shall cover at least the following subjects:

1. Hazards associated with the job
2. Work procedures involved
3. Special precautions
4. Energy source controls
5. Personal protective equipment requirements
6. Additional job briefings shall be held if significant changes, which might affect the safety of the employee, occur during the course of the work.

III. Lockout/Tagout

A. **Purpose:** The use of lockout/tagout procedures for the control of energy sources in the installations for the purpose of electric power generation, including related equipment for communication or metering. Locking and tagging procedures for the de-energizing of electric energy sources, which are used exclusively for the purposes of transmission and distribution, will follow.

Note 1. Section 5 of the Modern Electric Co. Control of Hazardous Energy and Ref: OSHA 29 CFR 1910.147, 333, and 417 with regards to control of hazardous energy will also be deemed to comply with this section if the procedures address the hazards covered by this section.

B. **Hazardous Energy Control (Electric Generation)**: Before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, start up, or release of stored energy could occur and cause injury, the machine or equipment is to be isolated from the energy source and rendered inoperative.

1. If an energy-isolating device is capable of being locked out, it shall be locked out. If it is not capable of being locked out, the use of a tagout system shall be used, providing the tagout system will provide full employee protection, the same as a lockout system would.

2. The tag shall be installed at the same location, as would a lock.

3. In demonstrating that the level of safety is achieved in the tagout program equivalent to the level of safety obtained by the use of a lockout program, there shall be additional elements used as necessary to provide the equivalent safety available from the use of a lockout device. Additional elements to be considered shall include the implementation of additional safety measures such as:

a) Removal of an isolating circuit element, blocking of controlling switch

b) Opening of an extra disconnecting device

c) Or the removal of a valve handle to reduce the likelihood of inadvertent energizing

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C. **Training:** Training shall be provided to ensure that the purpose and function of the energy control program are understood by the employees and that the knowledge and skills required for the application, usage, and removal of energy controls are acquired by employees.

1. Each employee shall receive training in the recognition of applicable hazardous energy sources, the type and magnitude of energy available in isolation and control

2. Each employee shall be instructed in the purpose and use of the energy control procedure

3. All employees whose work operations are or may be in an area where energy control procedures may be used shall be instructed about the procedures and about the prohibition relating to attempts to restart or reenergize machines or equipment that are locked out or tagged out.

D. **Tags**: Tags are essentially warning devices affixed to energy isolating devices and do not provide the physical restraint on those devices that is provided by a lock.

1. When a tag is attached to an energy isolating means it is not to be removed without authorization of the authorized person responsible for it, and it is never bypassed, ignored, or otherwise defeated.

2. Tags must be legible and understandable by all authorized employees, affected, and all other employees whose work operations are or may be in the area, in order to be effective.

3. Tags and their means of attachment must be made of materials, which will withstand the environmental conditions encountered in the workplace.

4. Tags must be securely attached to energy isolating devices so they cannot be inadvertently or accidentally detached during use.

E. **Locks**: Locks, tags, chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware shall be provided for isolating, securing, or blocking of machines or equipment from energy sources.

1. Lockout devices and tagout devices shall be singularly identified;

   a) Shall be the only device used for controlling energy
   b) And may not be used for other purposes

2. Lockout devices and tag devices shall be capable of withstanding the environment to which they are exposed, for the amount of time that they will be exposed.

   a) They shall have a minimum locking strength no less than 50 lbs..

3. Lockout devices shall be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as with the use of bolt cutters or metal cutting tools.

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F. **Procedures**: Established procedures for the application of energy control (Lockout/Tagout) shall include the following elements and actions, and these procedures shall be performed in the following sequence:

1. Before an authorized of affected employee turns off a machine or equipment, the authorized employee shall have knowledge of the following:

   a) Type and magnitude of the energy

   b) The hazard of the energy to be controlled

   c) Method or means to control the energy.

2. The machine or equipment shall be turned off or shut down using the procedures established for the machine or equipment.

   a) An orderly shutdown shall be used to avoid any additional or increased hazard to employees as a result of the equipment stoppage.

3. All energy isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated in such a manner as to isolate the machine or equipment from energy sources.

4. Lockout or tagout devices shall be affixed to energy isolating device by authorized employees.

5. Lockout devices shall be attached in a manner that will hold the energy isolating devices in a “safe” or “off” position.

6. Tagout devices shall be affixed in such a manner as will clearly indicate that the operation or movement of energy isolating devices from the “safe” or “off position is prohibited.

7. Following the application of lockout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, or otherwise rendered safe.

8. Before starting work on machines or equipment that have been locked out or tagged out, the authorized employee shall verify that isolation and de-energizing of the machine or equipment have been accomplished. Check your testers on a known live circuit, then check the circuit in question, then check your testers again on a known live circuit! Be Sure!

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9. Release from lockout/tagout

a) Before lockout or tagout devices are removed and energy is restored to the machine or equipment, the work area shall be inspected to ensure that nonessential items have been removed and that the machines or equipment components are operational.

b) The work area shall be checked to ensure that all employees have been safely positioned or removed.

c) After lockout or tagout devices have been removed and before a machine or equipment is started, affected employees shall be notified that the devices have been removed.

d) Each lockout or tagout device shall be removed from each energy isolating device by the authorized employee who applied the lockout or tagout device.

e) However, if the employee is not available to remove it, the device may be removed under the direction of the Modern Electric Co. Safety Director, providing that specific procedures are followed and documented with regards to OSHA 29 CFR 1910.269 Paragraph D Section 7.

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SECTION 29

WORKING ON OR NEAR EXPOSED ENERGIZED PARTS

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I. Working on or Near Exposed Energized Parts

A. **OSHA References**: 29 CFR 1910.269

B. **General**: Only qualified employees may work in areas containing unguarded, un-insulated energized lines or parts of equipment operating at 50 volts or more. Electric lines and equipment shall be considered and treated as energized. At least two employees shall be present while the following types of work are being performed:

1. Installation, removal, or repair of lines that are energized at more than 600 volts.

2. Installation, removal, or repair of de-energized lines if an employee is exposed to contact with other parts energized at more than 600 volts.

3. Installation, removal, or repair of equipment, such as transformers, capacitors, and regulators, if an employee is exposed to contact with parts energized at more than 600 volts.

4. Work involving the use of mechanical equipment, other than insulated aerial lifts, near parts energized at more than 600 volts.

C. **Minimum Approach Distances**: The employer shall ensure that no employee approaches or takes any conductive object closer to exposed energized parts than set forth in Table R-6 through Table R-10, unless:

1. The employee is insulated from the energized part.

2. The energized part is insulated from the employee and from any other conductive object at a different potential.

3. The employee is insulated from any other exposed conductive object, as during live-line bare hand work.

D. **Working Position**: The employer shall ensure that each employee, to the extent that other safety-related conditions at the worksite permit, works in a position from which a slip or shock will not bring the employee's body into contact with exposed, un-insulated parts energized at a potential different from the employee. Designated employee will provide warning in a timely manner if approach distances are compromised. Employees will be protected from hazards that might arise from equipment contact with the energized lines.

E. **Making Connections**: The employer shall ensure connections are made as follows:

1. In connecting de-energized equipment or lines to energize circuit by means of a conducting wire or device, an employee shall first attach the wire to the de-energized part.

2. When disconnecting equipment or lines from the energized circuit by means of a conducting wire or device, an employee shall remove the source first.

3. When lines or equipment are connected to or disconnected from energized circuits, loose conductors shall be kept away from exposed energized parts

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F. **Apparel**: When work is performed within reaching distance of exposed energized parts of equipment, the employer shall ensure that each employee removes or renders nonconductive all exposed conductive articles, such as key or watch chains, rings, or wrist watches or bands, unless such articles do not increase the hazards associated with contact with energized parts.

G. The employer shall ensure that each employee who is exposed to the hazards of flames or electric arcs does not wear clothing that, when exposed to flames or electric arcs, could increase the extent of injury that would be sustained by the employee.

H. **Fuse Handling**: When fuses must be installed or removed with one or both terminals energized at more than 300 volts or with exposed parts energized at more than 50 volts, the employer shall ensure that tools or gloves rated for the voltage are used. When expulsion-type fuses are installed with one or both terminals energized at more than 300 volts, the employer shall ensure that each employee wears eye protection.

II. De-Energized Lines and Equipment

A. A designated employee shall make a request of the system operator to have the particular section of line or equipment de-energized. The designated employee becomes the employee in charge and is responsible for the clearance.

B. All switches, disconnectors, jumpers, taps, or other means through which known sources of electric energy may be supplied to the particular lines and equipment to be de-energized shall be opened.

C. Such means shall be rendered inoperable, unless its design does not so permit, and tagged to indicate that employees are at work.

1. Automatically and remotely controlled switches that could cause the opened disconnecting means to close shall also be tagged at the point of control.

2. The automatic and remote-control feature shall be rendered inoperable, unless its design does not so permit.

3. Tags shall prohibit operation of the disconnecting means and shall indicate that employees are at work

D. Protective Grounds shall be installed as required.

1. Only after all protective grounds have been removed, after all crews working on the lines or equipment have released their clearance, after all employees are clear of the lines and equipment, and after all protective tags have been removed from a given point of disconnection may action be initiated to reenergize the lines or equipment at the point disconnection.

E. **Grounding for the Protection of Employees**: This section applies to the grounding of transmission and distribution lines and equipment for the purpose of protecting employees.

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1. **General:** For the employees to work lines of equipment as de-energized, the lines or equipment shall be d-energized and shall be grounded. However, if the employer can demonstrate that installation of a ground impracticable or that conditions resulting from the installation of a ground would present greater hazards than working without grounds, the lines and equipment may be treated as de-energized provided all of the following conditions are met:

    a) The lines and equipment have been de-energized
    b) No possibility of contact with another energized source
    c) The hazard of induced voltage is present

2. **"Equipotential Zone"** Temporary protective grounds shall be placed at such locations and arranged in such a manner as to prevent each employee from being exposed to hazardous differences in electric potential.

3. **Protective Grounding Equipment**: Shall be capable of conducting maximum fault current that could flow at point of grounding for the time necessary to clear the fault. Equipment shall have a capacity greater than or equal to that No. 2 AWG copper

    a) Protective grounds shall have an impedance low enough to cause immediate operation of protective devices in case of accidental energized of the lines or equipment.

    b) "Testing". Before any ground is installed, lines and equipment shall be tested and found absent of nominal voltage, unless a previously installed ground is present.

    c) "Order of Connection". When a ground is to be removed, the grounding device shall be removed from the line or equipment using a live-line tool.

    d) Live Line tools must be of proper design and construction as well as wiped clean and visually inspected for defects before use and before each day. If Live Line Tool is found defected, it must immediately be removed and put out of service.

    e) "Additional Precautions". When work is performed on cable at a location, remove from cable terminal, cable may not be grounded at cable terminal if there is a possibility of hazardous transfer of potential should fault occur

F. **Safety Reference Points**

1. Regardless of how many persons are present, workman or visitors, at a Substation or location of any High Voltage Equipment, one (1) person must be in charge, and only one! This person must be trained and familiar with the equipment, safety requirements, and procedures for energizing/de-energizing!

    a) Always wear the proper PPE (Personal Protective Equipment).
    b) Always test your testers, before and after, each use. Tools for primary employee protection will be removed from service for inspection every 2 years.
    c) Always remove all grounds from current carrying conductors before energizing. If you put it on take it off.
    d) OSHA High Voltage proximity starts at ten (10) feet.

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SECTION 30

ARC FLASH PROTECTION POLICY

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I. Protection against Arc Flash

A. **Policy**: An arc flash is a "dangerous condition associated with the release of energy caused by an electric arc." An arc flash is an explosion causing severe burns, injuries and/or death depending on the severity.

Most workers realize that electrical shock is potentially life threatening, but many do not understand that wearing clothing that is not flame resistant can result in severe harm or death if it is ignited in an electrical arc flash.

B. **Purpose**: While it is the policy of Modern Electric Co. to de-energize the power source before performing any work on the system, we understand that at times it is necessary to be exposed to the energy source (e.g. Investigative work). Before the point of exposure, we need to protect the worker from a potential arc flash that is always possible due to the presence of a power source. The means of proper PPE and levels of protection are simplified with the use of fire resistant garments that meet the hazard risks.

Keep in mind that the use of these suits, are only needed when you are being exposed to energy, or you are attempting to tie-in or are making contact with the power source. Once the potential for an arc flash is either removed or isolated, and the worker is protected, the protective suit is no longer needed (e.g. the panel cover is back on).

It is the policy of Modern Electric Co. that all employees use the following PPE in order to protect themselves against Arc Flash occurrences.

C. **Exposure**: to under 600 volts:

1. Nomex full body jump suit
2. Properly rated gloves
3. Dielectric hard hat
4. Full amber face shield
5. Dielectric booties to slip over work boots

D. **Examples of work performed at this level**: (examples not intended to be all inclusive of every type of work!)

1. Removing any panel covers or barriers of energized equipment to perform investigative functions or inspections.

2. Working in a panel with the line side energized and the panel cover removed.

3. Installing a breaker into an energized electrical panel.

4. Pulling cables or wiring into energized panels.

5. Pulling or installing fuses into energized parts.

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E. **Exposure to <u>over</u> 600 volts**:

1. The level of protection for 600 volts and above will be a full body 40cal. High Voltage Suit complete with a full Head Hood, Dielectric booties, and properly ratted High Voltage gloves.

2. Examples: Work performed at this level: (examples not intended to be all inclusive of every type of work!)

a) Removing any gear covers or barriers of energized equipment to perform investigative functions or inspections.

b) Installing protective blankets or insulating devices on Buss work (e.g. rubbering up) in an active High Voltage Substation.

c) Racking in a breaker into an energized electrical cabinet.

d) Pulling cables or wiring into energized switchgear.

e) Pulling or installing cut-outs on a utility pole.

3. Contact your Foreman or supervisor to obtain a Modern Electric Co. Arc Flash Protection Kit which will have all of the above mentioned PPE. Check the kits before use to insure that all of the high voltage PPE has a current inspection certification. Do not use if it has expired!

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SECTION 31

CADMIUM

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I. Scope

This written compliance program applies to all Modern Electric Co. employees or employees of Modern Electric Co. subcontractors who may be exposed to cadmium at or above the prescribed action level of 2.5 micrograms per cubic meter of air averaged over any eight-hour period. (2.5ug/m3). The permissible exposure limit (PEL) for cadmium 5 micrograms per cubic meter of air, averaged over any 8-hour period. (5ug/m3).

II. Application

Modern Electric Co. is not a user of cadmium. However, this material may be found at many of our client's facilities. Modern Electric Co. should request copies of any plot plan or unit map indicating the location of regulated areas. All employees must be trained, as part of their initial site training, as to the hazards of cadmium exposure, signs, symptoms, necessary protective measures and the location of regulated areas.

III. Exposure Monitoring

A. Air samples, taken by certified technicians and analyzed by approved Environmental Laboratories, must be taken from air that is representative of each employee's exposure to cadmium over an eight-hour period.

1. Exposure for monitoring purposes is defined as exposure that would occur if the employee were not using a respirator.

2. Full shift personal samples must be collected for each shift, each area and one sample for each classification in each work area.

IV. Initial Monitoring

Initial monitoring is required to accurately determine the employee's exposure to cadmium. All employees will be notified within 7 working days, in writing, of the results of any monitoring samples that represent the employee's exposure. If the results of monitoring conducted indicate exposure above the permissible exposure limit, a written notice will be provided. The written notice must include as statement that the PEL was exceeded and a description of the corrective actions taken to reduce the exposure below the PEL.

A. If the initial monitoring discloses exposure below the action level, additional monitoring will not be required unless:

1. There has been a change of production, process, control, or personal change that may result in new or additional exposures.

2. Whenever the company, the employee or the client has any other reason to suspect a change that may result in new or additional exposures.

3. Whenever an employee reports that they may be exposed above the action level.

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4. If the initial monitoring discloses exposure at or above the action level and below the PEL, air monitoring and personal air sampling of 25% of the represented work force will be conducted.

5. If the initial monitoring discloses exposure above the PEL, air monitoring will be conducted periodically to confirm cadmium levels are below the action level. If our initial determination reveals that employee's exposures will be above the PEL, attempts will be made through administrative and engineering controls to reduce exposures below the PEL. Engineering and administrative controls will include, but are not limited to wetting down contaminated dust and rotating employees in regulated areas. If this should fail to reduce the exposure level, employees shall wear the appropriate level of personal protective equipment (PPE) necessary to reduce exposures below the PEL.

V. Accuracy of Measurement

Sampling devices and equipment used to monitor exposure must be accurate (with a confidence level of 95%). Only certified laboratories will be selected for sample analysis.

VI. Regulated Areas

Regulated areas will be established where employee exposures are in excess of the PEL.

A. The regulated area must be segregated from the rest of the work place in a manner that will minimize the number of persons who will be exposed.

B. Access to the regulated area must be limited to persons authorized, trained, and designated as having access to the area.

C. All persons entering a regulated area must be trained, qualified, fit tested, and provided with respiratory protection in accordance with the Respiratory Protection Program.

D. Documentation of training must be on file with the Project Supervisor and Safety Director.

E. Food, beverages, smoking products, chewing tobacco, or other smokeless tobacco, and chewing gum will not be consumed in the regulated area. Cosmetics will also not be applied. Drinking water may be consumed.

VII. Respiratory Protection

Respiratory protection must be used if engineering and work practices cannot reduce the exposure level below the PEL. Respirators will be used in the following circumstances:

A. While installing or implementing feasible engineering or work practice controls.

B. During maintenance and repair work when the client has established that engineering controls are not feasible.

C. Where engineering controls and supplemental work practice controls are not sufficient to reduce the exposure.

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D. Respirator selection will be accomplished in accordance with the Respiratory Protection Program.

E. Respirators will not be issued to any employee not trained in the use, care, and selection. Respirators will not be issued to any employee not fit tested in the specific respirator issued

VIII. Protective Work Clothing

Protective Work Clothing will be provided at no cost to the employee as follows:

A. Coveralls or similar full-body work clothing.

B. Gloves and shoes or coverlets

C. Face shields or vented goggles when necessary to prevent eye irritation. Impervious clothing for employees exposed to arsenic trichloride.

D. Cleaning and replacement will be provided at least once weekly in a freshly laundered, clean, and dry condition. If the employee is exposed to cadmium of over 50 ug/m3 or in an area where more frequent washing is needed to prevent skin irritation, clothing will be provided daily.

E. Clothing shall be repaired or replaced to maintain its protection factor.

F. Clothing will only be removed in designated change rooms and will be disposed of in containers clearly marked with the following:

1. **CAUTION:** Clothing contaminated with cadmium; do not remove dust by blowing or shaking. Dispose of cadmium contaminated wash water in accordance with applicable Local, State, or Federal Regulations.

2. Contaminated clothing and/or equipment will not be shaken out by employees or taken outside of the designated change trailer.

IX. Housekeeping

All surfaces must be maintained free from accumulations of cadmium. Shoveling and brushing of floors and surfaces will be allowed only if vacuuming with a HEPA equipped vacuum has failed to clean the surfaces. Air blowing is not permitted at any time.

X. Hygiene Facilities

The following hygiene facilities will be provided to employees working in regulated areas.

A. Change Facilities will be provided with clean rooms equipped with storage facilities for street clothes and separate storage for protective clothing and equipment.

B. Showers will be provided where employees working in regulated areas.

C. Lunchrooms that have a temperature controlled positive pressure filtered air supply and readily accessible to employees working in regulated areas.

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D. Employees must wash hands and faces prior to eating.

E. Lavatory facilities shall be provided.

F. Vacuums will be provided to clean protective clothing and shoes worn in areas where the exposure exceeds 50 ug/m3, in an area before entering change rooms, lunchrooms, or shower rooms required.

XI. Signs and Labels

Signs will be posted around perimeter of regulated area and labels will be used to identify samples, waste, contaminated clothing, and equipment will be utilized.

A. Signs stating the following will be posted in and around the regulated work area:

DANGER CADMIUM CANCER HAZARD CAN CAUSE LUNG AND KIDNEY DISEASEAUTHORIZED PERSONNEL ONLY NO SMOKING OR EATING RESPIRATOR REQUIRED IN THIS AREA

B. Labels must be applied to all shipping and storage containers of cadmium:

DANGER CONTAINS CADMIUM CANCER HAZARD AVOID CREATING DUST CAN CAUSE LUNG AND KIDNEY DISEASE

XII. Medical Monitoring

Modern Electric Co. supports the practices necessary for early detection of cadmium exposure. The medical surveillance program supplements the primary goals of the cadmium exposure control program of preventing disease through elimination or reduction of airborne concentrations of cadmium, and sources of ingestion. The medical surveillance provisions incorporate both initial and ongoing medical surveillance.

A. Modern Electric Co. will provide initial medical surveillance to employees who are occupationally exposed to airborne cadmium levels greater than the action level 30 days a year or above the PEL for greater than 10 days a year.

This monitoring consists of visits with the physician to include a detailed occupational history and laboratory analysis per 1926.1127(l) (2), as required. To ensure appropriate medical surveillance is performed, we provide to the physician and/or representative copies of the regulation and appendices, a description of the employee's duties, a list of the personal protective equipment worn by the employee, and past exposure assessment data.

B. All medical examinations, procedures, and blood Cadmium level sampling/analysis shall be conducted by licensed healthcare practitioners and/or physicians. Our medical surveillance program shall meet the requirements of 29 CFR 1926.1127(1).

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XIII. Medical Removal

Modern Electric Co. will remove employees from work who have exposures to cadmium at or above the action level each time a periodic and a follow-up blood sample indicates that medical removal is necessary as required by 1926.1127 (l)(3),(4), & (6). We also remove employees from work who have exposures to cadmium at or above the action level when a health care professional determines that they have medical conditions which, when exposed to cadmium, places them at greater risk for those health problems. Employees who are removed from work will receive all wages, benefits, for a period of 18 months without loss of seniority or promotion opportunities. The company reserves the right to place an employee in a position, of equal responsibility, where the employee will not be exposed occupationally to cadmium.

XIV. Employee Training

No employee will be allowed to perform any task which may result in exposure above the action level without training in this policy and the contents of 29 CFR 1926.1127 (cadmium), 1926.59 (hazard communication), and respiratory protection. Modern Electric Co. will ensure its employees receive the required training and all training records are kept on file for at least one year. Documented training records will include the identity of the employee trained, signature of the instructor and date of training. Additionally, training must be provided in the following:

A. The health hazards associated with cadmium.

B. The quantity, location, manner of use, storage, source of exposure and the nature of the operation which could result in exposure and any necessary protective steps. The purpose, proper use, and limitations of respirators.

C. The purpose and description of the medical surveillance program, engineering controls, and work practices associated with the job.

XV. Monitoring Data Record Keeping

As a minimum, the following records will be maintained and accessible to the employee, client designated representative and employee designated representative. Monitoring records must be retained and maintained for a period of at least 30 years of the objective data relied upon. All environmental monitoring data including the date, number, duration, location, and results of each of the samples taken, including a description of the sampling procedure used to determine representative employee exposure.

A. A description of the sampling and analytical method used and evidence of their accuracy.

B. The type of respiratory protection worn, if any.

C. The name, social security number, and job classification of the employees' monitored and all other employees whose exposure the samples represent.

D. The environmental variables that could affect the measurement of the employees exposure.

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XVI. Medical Records Retention

The employer or physician must maintain medical records for at least 30 years. A medical surveillance record will be established and maintained as an accurate record for each employee subject to medical surveillance. The record shall include as a minimum:

A. The name, social security number and description of the employee's duties.

B. A copy of the Physicians written opinions.

C. The results of any exposure monitoring done for the employee and the representative exposure levels supplied.

D. Any employee medical complaints related to exposure to cadmium.

E. A copy of the medical examination results including medical and work history.

F. A copy of information provided to the physician as required by 1926.1127(l) (9)

XVII. Emergency Situations

In emergency situations, which involve a substantial release of cadmium, Modern Electric Co. shall ensure workers are protected by following all aspects of this program. This will include limiting access to authorized employees, provision and use of PPE, exposure monitoring, medical surveillance, hygiene facilities, work practices, fugitive emission controls, and proper disposal.

XVIII.Maintenance of Ventilation Systems

If performing maintenance on ventilation systems, Modern Electric Co. will utilize dust suppression techniques and safe work practices to minimize exposure to cadmium. If engineering controls fail to reduce cadmium levels below the action level, appropriate PPE including gloves, coveralls, boots, head coverings, goggles, and respirators will be utilized.

XIX. Program Review

This program will be evaluated at least every six months. All facets of the program will be included in the evaluation. The program will be reviewed to ensure it meets the requirements of 29 CFR 1926.1127.

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SECTION 32

PROCESS SAFETY MANAGEMENT OVERVIEW

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I. Regulatory Standard

OSHA 29 CFR 1910.119

II. General

Process safety management is the proactive identification, evaluation, and mitigation or prevention of chemical releases that could occur as a result of failures in process, procedures, or equipment. The major objective of process safety management of highly hazardous chemicals is to prevent unwanted releases of hazardous chemicals especially into locations which could expose our employees and or community to serious hazards

Unexpected releases of toxic, reactive, or flammable liquids and gases in processes involving highly hazardous chemicals have occurred numerous times in industry in recent years. Incidents occur in various industries that use highly hazardous chemicals which meet the criteria for highly hazardous chemicals. The Occupational Safety and Health Administration (OSHA) estimates that losses can be reduced tremendously if proper safety precautions and preparation at job sites are initiated.

The host employer shall assure that each contract employee is instructed in the known potential fire, explosion or toxic release hazards related to his/her job and the process and the applicable provisions of the emergency action plan

III. Training

Whenever Modern Electric Co. employees perform work in and around processes that involve highly hazardous chemicals, they will need to be provided with site specific training so that they can accomplish the desired job tasks without compromising the safety and health of employees.

This training will be provided by client prior to Bldg. Controls, Inc employees working on site and will include provisions of client's site-specific emergency action plan. SDS Sheets for all highly hazardous chemicals will be made available to employees and be kept on site for reference.

Modern Electric Co. will document that each employee has received & understood the required training. MEC shall prepare a record which contains the identity of the contract employee, the date of training, and the means used to verify that the employee understood the training.

Modern Electric Co. will only use qualified individuals that have been trained in proper safe work practices to do process safety work

IV. Permitting System

MEC employees will abide and follow safety work practices during operations such as lockout/tagout, confined space entry, opening process equipment or piping and controls over entrance to facility. A permit system or work authorization system for these activities may be instituted. The use of a work authorization system keeps a client informed of MEC employee activities and as a benefit the client will have better coordination and more management control over the work being performed in the process area.

MEC Employees will not perform hot work until a hot work permit is obtained. The permit shall document that provisions of CFR 1910.252(a) has been met.

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V. Incident Near Miss Investigation

Employees must immediately report all accidents, injuries, and near misses. An incident investigation must be initiated within 48 hours. See Section 2 for Incident Investigation Protocols. All Results from the investigation and any corrective actions taken will be maintained for a period of at least 5 years

VI. Notification

Modern Electric Co. will inform the client of any unique hazards presented by their work, or of any hazards found by Modern Electric Co. work.

VII. Trade Secrets

All Modern Electric Co. employees must respect the confidentiality of trade secret information when the process safety information is released to them.

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SECTION 33

BENZENE AWARENESS PROGRAM

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I. Regulatory Standard

OSHA - 29 CFR 1910.106 and 1926.55

II. Purpose

The Benzene Awareness Program is essential to the safety of all Modern Electric Co. employees and to inform personnel of the dangers of Benzene.

III. Synonyms

Benzol, benzole, coal naphtha, cyclohexatriene, phene, phenyl hydride, pyrobenzol. (Benzin, petroleum benzin, and Benzine do not contain Benzene)

IV. Scope

Modern Electric Co. has chosen to establish a Benzene Awareness Program for emergencies that could arise from exposure to Benzene.

V. Physical and Chemical Characteristics

A. Benzene is a clear, colorless liquid with a distinctive sweet odor. Its boiling point is 176 degrees F and its flash point is 12 degrees F. The flammable limits in the air are 1.3% for the low end and 7.5% for the high end. Benzene is a flammable liquid. Its vapors can form explosive mixtures. All ignition sources must be controlled when Benzene is used, handled, or stored. Where liquid or vapor may be released, such areas shall be considered as hazardous locations (commonly found in petroleum refining sites, tank gauging, field maintenance, etc.)

B. Benzene vapors are heavier than air; thus the vapors may travel along the ground and be ignited by open flames or sparks at locations remote from the site at which Benzene is handled.

C. Benzene is classified as a 1 B flammable liquid for the purpose of conforming to the requirements of 29 CFR 1910.106. A concentration exceeding 3,250 ppm is considered a potential fire explosion hazard. Location where Benzene may be present in quantities sufficient to produce explosive or ignitable mixtures are considered Class I Group D for the purpose of conforming to the requirements of 29 CFR 1910.309

VI. Health Effects

A. Benzene is primarily an inhalation hazard. Systemic absorption may cause depression of the hematopoietic system, pancytopenia, aplastic anemia, and leukemia. Inhalation of high concentrations can affect the central nervous system function. Aspiration of small amounts of liquid Benzene immediately causes pulmonary edema and hemorrhage of pulmonary tissue. There is some absorption through the skin. Absorption may be more rapid in the case of abraded skin, and Benzene may be more readily absorbed if it is present in a mixture or as a contaminant in solvents that are readily absorbed. The de-fatting action of Benzene may produce primary irritation due to repeated or prolonged contact with the skin. A high concentration is irritating to the eyes and the mucous membranes of the nose and respiratory tract.

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B. Direct skin contact with Benzene may cause erythema. Repeated or prolonged contact may result in drying, scaling, dermatitis or development of secondary skin infections. In addition, there is Benzene absorption through the skin. Local effects of Benzene vapor or liquid on the eye are slight. Only at very high concentrations is there any smarting sensation in the eye. Inhalation of high concentrations of Benzene may have an initial stimulatory effect on the central nervous system characterized by exhilaration, nervous excitation, and/or giddiness, followed by a period of depression, drowsiness, or fatigue. A sensation of tightness in the chest accompanied by breathlessness may occur and ultimately the victim may lose consciousness. Tremors, convulsions and death may follow from respiratory paralysis or circulatory collapse in a few minutes to several hours following severe exposure.

C. The detrimental effect on the blood-forming system of prolonged exposure hematopoietic system is the chief target for Benzene's toxic effects that are manifested by alterations in the levels of formed elements in the peripheral blood. These effects have occurred at concentrations of Benzene that may not cause irritation of mucous membranes, or any morbidity is varied, often not readily noticed and non-specific. Subjective complaints of headache, dizziness, and loss of appetite may precede or follow clinical signs. Rapid pulse and low blood pressure, in addition to a physical appearance of anemia, may accompany a subjective complaint of shortness of breath and excessive tiredness. Bleeding from the nose, gums, or mucous membranes, and the development of purpuric spots (small bruises) may occur as the condition progresses. Clinical evidence of leukemia, anemia, and thrombocytopenia, singly or in combination, has been frequently reported among the first signs.

D. Bone marrow may appear normal, a plastic or hyperplasic, and may not, in all situations, correlate with peripheral blood forming tissues. Because of variations in the susceptibility to Benzene morbidity. There is no "typical" blood picture. The onset of effects of Benzene exposure may be delayed for many months or years after the actual exposure has ceased and identification or correlation with Benzene exposure must be sought out in the occupational history.

VII. General Requirements

MEC will establish Benzene operational procedures through the use of this document.

A. Facility Evaluation. This employer shall evaluate our facility(s) to determine if any work area meets the criteria for designation as a Regulated Benzene Hazard Area.

B. Regulated areas. This employer shall establish a regulated area wherever the airborne concentration of benzene exceeds or can reasonably be expected to exceed the permissible exposure limits, either the 8 hour time weighted average exposure of 1 ppm or the short term exposure limit of 5 ppm for 15 minutes.

C. Benzene liquid is highly flammable and vapors may form explosive mixtures in air. Fire extinguishers must be readily available. Smoking is prohibited in areas where benzene is used or stored.

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VIII. Employee Notification and Signage

Employer shall post signs at entrances to regulated areas. Signs shall bear the following legend

DANGER *BENZENE* CANCER HAZARD
FLAMMABLE - NO SMOKING AUTHORIZED PERSONNEL ONLY
RESPIRATOR REQUIRED

IX. Containers

This employer shall ensure that labels or other appropriate forms of warning are provided for containers of benzene within the workplace. There is no requirement to label pipes. The labels shall comply with the requirements of 29 CFR 1910.1200 (Hazard Communication Standard) and in addition shall include the following legend:

DANGER
CONTAINS BENZENE
CANCER HAZARD

X. Training

A. Types of training. The company 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 Benzene exposure hazards associated with the individual job.

B. Initial Training. Prior to job assignment, this employer shall provide training to ensure that the hazards associated with Benzene are understood by employees and that the knowledge, skills and personal protective equipment required are acquired by employees. The training shall as a minimum include the following:

C. Each authorized employee shall receive training in the recognition of applicable hazards involved with the particular job and job site, as well as the methods and means necessary for safe work.

D. The specific nature of the operation which could result in exposure to Benzene.

E. The purpose, proper selection, fitting, use and limitation of personal protective equipment (PPE).

F. The adverse health effects associated with excessive exposure to Benzene.

G. The engineering controls and work practices associated with the employee's job assignment, including training of employees to follow relevant good work practices.

H. The contents of any compliance plan in effect.

I. The requirements of the Hazard Communication Standard under 29 CFR 1910.1200.

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J. The employee's right of access to records under 29 CFR 1910.20.

K. The medical surveillance program in place at this facility used to determine Benzene exposure.

L. Refresher Training - Scheduled refresher training will be conducted on a(n)_____basis.

XI. Re-training

A. Re-training shall be provided for all affected employees as a minimum whenever:

1. There is a change in job assignments.

2. There is a change in personal protective equipment.

3. There is a change in equipment that presents a new hazard.

4. There is a change in processes that presents a new hazard.

5. Their work takes them into hazardous or regulated area.

6. There is a change in Benzene safety procedures

7. Safety procedure fails resulting in a near-miss, illness, or injury.

B. Additional re-training. Additional retraining shall also be conducted whenever a periodic inspection reveals, or whenever this employer has reason to believe, that there are deviations from or inadequacies in the employee's knowledge of known hazards, or use of equipment or procedures.

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

D. Certification - This employer shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain a synopsis of the training conducted, each employee's name, and dates of training.

XII. Monitoring and Medical Surveillance

This employer shall monitor our workplace and work operations to determine accurately the airborne concentrations of benzene to which employees may be exposed.

A. Initial monitoring will be completed within 30 days of intro of benzene into the workplace.

B. Periodic monitoring and monitoring frequency. If the monitoring reveals employee exposure at or above the action level but at or below the TWA, the monitoring will be repeated each such employee at least every year.

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C. Exposure above TWA - If monitoring reveals employee exposure above TWA, monitoring will be repeated for each such employee at least every six (6) months.

D. Exposures at or below the TWA - The monitoring schedule may be reduced from every six months to annually for any employee for whom two consecutive measurements taken at least 7 days apart indicate that the employee exposure has decreased to the TWA or below, but is at or above the action level.

E. Termination of monitoring - If the initial reveals employee exposure to be below the action level, the monitoring may be discontinued for that employee, except as otherwise required.

XIII. Spill and Leak Procedures

Spills and leaks will be under the supervision of the Supervisor. The following apply:

A. Persons not wearing protective equipment and clothing will be restricted from areas of spills or leaks until cleanup has been completed.

B. Emergency Containment Benzene exposure can be hazardous. Only authorized and trained emergency response personnel should attempt containment. If you are not trained in containment of Benzene, evacuate the area in accordance with established procedures. If Benzene is spilled or leaked the following steps as a minimum should be taken.

1. Remove all ignition sources.

2. Ventilate the area of the spill or leak to disperse vapors.

3. If possible, stop flow of liquid, allow to vaporize.

4. Use containment equipment such as dikes, compatible absorbent materials, etc.

5. Use non-sparking tools and explosion proof equipment at all times in spill area.

6. Employer should be aware of Owners contingency plan provisions. Employees must be informed where benzene is used in host facility and aware of additional plant safety rules.

XIV. Emergency First Aid Procedures

In the event of an emergency, institute first aid procedures and send for first aid or medical assistance in accordance with local procedures. Dial 9-1-1 for emergency response personnel.

A. **Eye Exposure**: Wash immediately with large amounts of water for at least 15 minutes. Lifting the lower and upper lids occasionally, get medical attention as soon as possible.

B. **Skin Exposure**: Immediately flush with copious amounts of water. Remove any clothing contaminated, and flush exposed skin areas, get medical attention as soon as possible.

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C. **Swallowing Exposure**: If benzene has been swallowed and the patient is conscious, do not induce vomiting. Call for medical assistance or a doctor immediately.

D. **Respiratory Exposure**: Get the victim to open, fresh air immediately. If breathing has stopped perform CPR. Keep victim warm and at rest. Get medical attention as soon as possible

E. **Rescue Considerations:** Don't become a second victim. Move the affected person from the hazardous area. If the exposed person has been overcome, initiate local emergency notification procedures. Never enter any vessel or confined space where the benzene concentration might be high enough to displace air or create an explosive atmosphere without proper training, equipment and procedures. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arise**.**

XV. Protective Clothing and Personal Protective Equipment (PPE)

Where engineering controls, administrative controls, and job hazard analyses do not eliminate all job hazards, employees will (where appropriate) wear personal protective equipment (PPE).

A. These include items such as caps, hair nets, face shields, safety goggles, glasses, hearing protection, foot guards, gloves, sleeves, aprons, respirators etc. Supervisors will ensure that equipment selected will meet the following requirements:

1. It will be appropriate for the particular hazard.

2. It will be maintained in good condition.

3. It will be properly stored when not in use, to prevent damage or loss.

4. It will be kept clean, fully functional and sanitary

B. Hazards associated with wear of protective clothing, PPE, personal clothing and jewelry. Protective clothing and PPE can present additional safety hazards. Supervisors will ensure workers wear appropriate clothing and PPE. These items will be worn so as not create additional hazards.

1. Personal clothing and jewelry - Personal clothing and jewelry will be monitored by the immediate supervisor. Clothing or jewelry that could become entangled in tools, equipment or machinery or of an excessively flammable nature will be prohibited.

C. **Respirators**: Respirators are required for those operations in which engineering controls or work practice controls are not feasible to reduce exposure to the permissible level. If it can be documented that benzene is present in the workplace less than 30 days a year, respirators may be used in lieu of engineering controls. If you experience difficulty breathing while wearing a respirator, you may request a positive pressure respirator. Contact your supervisor immediately.

D. **Protective Clothing:** You must wear appropriate protective clothing (such as boots, gloves, sleeves, aprons, etc.) over any parts of your body that could be exposed to liquid benzene

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E. **Eye and Face Protection:** You must wear splash-proof safety goggles if it is possible that benzene may get into your eyes. In addition, you must wear a face shield if your face could be splashed with benzene liquid

F. **Documentation**: PPE requirements will be documented on a "Protective Measure Determination" form and properly filed.

XVI. Tool Selection, Evaluation and Condition

The greatest hazards posed by tools usually result from misuse and/or improper maintenance. Tool selection sometimes is not considered a priority when arrangements are made to begin work. All employees will consider the following when selecting tools:

A. Is the tool correct for the type of work to be performed?

B. Are grounding methods sufficient when working in wet conditions?

C. Does the tool create sparks or heat? Has this been considered when working around flammable substances?

D. Are tools stored properly when not being used?

E. Have tools been modified beyond the manufacturers specifications? If so, has the modifications been approved by a "Competent Person?"

XVII. Regulatory Limits

The permissible exposure limits for Benzene are as follows:

A. Airborne: The maximum time weighted average (TWA) exposure limit is 1 part Benzene vapor per million parts of air (1 ppm) for an 8 hour workday and the maximum short term exposure limit (STEL) is 5 ppm for any 15 minute period.

B. An airborne concentration of benzene of 0.5 parts per million (ppm) calculated as an 8 hour time weighted average.

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SECTION 34

HYDROGEN SULFIDE (H2S) PROGRAM

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I. Regulatory Standard

A. OSHA 29 CFR 1910.1200 and 1926.55

B. **Purpose:** inform interest persons, including employees, that MEC is complying with OSHA's gases, vapors, fumes, dusts and mists standard, Title 29 Code of Federal Regulations 1926.55 and other OSHA rules as needed to ensure that no employee is exposed to inhalation, ingestion, skin absorption or contact with any material or substance at a concentration above those specified in the "Threshold Limit Values of Airborne Contaminants for 1970" of the American Conference of Governmental Industrial Hygienists found in Appendix A of 29 CFR 1926.55. This program will address potential exposures to Hydrogen Sulfide

C. To achieve compliance, MEC must first implement all feasible administrative and engineering controls. However, when such controls are not feasible, employees will use protective equipment provided by MEC at no cost to the employee or other protective measures to keep the exposure of employees to air contaminants within the limits prescribed in Appendix A of 29 CFR 1926.55. All equipment and technical measures used to achieve compliance will first be approved for each particular use by a competent industrial hygienist or other technically qualified person.

II. Administrative Duties

This written safety program is for Modern Electric Co. employees and subcontractors construction work sites. The Site Supervisor is the program coordinator/manager and is responsible for implementation

III. Scope

Modern Electric Co. has chosen to establish a Hydrogen Sulfide Awareness Program for emergencies that could arise from exposure to Hydrogen Sulfide.

IV. Physical Chemical Characteristics

A. Sulfur and Sulfur Compounds may be present in crude oil as hydrogen sulfide (H2S), as compounds (ex. Mercaptans, sulfides, disulfides, thiophenes, etc.), or as elemental sulfur. Each crude oil has different amounts and types of sulfur compounds, but as a rule, the proportion stability and complexity of the compounds are greater in heavier crude oil fractions.

B. As part of the work of MEC, our employees may be exposed to H2S especially when working in confined spaces or refineries. Hydrogen Sulfide is a primary contributor to corrosion in refinery processing units and piping. Other corrosive substances are elemental sulfur and mercaptans. Moreover, the corrosive sulfur compounds have an obnoxious odor.

C. Hydrogen Sulfide is a toxic, colorless with an order of rotten eggs at low concentrations, is soluble in water and is flammable.

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V. Health Effects

Inhalation, ingestion and contact with, are all methods by which H2S can affect the body. The effects may range from irritation of the eyes, nose and throat, temporary loss of smell, headaches, dizziness and upset stomach are more intense symptoms caused by higher concentrations. However, inhalation of high concentration of H2S may cause instant paralysis of the respirator system causing loss of consciousness and death. In concentrations of H2S at 1000 to 2000 ppm, even a single breath may cause coma and may be fatal. Because of its extremely serious and/or fatal potential, any employee believed to be exposed to H2S shall immediately notify the Supervisor or Manager.

VI. General Requirements

A. Modern Electric Co. will establish Hydrogen Sulfide operational procedures throughout the use of this document

B. Permissible Exposure Levels (PEL) – while not definitive, H2S levels below 10 ppm appears to cause little short term effects. When H2S level are unknown, respirators shall be used.

C. Current OSHA Standards are 20 ppm ceiling level, 50 ppm max allowable peak for 10 minutes with no other exposure.

D. Current NIOSH standards are 10 ppm PEL averaged over a 10 minute period, 50 ppm area shall be evacuated.

VII. Exposure Detection, Assessment and Monitoring

A. MEC Site Supervisor shall conduct personal or area sampling for hydrogen sulfide to measure worker exposures. Air sampling is needed to measure worker exposures and select appropriate engineering controls and respiratory protection. Where data is collected, it must be retained to support negative exposure assessments. MEC will conduct both initial and periodic air monitoring.

B. MEC will further perform air monitoring as needed to measure the effectiveness of controls and as required under our written excavation procedures.

C. MEC will utilize direct reading instruments (for gas meter) and colorimetric tubes for quantification of exposures to Hydrogen Sulfide. Signs and symptoms of exposure are as follows:

1.	0.13 ppm	Threshold of odor detection
2.	0.77 ppm	Faint, but readily perceptible odor
3.	4.6 ppm	Easily noticeable odor
4.	10 ppm	Eye irritation, soreness, redness and burning
5.	27 ppm	Strong, unpleasant, but not intolerable odor

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6. 50 ppm Irritation & dryness of nose, throat, and airways cough, shortness of breath, pneumonia
7. 100 ppm immediate irritation of eyes and respiratory tract
8. 150 ppm Sense of smell may be paralyzed
9. 200 ppm Headaches, dizziness, nausea
10. 500 ppm Unconsciousness and death within a few minutes, may be no warning odor
11. 1000 ppm immediate loss of consciousness and respiratory paralysis leading to death

D. Personal or area monitors that alarm when PEL exceeds the preset level of 20 PPM for 1910 or 10 PPM for 1926

VIII. Employee Notification and Signage

A. This employer shall post signs at entrances to regulated areas. The signs shall bear the following legend:

DANGER *HYDROGEN SULFIDE* TOXIC
FLAMMABLE - NO SMOKING AUTHORIZED PERSONNEL ONLY
RESPIRATOR REQUIRED

IX. Method of Compliance

A. Exposures to Hydrogen Sulfide (H2S) can generally be controlled through the use of engineering controls, work practices and personal protective equipment. Engineering controls are hazard controls designed into equipment and workplaces. Work practices are procedures followed by employers and workers to control hazards. The following engineering controls, work practices and personal protective equipment should be used when dealing with H2S.

1. Ventilate spaces to mitigate accumulation of hydrogen sulfide or other gases.

2. Notify the site supervisor upon detection of H2S.

3. If the potential for exposure exists and assessment of levels cannot be performed, assume the Permissible Exposure Limit is being exceeded and wear a NIOSH approved supplied air respirator.

4. For persons escaping or providing emergency help, an approved, self-contained breathing apparatus or airline respirator with escape SCBA, shall be used.

X. Training

A. Modern Electric Co. will provide our employees with regulatory training that includes requirements of the substance specific requirements. This will include health effects, background information, engineering controls, PPE, medical surveillance, communication of hazards, hygiene and methods of compliance at a minimum.

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XI. Medical Surveillance

A. Although Modern Electric Co. understands that medical examinations should always supplement effective gas, vapor, fume, dust and mist monitoring and controls and never substitute for them, we provide medical examinations for all workers who may be exposed to Hydrogen Sulfide at or above the respective PEL for greater than 30 days per year. OSHA reference 29 CFR 1926.55

B. These medical examinations are provided by professional healthcare organizations at no cost to the employee and shall be included all components as required under particular substance standards.

XII. Recordkeeping

A. Modern Electric Co. knows record keeping is critical to our safety and health program. Our record keeping tasks, at a minimum, include:

1. Exposure monitoring data – 30 years

2. Medical surveillance data – duration of employment, plus 30 years.

XIII. Emergency, Spill and Leak Procedures

A. Employer should be aware of Owners Contingency Plan Provisions. Employees must be informed of the plan of the host facility and be aware of additional plant safety rules.

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SECTION 35

HEXAVALENT CHROMIUM - CHROMIUM VI PROGRAM

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I. Purpose

The purpose of this program outlines the requirements that Modern Electric Co. employees and subcontractors must comply with when implementing a program to evaluate and control worker exposure to hexavalent chromium (Cr VI). The program provides information and the process to follow to recognize, evaluate and control employee exposure to Cr VI at Modern Electric Co. project locations

A. **References:**

1. Occupational Exposure to Hexavalent Chromium – Federal Register Number 71:10099-10385, US Dept. of Labor, Final Rule, 29 CFR 1910.1026 and 29 CFR 1926.1126, Chromium VI

2. US Dept. of Labor, Occupational Safety and Health Administration (OSHA), Final Rule, 29 CFR 1910.1026 and 29 CFR 1926.1126, Chromium VI

II. Scope and Application

This program applies enterprise wide to call Modern Electric Co. legal entities to their employees, subcontractors and lower tier subcontractors that operate in the United States.

Where it states OSHA agencies may have more stringent requirements, contact the appropriate Health & Safety Lead to address these specific requirements.

This program applies when employees may be exposed to Cr VI due to the following activities:

B. Modern Electric Co. employees who may be exposed to Cr VI when performing hot work such as welding on stainless steel or Cr VI painted surfaces, traffic painting or pain removal containing CR VI, refractory brick restoration or soil disturbance activities such as drilling or from heavy equipment moving on soils containing Cr VI soils.

C. Modern Electric Co. workers who may be exposed to Cr VI when working at project sites or in proximity to Cr VI related operations, such as, electroplating, painting (aerospace and auto body repair), chromate pigment and chemical projection, chromium dye and catalyst production, glass manufacturing or plastic colorant production. (MEC, Subcontractor or third-party contractor employees)

D. Modern Electric Co. provides oversight of subcontractor's activities where worker exposure to Cr VI can occur.

E. Applicable Enterprise Programs – other programs that may be applicable to worker exposure to Cr VI include the following:

1. Abrasive blasting on surfaces containing Chromium VI creating airborne dispersion of Chromium VI compounds and resulting in worker exposure.

2. Contracts, subcontracts and HSE management practices for subcontractor workers who perform tasks that could result in exposure to Cr VI

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3. Operations or tasks involving exposure to Cr VI in confined spaces

4. Worker decontamination when Cr VI materials may adhere to workers' skin or clothing or to personal protective equipment worn by them.

5. Disposal of personal protective equipment (PPE) or other debris contaminated by chromium compounds.

6. Demolition where materials containing Cr VI could become airborne and present a potential worker exposure

7. Exposure assessment for employee exposure to Cr VI

8. Medical monitoring and access to records for employees exposed to Cr VI

9. Wearing respiratory protection as a control measure to minimize employee exposure to Cr VI

10. Employee training on the hazards and exposure prevention measures to Cr VI

III. Definitions

A. **Action Level (AL):** The action level for implementation of this program is a concentration of airborne Cr VI of 2.5 micrograms per cubic meter of air calculated as an 8 hour time weighted average (TWA)

B. **Chromium VI or Hexavalent Chrome:** Chromium with a valence of positive six, in any form and any compound

C. **Emergency Release:** Any activity that results or is likely to result in an uncontrolled release of Cr VI. If any incidental release of Cr VI (measured at or below the Permissible Exposure Limit) can be controlled at the time of release by workers in the immediate release area, it is not an emergency

D. **Worker Exposure:** The exposure to airborne Cr VI that would occur i8f the worker was not using respiratory protection.

E. **High Efficiency Particulate (HEPA) Filter:** Filter that is at least 99.97% efficient in removing mono-dispersed particles of 0.3 micrometers (ug) in diameter or larger

F. **Historical Monitoring Data:** Hexavalent chromium exposure assessment monitoring conducted prior to May 30, 2006, obtained during work operations conducted under workplace conditions closely resembling the processes, types of material, control methods, work practices and environmental conditions in the employer's current operations.

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G. **Objective Data**: Information such as air monitoring data from industry-wide surveys or calculations based on the composition or chemical and physical properties of a substance demonstrating the worker exposure to Cr VI associated with a particular product or material or a specific process, operation or activity. The data must reflect workplace conditions closely resembling the processes, types of material, control methods, work practices and environmental conditions in the employer's current operations.

H. **Permissible Exposure Limit (PEL)**: The level of worker exposure to an airborne concentration of Cr VI, without regard to the use of respirators, at 5 micrograms per cubic meter f air (5ug/$m^{3)}$ calculated as an 8 hour time weighted average (TWA) that cannot be exceeded.

IV. Roles and Responsibilities

The following sections outline the roles and responsibilities for individuals when applying this program

A. **Health & Safety Leads**

1. Responsible for assisting Project Managers in implementing this program for al projects, where there is a potential for worker exposure to Cr VI.

2. Has the authority to approve deviations from this standard to accommodate additional domestic and international requirements.

B. **Project Manager**

1. Responsible for implementing this procedure and providing adequate resources (budget and staff) for project specific implementation of the H&S Management process on projects where there is potential for worker exposure to Cr VI

2. Has overall H&S Management responsibility, but may delegate specific tasks to other project staff

3. Retains ultimate H&S responsibility for the project.

C. **Site Manager**

1. Responsible for all field operations onsite and is typically the Construction Manager (CM), Site Superintendent, Site Supervisor or Field Team Leader.

2. Directly responsible for implementing all aspects of the project H&S plan and applicable requirements of this program.

D. **Health & Safety Manager (HSM)**

1. Provide health and safety technical guidance and support to the project.

2. Prepares and/or approves the MEC project's H&S plan, develops the Cr VI sampling plan, conducts the personal protective equipment (PPE) evaluation for skin, eye and respiratory hazards to Cr VI.

3. Reviews subcontractor H&S plans and submittals, conducts project's H&S audits and provides H&S support and guidance to the project

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E. **Site Safety Coordinator (SSC)**

1. SSC is either the Site Manager or someone designated by the Site Manager to implement the project's H&S plan.

2. Ensures that the appropriate elements of the program are implemented.

V. Requirements

The following requirements outline the mandatory criteria that each Modern Electric Co. employee must comply with when implementing this program using their policies, procedures, processes, training and contracting documents.

A. **Subcontractor Management**

1. Subcontractor H&S responsibilities are expressly defined through the subcontract terms and conditions. Subcontractors must determine how to conduct their operations in compliance with applicable H&S regulations, industry standards and how to correct deficiencies.

2. MEC employees shall not direct the means and methods of subcontractor operations.

3. Subcontractors are responsible and accountable for implementing these requirements and any additional requirements established in their own H&S procedures as described in MEC Health & Safety Program, Contracts, Subcontracts and HSE&Q Practices. Subcontractors retain control over their practice and MEC oversight does not relieve them of their own responsibility for effective implementation and enforcement of H&S requirements.

4. The "Subcontractor Health and Safety Procedure Criteria – Cr VI" provides the minimum criteria for these safety procedures. These criteria may be used by the H&S staff to review submitted subcontractor safety procedures when MEC is performing oversight of subcontractor's operations.

B. **Exposure Determination**

1. Initial exposure monitoring must be conducted to document worker breathing zone exposures over the course of a full shift. A representative (8) hour TWA sample shall be collected to determine employee exposure for each job classification in each work area.

2. Air monitoring will be performed at the beginning of each job task.

3. Exposure determinations must follow the current, accepted samp0ling and analytical method equivalent to that used by OSHA.

4. Sample media used for Cr VI monitoring will be analyzed using an industrial hygiene laboratory accredited by the American Industrial Hygiene Associations (AIHA). An equivalent laboratory accreditation can be substituted in countries that do not have an AIHA accredited industrial hygiene laboratory.

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5. Periodic monitoring of workers is required at least every 6 months when the initial monitoring indicates TWA results are equal to or great than the Action Level (AL), but below the Permissible Exposure Limit (PEL).

6. When initial monitoring results are greater than the PEL, additional periodic monitoring, at least quarterly, for each worker involved is required.

7. When monitoring results fall below the AL, monitoring may be suspended.

8. Additional monitoring is required when there has been a change in production process, control equipment, personnel or work practices that may result in new or additional exposures.

9. A performance oriented option may be used to determine the initial (8) hour TWA exposure for each worker on the basis of any combination of air monitoring data, historical monitoring data or objective data sufficient to accurately characterize exposure to Cr VI.

10. When the PEL has been exceeded, notification to the affected worker shall include the control measures utilized to reduce the exposure to below the PEL.

C. **Demarcation of Regulated Areas**

1. Work areas where worker exposure to Cr VI is or can be reasonably be expected to exceed the OSHA PEL, must be demarcated and access limited to only workers authorized to enter.

D. **Methods of Compliance**: Engineering and work practice controls must be applied to reduce the Cr VI worker exposure level to below the OSHA PE, unless it can be demonstrated that such controls are not feasible. Rotating employees to different jobs shall not be used to achieve compliance with the PEL. Methods of compliance to the hierarchy of controls include the following:

1. Substitution – gas tungsten arc welding (GTAW) instead of shielded metal arc welding (SMAW) or flux cored arc welding (FCAW)

2. Engineering controls – mechanical ventilation to remove fumes from the breathing zone.

3. Administrative Controls – safe work practices for the worker on proper positioning to minimize fume trail in their breathing zone, either through positioning upwind in an open area or in proper alignment with ventilation controls.

4. Personal Protection Equipment (PPE) – use of respirator protection as the last resort in reducing exposure or as an interim measure until substation can be applied or engineering controls installed.

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E. **Respiratory Protection**: Respiratory protection will be provided by the employer and worn by the worker sufficient to reduce the exposure to below the Cr VI action level. Respiratory protection will be used only as a last resort to ensure that worker exposure to Cr VI is maintained below the action level or as an interim measure while applying substitution of materials or processes, implementation of work practice controls or installation of mechanical ventilation. When employee exposures are above the PEL for no more than 30 days per year (12 consecutive months) from a particular process or task, respiratory protection can be primarily relied upon to ensure employee exposure is maintained below the PEL

The elements of the respiratory protection program must comply with the Modern Electric Co., Respiratory Protection Program and 29 CFR 1910.134-Respiratory Protection. Key elements for an appropriate respiratory program include the following:

1. Exposure assessment to determine the appropriate respiratory protection to be selected with the required protection factor and fit factor.

2. Medical surveillance for workers to determine their ability to wear respiratory protection.

3. Fit testing of workers to identify which model and type of respiratory protection can be worn.

4. Training workers on the how to wear, use, clean and maintain their respiratory protection equipment.

5. Respirator cartridge change out guidelines for workers.

6. Periodic evaluation of the respiratory protection program by the assigned H&S representation.

F. **Personal Protective Equipment (PPE) and Work Clothing:** PPE and work clothing shall be provided to workers where an eye or skin hazard may exist to Cr VI at no cost to them. The elements of the PPE and work clothing program must comply with the Modern Electric Co. Personal Protection Equipment Program, 29 CFR 1910.132-General Requirements for PPE and 29 CFR 1910.133-Eye and Face Protection. Key elements for an appropriate protective work clothing program include the following:

1. Evaluation of the Health and Safety Manager of work tasks to identify the appropriate type of PPE and work clothing.

2. Providing the appropriate PPE and work clothing in a variety of sizes and styles.

3. Training workers on wearing, using, cleaning and maintaining PPE and work clothing

4. Ensuring that workers do not remove contaminated PPE or work clothing from the worksite

5. Providing a service to launder reusable work clothing

6. Repair or replace as needed

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G. **Hygiene Areas and Practices**: Where work clothing is required to be worn in place of street clothing to prevent skin exposure to Cr VI, change rooms and washing facilities must be provided. Change rooms must include separate storage facilities for work and street clothing. Washing facilities must be readily accessible to workers and must be used by them at the end of the work shift, as well as prior to eating, drinking, smoking, chewing tobacco or gum, applying cosmetics or using the toilet.

An area on the worksite must be designated to be free of Cr VI for workers to consume food and/or beverages.

H. **General Work Practices and Housekeeping**: Work areas or project sites where Cr VI can potentially expose workers must implement and follow work practices to maintain acceptable housekeeping conditions to minimize contact or exposure. General work practices and housekeeping must include the following:

1. All surfaced must be maintained as clean as practicable to minimize accumulation of Cr VI containing substances, dust or particles.

2. All spills and releases of Cr VI containing material must be cleaned up promptly.

3. Surfaces contaminated with Cr VI must be cleaned with HEPA filter vacuuming or equivalent methods or practices that minimize the potential for worker exposure.

4. Avoid using compressed air, dry shoveling, dry sweeping or dry brushing and use only when a HEPA filter vacuum system or equivalent method has been tried and found to be not effective.

5. Waste containing significant amounts of chromium may be subject to hazardous waste regulations & the corresponding generation, treatment and disposal requirements.

I. **Medical Surveillance**: Workers who are or will be potentially exposed to airborne Cr VI above the action level for at least 30 days per year without regard to respirator use will participate in their employer's Cr VI medical surveillance program.

Further participation in periodic Cr VI medical surveillance will be based on exposure conditions such as an emergency or when a worker shows signs or symptoms of exposure annually or within a specified frequency determined by the company consulting physician (or equivalent) and at termination of employment.

Subcontractors are responsible for their workers receiving medical surveillance for Cr VI as required by regulatory requirements, contract or their own company's requirements.

J. **Communication Hazards**: Information concerning Cr VI hazards will be:

1. Communicated according to the requirements of the OSHA Hazcom Standard and the OSHA Cr VI Standard including, but not limited to the requirements concerning warning signs, labels, Safety Data Sheets (SDA's), employee information and training.

2. **The entrance to regulated areas must be posted with signs that read: "CHROMIUM VI REGULATED AREA – AUTHORIZED PERSONNEL ONLY."**

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3. The entrance to regulated areas must be posted with signs that read: "**CHROMIUM VI REGULATED AREA – AUTHORIZED PERSONNEL ONLY."**

4. In addition to the positing requirements, owners, contractors and other personnel working in the area must be notified

5. All storage or shipping containers shall be labeled with the following:

"DANGER – CONTAINS Cr VI – CANCER HAZARD – HARMFUL IF INHALED OR SWALLED – USE ONLY WITH ADEQUATE VENTILATION OR RESPIRATORY PROTECTION"

6. A copy of this program and the OSHA Cr VI Standards (General Industry and Construction) will be made available to all affected project workers.

K. **Training**: Workers who may be exposed to airborne Cr VI about the action level or anticipate working on projects where they could be exposed to airborne Cr VI above the action level, or to soil that contains elevated levels of Cr VI, just complete initial Cr VI exposure, must complete initial Cr VI exposure training. This training covers the following information:

1. Where Cr VI is typically encountered at Modern Electric Co. projects

2. The regulatory requirements, exposure limits, potential hazards including toxicity and physical characteristics, and medical monitoring requirements

3. For site-specific Cr VI hazards, discussion on the location and tasks associated with potential exposure and associated control measures

4. Information contained in the site-specific Health, Safety, and Environmental Protection Plan or Job Hazard Analysis created for the project

5. Quantity, location, manner of use, storage, sources of exposure, and the specific nature of operations that could result in exposure to Cr VI, as well as any necessary protective steps

6. Purpose, proper use, and limitation of respirators

7. Purpose and a description of the medical surveillance program

8. Engineering controls & work practices associated with employee's job assignment

9. A review of this program

Each worker must be provided with a copy of the OSHA Chromium Standard (General Industry and/or Construction) and appendices, if requested.

Subcontractors are responsible for complying with all applicable training requirements relating to Cr VI exposure and for providing the training necessary to complete their tasks safely.

Modern Electric Co. will provide initial training prior to or at each initial assignment. MEC will ensure the training is understandable and ensure each employee can demonstrate knowledge of the health hazards associated with Cr VI exposure, location, manner of use and release of

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chromium in the workplace, engineering and work practice controls, purpose, proper selection, fitting, proper use and limitations of respirator and protective clothing, emergency procedures, measures employees can take to protect themselves from exposure, purpose and description of medical surveillance program, contents of the standard. MEC will have readily available without cost to all affected employees. MEC will also document all employees training.

VI. Recordkeeping

A. **Air Monitoring Data**: An accurate record of all workers personal air sampling and other air monitoring related to determining Cr VI for MEC employees must be completed and maintained that includes at least the following:

1. The date of measurement for each sample taken
2. The operation involving exposure to chromium (VI) that is being monitored
3. Sampling and analytical methods used and evidence of their accuracy
4. Number, duration, and the results of samples taken
5. Type of personal protective equipment, such as respirators worn
6. Name, social security number, and job classification of all employees represented by the monitoring, indicating which employees were actually monitored.

The employer shall ensure that exposure records are maintained and made available in accordance with 29 CFR 1910.1020.

B. **Historical Monitoring Data**: Where the employer has relied on historical monitoring data to determine exposure to chromium (VI), the employer shall establish and maintain an accurate record of the historical monitoring data relied upon. The record shall include information that reflects the following conditions:

1. The data were collected using methods that meet the accuracy requirements
2. The processes and work practices that were in use when the historical monitoring data were obtained are essentially the same as those to be used during the job for which exposure is being determined
3. The characteristics of the chromium (VI) containing material being handled when the historical monitoring data were obtained are the same as those on the job for which exposure is being determined
4. Environmental conditions prevailing when the historical monitoring data were obtained are the same as those on the job for which exposure is being determined
5. Other data relevant to the operations, materials, processing, or employee exposures covered by the exception.

The employer shall ensure that historical exposure records are maintained and made available in accordance with 29 CFR 1910.1020.

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C. **Objective Data**: The employer shall maintain an accurate record of all objective data relied upon to comply with the requirements of this section. This record shall include at least the following information:

1. The chromium containing material in question
2. The source of the objective data
3. The testing protocol and results of testing, or analysis of the material for the release of chromium (VI)
4. A description of the process, operation, or activity and how the data support the determination
5. Other data relevant to the process, operation, activity, material, or employee exposures.

The employer shall ensure that objective data are maintained and made available in accordance with 29 CFR 1910.1020.

D. Exposure assessment records related to Cr VI, including workers personal air sampling, historical monitoring data and objective data must be maintained for a minimum of thirty (30) years. Copies of exposure assessment records for MEC employees are to be forwarded to the Modern Electric Co.'s Manager.

E. Medical monitoring records related to Cr VI must be maintained for each employee for thirty (30) years beyond their duration of employment. Medical monitoring records will be retained in the employee's medical file and maintained by the MEC occupational health care provider.

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Cr VI FACT SHEET

Uses and Occurrences:

Chromium is a naturally occurring element in rocks, animals, plants, soil and volcanic gases. Chromium occurs in the environment predominantly in one of two valence states:

- **Trivalent (Cr III)**: occurs naturally and is an essential nutrient
- **Hexavalent Chromium (Cr VI)**: along with the less common metallic chromium (Cr 0), is most commonly produced in plating processes

The major industrial sources of Cr VI compounds are chromate pigments in dyes, paints, inks, and plastics; chromates added as anti-corrosive agents to paints, primer, and other surface coatings; chrome plating by depositing chromium metal onto an item's surface using a solution of chromic acid; particles released during smelting of Ferro-chromium ore; fumes from welding stainless steel or nonferrous chromium alloys; and as an impurity in Portland cement.

Physical Characteristics:

Appearance:	Dark red flakes or powder
Odor:	None
Flammable:	Non-combustible, solid, but will accelerate burning of combustible materials
Flash Point:	None
Flammable Range:	None
Specific Gravity:	2.7 for Cr VI
Stability:	Stable
Incompatibilities:	Reducing and oxidizing agents, acetic acid
Melting Point:	1907° C or 3465° F for Cr
Boiling Point:	2671° C or 4840° for Cr

Signs and Symptoms of Exposure:

Short Term (Acute): Coughing, sneezing, chest pain, breathing difficulty, itching and burning sensation to skin and lungs.

Long Term (Chronic): Allergic (asthma like symptoms), respiratory reaction, skin and eye irritation, nosebleeds, contact dermatitis, allergic like skin reaction, ulceration and perforation o of the nasal septum.

Modes of Exposure:

Inhalation:	Dusts and fumes
Skin Absorption:	Liquid
Ingestion:	Dusts and liquids

Exposure Limits:

Action Level:	2.5 micrograms per cubic meter (µg/m³) PEL: 5 µg/m³
STEL:	None
TLV:	5 µg/m³

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Exposure Level vs. Regulatory Requirements

EXPOSURE LEVEL (EL)	REGULATORY REQUIREMENTS
EL < AL	Maintain exposure as low as reasonably achievable
AL > EL, EL < PEL	Implement portions of the OSHA Cr VI standard and Training
EL > PEL	Implement all portions of the OSHA Cr VI Standard including training, medical surveillance, engineering controls, establishment of work areas, etc.

PPE:

Eye: Safety Glasses
Skin: Chemical protection gloves and body protection
Respiratory: Air purifying and supplied air respirators, depending on the exposure and a PAPR if requested by the worker.

First Aid:

Inhalation: Move to fresh air and seek medical attention promptly
Skin: Quick drenching with water, wash skin with soap and water, seek medical attention promptly.
Eyes: Flush with water for 15 minutes lifting the lower and upper lids occasionally, seek medical attention promptly.
Indigestion: Seek medical attention promptly.

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SECTION 36

ABRASIVE BLASTING

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I. Hazard Overview

Abrasive blasting involved forcefully projecting a stream of abrasive particles onto a surface, usually with compressed air or steam. Because silica sand is commonly used in this process, workers who perform abrasive blasting are often known as sandblasters.

II. General Requirements

Facility Evaluation – MEC shall evaluate facility(s) or host employer facilities to determine if any work area meets the criteria for designation as an "Abrasive Blasting Hazard Area". Such areas will be fully evaluated for safety and compliance with respective safety regulations.

III. Definitions

A. **Abrasive** – a solid substance used in an abrasive blasting operation.

B. **Abrasive Blasting Respirator** – A continuous flow air-line respirator constructed so that it will cover the wearer's head, neck and shoulders, to protect him/her from rebounding abrasive.

C. **Blast Cleaning Barrel** – a complete enclosure which rotates on an axis, or which has an internal moving tread to tumble the parts in order to expose various surfaces of the parts to the action of an automatic blast spray.

D. **Blast Cleaning Room** – a complete enclosure in which blasting operations are performed and where the operator works inside of the room to operate the blasting nozzle and direct the flow of the abrasive material.

E. **Blasting Cabinet** – an enclosure where the operator stands outside and operates the blasting nozzle through an opening or openings in the enclosure.

F. **Clean Air** – air of such purity that it will not cause harm or discomfort to an individual if it is inhaled for extended periods of time.

G. **Dust Collector** – a device or combination of devices for separating dust from the air handled by an exhaust ventilation system.

H. **Exhaust Ventilation System** - a system for removing contaminated air from a space comprising two or more of the following elements:

1. Enclosure or hood
2. Duct work
3. Dust collecting equipment
4. Exhauster
5. Discharge stack

I. **Particulate Filter Respirator** – an air purifying respirator, commonly referred to as a dust fume respirator. It removes most of the dust or fume from the air passing through the device.

J. **Reparable dust** – airborne dust in sizes capable of passing through the upper respiratory system to reach the lower lunch passages.

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K. **Rotary Blast Cleaning Table** – an enclosure where the pieces to be cleaned are positioned on a rotating table and are passed automatically through a series of blast sprays.

L. **Abrasive Blasting** – the forcible application of an abrasive to a surface by pneumatic pressure, hydraulic pressure or centrifugal force

IV. Health Effects

When workers inhale the crystalline silica used in abrasive blasting, the lung tissue reacts by developing fibrotic nodules and scarring around the trapped silica particles. This fibrotic condition of the lunch is called Silicosis. If the nodules grow to large, breathing becomes difficult and death may result. Silicosis victims are also high as risk of developing "Active" Tuberculosis. The Silica Sand is used in abrasive blasting typically fractures into fine particles and become airborne. Inhalation of such silica appears to produce a more sever lung reaction than Silica that is not freshly fractured. The factor may contribute to the reaction than silica that is not freshly fractured. This factor may contribute to the development of acute and accelerated forms of Silicosis among Sandblasters. Sandblasters working in the dust atmosphere created by airborne particles of Silica and without proper PPE and who remain in an atmosphere containing these particles may inhale dangerous or lethal amount unknowingly.

V. Permissible Exposure Limit

The following control methods will be used to ensure that the employee exposure to the hazardous substances is below the PEL set by OSHA in 1926.55(a)

A. **Engineering Controls**

1. MEC will install and maintain engineering controls where possible to eliminate or reduce the amount of Silica in the work area and to reduce buildup of dust on equipment and machinery surfaces. Preventative maintenance will be conducted as a HIGH priority to ensure effectiveness of the engineering controls. Where possible controls will include, but are not limited to:

a) General exhaust ventilation systems
b) Local ventilation systems
c) Dust collection systems
d) Enclosed cabs for Workers
e) Water sprays for dust reduction
f) Wet drilling when drilling operations are in effect
g) Drill platform skirts when drilling Operations are in effect

B. **Administrative Controls**

1. Where engineering controls are not feasible, administrative controls will be attempted where possible to eliminate or reduce the amount of Silica or environmental dusts each worker is exposed to. Where possible controls will be include but are not limited to:

a) Job Specific Training Programs
b) Job Rotation
c) Job Enlargement

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d) Job Pacing Variations
e) Checklists for Job Improvement
f) Policies and Procedure Development
g) Regular Job Inspections and Review
h) Employee Feedback Surveys

C. **Personal Protective Equipment (PPE)**

1. Where administrative controls are not feasible, PPE will be selected and used through the job hazard analysis (JHA) program. Supervisors will ensure that equipment selected will meet the following requirements:

a) It will be appropriate for the particular hazard.

b) It will be maintained in good condition

c) It will be properly stored when not in use to prevent damage

d) It will be kept clean, fully functional and sanitary.

e) Hazards associates with the proactive clothing, PPE, personal clothing and jewelry. Protective clothing and PPE can present additional safety hazards. Supervisors will ensure workers wear appropriate clothing and PPE. These items will be worn so as to not create additional hazards.

(1) Personal clothing and jewelry will be monitored by the immediate supervisor. Clothing or jewelry that could become entangled in tools, equipment or machinery or of an excessively flammable nature will be prohibited.

2. Documentation - PPE requirements will be documented on a “Protective Measures Determination” for JHA Program and properly filed.

a) Types of PPE, where required, will include but are not limited to:

(1) Abrasive blasting gloves

(2) Appropriate respirators

(a) If utilizing supplied air respirators, the air supply needs to be supplied by breathing air bottles or compressor which will maintain a clean and adequate supply of air, which is free from any dusts, mists or noxious gases

(3) Body shields

(4) Aprons

(5) Non-slip and steel toed shoes

(6) Full eye protection

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(7) Full body jumpsuits for dust protection

(8) Hard hats

(9) Caps

(10) Hair Nets

(11) Foot guards

VI. Permit Required Confined Space Program

Reference Section VII

VII. Procedures for Atmospheric Testing

Atmospheric testing Abrasive Blasting Hazard Areas is required for two (2) distinct purposes. Evaluation of the hazards of the work area and verification that acceptable particulate levels exist in that area.

A. **Evaluation Testing** – MEC will ensure that the atmosphere is analyzed using equipment of sufficient sensitivity and specificity to identify and evaluate any hazardous particulate levels that may exist or arise. Evaluation and interpretation of this data and development work procedures will be done by or reviewed by a technically qualified professional such as an OSHA Consulting Service, Certified Industrial Hygienist, Registered Safety Engineer, Certified Safety Professional, etc. based on evaluation of all serious hazards.

VIII. Training

A. **Types of Training** – MEC 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 Abrasive Blasting exposure hazards associated with the individual job.

1. **Initial Training –** Prior to job assignment, MEC shall provide training to ensure that the hazards associates with Abrasive Blasting are understood by employees and that the knowledge, skills and PPE required, are acquired by employees. The training shall have as a minimum the following:

a) Training in the recognition of applicable hazards involved with the job and jobsite, as well as the methods and means necessary for safe work.

b) The specific nature of the operation in which could result in exposure to Abrasive Blasting materials.

c) The purpose, proper selection, fitting, use and limitation of PPE

d) The adverse health effects associated with excessive exposure to Abrasive Blasting materials.

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e) The engineering & administrative controls and work practices associated with the employee's job assignment, including training of employees to follow relevant good work practices.

f) The contents of any compliance plan in effect

g) The employee's right of access to records under 29 CRF 1910.20

h) Refresher training will be conducted

2. **Re-Training** – Re-training shall be provided for all affected employees as a minimum, under the following conditions:

a) Change in job assignment
b) Change in PPE
c) Change in equipment that presents a new hazard
d) Change in processes that present a new hazard
e) Work takes them into hazardous areas
f) Change in Abrasive Blasting safety procedures
g) Safety procedures fail, resulting in a near miss, illness or injury

Additional re-training shall also be conducted whenever MEC has reason to believe and/or a periodic inspection reveals that there are deviations from or inadequacies in the employee's knowledge of known hazards or use of equipment or procedures.

The re-training shall re-establish employee proficiency and introduce new equipment or revised control methods and procedures, as necessary.

Modern Electric Co. shall certify that employee training has been accomplished and is being kept up to date. The certification shall list each employee's name, the date (s) of training and contain a synopsis of the training conducted.

IX. Work Operations

A. Work operations in which particulate or Abrasive Blasting material may be encountered involve welding, burning, cutting, brazing, grinding and abrasive blasting sanding and drilling work

B. The equipment and materials used to accomplish work operations are those normally associated with sandblasting and paint operations.

C. All work areas/stations will be kept in a clean and safe manner. Debris such as dust and materials will be removed when work is completed. If excessive debris is generated during working operations, it will be cleaned at that time. Compressed air will not be used for the cleaning of work surfaces or tools unless:

1. The air pressure is kept below 30 psi
2. Adequate protection is provided against chipping and flying hazards
3. Proper PPE is utilized

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D. Employee crew size will vary and employee job responsibilities will be that of their craft as stated in the company's policy. Specific additional responsibilities will be:

1. **Superintendent/General Supervisor**

   a) Monitors procedure to ensure compliance with the work practice.

2. **Supervisors**

   a) Ensures that the initial determination for potential Abrasive Blasting or particulate exposure has been accomplished before work begins.

   b) Supervises the safe performance of work in accordance with this and other related work practices

   c) Assigns jobs only to qualified employees

3. **Employees**

   a) Uses the protective and safety equipment as assigned and directed.

   b) Abides by the requirements of this and site specific work practices

X. Monitoring and Measurement Procedures

A. **Eight (8) Hour Time Weighted Average (TWA) Evaluations** – Where possible, these will be taken so that the average eight (8) hour exposure is based on a single eight (8) hour sample. Air samples will be taken in the employee's breathing zone. Only qualified personnel will be selected to conduct these evaluations.

B. **Ceiling Evaluations** – Where possible, measurements to determine employee ceiling exposure will be taken during periods of maximum expected airborne concentrations of Abrasive Blasting material or particulates. Each measurement will consist of a 15 minute sample or series of consecutive samples totaling 15 minutes. Air samples will be taken in the employee's breathing zone and only by qualified personnel.

C. **Peak and Above Ceiling Evaluations** – Measurements to determine employee peak exposure will be taken during periods of maximum expected airborne concentrations of Abrasive Blasting materials or particulates. Each measurement will consist of a 10 minutes sample or series of consecutive samples totaling 10 minutes. A minimum of three (3) measurements will be taken on one (1) work shift and the highest of all measurements taken will be assumed to be an estimate of the employee's exposure. Air samples will be taken in the employee's breaking zone and only by qualified personnel.

D. **Sampling Methods** – Sampling and analysis will be conducted in accordance with acceptable industrial hygiene practices. Sampling data will be maintained for the duration of employment of the affected employee plus 30 years.

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XI. Spill and Leak Procedures

Spill and leak procedures will largely depend on the capability and emergency procedures of MEC and any host employer. We will ensure that adequate clean up procedures are in effect in any facility owned by us. Anytime employees work with a host employer, we will ensure adequate procedures are in place for the protection of all employees (MEC and Host) and the surrounding area.

XII. Emergency First Aid Procedures

In the event of an emergency, institute first aid procedures and send for first aid or medical assistance in accordance with local procedures.

A. **Eye Exposure** – wash immediately with large amounts of water lifting the lower and upper lids occasionally and get medical attention as soon as possible.

B. **Skin Exposure (embedded particulates)** – immediately flush with copious amounts of water and remove any clothing blocking exposed skin areas and flush exposed skin areas. Get medical attention as soon as possible

C. **Respiratory Exposure** – get the victim to open and fresh air immediately. If breathing has stopped, perform CPR. Keep the victim warm and at rest. Get medical attention immediately.

D. **Rescue Considerations** – Don't become a second victim. Move the affected person from the hazardous area. If they exposed person has been overcome, initiate local emergency notification procedure. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arises.

XIII. Tool Selection, Evaluation and Condition

The greatest hazards posed by tools usually result from misuse and/or improper maintenance. Tool selection sometimes is not considered a priority when arrangements are made to begin work. All employees will consider the following when selecting tools:

A. Is the tool correct for the type of work to be performed?

B. Is the tool equipped with a "deadmans" switch, which needs to be held open by the operator and upon release will shut off the tool?

C. Are guards installed properly and in good condition?

D. Are grounding methods sufficient when working in wet conditions?

E. Are bonding and grounding methods sufficient to discharge static electricity accumulation on tools?

F. Does the tool create sparks or heat and has this been considered when working around flammable substances?

G. Do impact tools such as chisels, wedges or drift pins have mushroomed heads? The heads can shatter on impact, sending sharp fragments flying!

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H. Are wooden handled tools loose or splintered? This can result in the heads flying off and striking the user and/or co-workers?

I. Are cutting tools sharp? Dull tools are more hazardous than sharp ones.

J. Is the tool used on the proper working surface? Tools used on dirty or wet working surfaces can create a multitude of hazards.

K. Are tools stored properly when not being used? Saw blades, knives, scissors and sharp like tools should be stored so that sharp edges are directed away from aisles and co –workers.

L. Is there sufficient clearance for tools requiring swinging motions such as hammers, axes, picks, etc.?

M. Tools will be checked for excessive vibration.

N. Have tools been modified beyond the manufacturers specifications? If so, have the modifications been approved by a "competent person"?

O. Blast cleaning nozzles will be equipped with an operating valve which must be held open manually. A support shall be provided on which the nozzle may be mounted when not in use.

XIV. Medical Surveillance

The medical surveillance provisions of this standard practice instruction are intended to provide our employees with a comprehensive approach to prevention of Silicosis. The primary purpose is to supplement the OSHA standards primary mechanisms of disease and illness prevention, the elimination or reduction of airborne concentrations of Abrasive Blasting Materials or particles and sources of ingestion, by facilitating the early detection of medical effects associated with exposure to Abrasive Blasting Materials or particulates. The ultimate goal will be to develop a plan to reducing exposures of employees whose X-rays show changes consistent with silicosis. Modern Electric Co. will bear the expenses of the Medical Surveillance Program.

A. All medical examinations and procedures will be performed by or under the supervision of a licensed physician and be provided without cost to employees at a reasonable time and place.

B. The medical surveillance provisions contemplate two (2) phases of surveillance:

1. **Initial Surveillance** – X-Rays read by a specialist in dust diseases. It will be provided to our employees occupationally exposed to airborne concentrations of Abrasive Blasting material or particulates on any one day at or above the action level, as well as to employees performing high exposure "trigger tasks" during initial exposure assessment.

2. **Routine and Follow-up Medical Surveillance** – If an employee's airborne Abrasive Blasting Material or particulates exposure is of concern (based on healthcare provider recommendation), this employer shall provide a medical surveillance program to the employee consisting of routing monitoring as recommended by a healthcare provider. If a routine and follow-up test for Abrasive Blasting Materials or particulates exceeds recommended exposure criteria, the employee will be removed from exposure. Employees will be notified in writing of any medical monitoring results within five (5) working days after receipt of monitoring results

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C. **Surveillance Initiation** – This employer will provide a full medical surveillance program to any employee, including period medical exams (based on healthcare provider recommendation), when it is determined that the employee's exposure to Abrasive Blasting Materials or particulates is detrimental to his or her health.

D. **Examination Criteria** – the content and frequency will be at the discretion of the attending physician. Each examination at a minimum will include:

1. A work and medical history
2. A physical examination
3. Appropriate X-rays as required by the healthcare provider

E. **Medical Consultations** – will be provided upon notification by an employee under the following conditions:

1. Employee has developed symptoms commonly associated with Silicosis
2. Employee has demonstrated difficulty in breathing during fit testing or use of a respirator

F. **Medical Removal Protection** – will remove an employee from work having an exposure to Abrasive Blasting Materials or particulates under the following conditions:

1. **Exposure Limit** – when it is determined from workplace monitoring that airborne particulates exceed OSHA or NIOSH recommended exposure limits
2. **Evidence of Silicosis** – when it is suspected from any source that an employee has an evidence of Silicosis
3. **Medical Determination** – On each occasion that a final medical determination results in a medical finding, determination or opinion that the employee has a detected condition which places the employee at an increased risk of impairment to health from exposure to Abrasive Blasting Materials or particulates

G. **Return to Work** – Any employee removed from exposure to Abrasive Blasting Materials or particulates may return to former job status when approved by their healthcare provider. A written recommendation that the employee no longer has a detected medical condition which places the employee at an increased risk of impairment of health, will be required by MEC before return to work is authorized.

XV. Entry Control

Those work areas meeting the criteria for delineation as an "Abrasive Hazards Work Area", will be restricted only to trained and authorized employees. Physical barriers, ropes, fencing or any other equally effective means of entry control may be used to control entry.

XVI. Hazard Marking

Abrasive Hazards Work Areas will be identified by signage and color coding as needed. A sign reading "DANGER – ABRASIVE HAZARDS WORK AREA" or similar, will be used to satisfy the requirements for a sign.

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XVII. Hazard Notification

A. Modern Electric Co. shall employees working near Abrasive Hazards Work Areas 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 Abrasive Blasting.

B. Abrasives and the surface coatings on the materials blasted are shattered and pulverized during blasting operations. Dust formed will contain particles or respirable size. The composition and toxicity of the dust from these sources shall be considered in making an evaluation of the potential health hazards.

C. Organic abrasives which are combustible shall be used only in automatic systems. Where flammable or explosive dust mixtures may be preset, the construction of the equipment, including the exhaust system and all electrical wiring shall conform to the requirements of the American National Standard Installation of Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying, Z33.1-1961)NFPA 91-1961) and Subpart S of that part. The blast nozzle shall be bonded and grounded to prevent the buildup of static charges. Where flammable or explosive dust mixtures may be present, the abrasive blasting enclosure, the ducts and the dust collector shall be constructed with loose panels or explosion venting areas located on sides away from any occupied area to provide for pressure relief in case of explosion, following the principles set forth in the National Fire Protection Association Explosion Venting Guide, NFPA 68-1954.

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SECTION 37

SILICA

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I. Scope and Application

This section applies to all occupational exposures to respirable crystalline silica in construction work, except where employee exposure will remain below 25 micrograms per cubic meter of air (25µg/m^3) as an 8-hour time-weighted average (TWA) under any foreseeable conditions.

ll. Definitions

A. **Action level -** a concentration of airborne respirable crystalline silica of 25 µg/m^3, calculated as an 8-hour TWA.

B. **Assistant Secretary -** Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

C. **Director** - Director of the National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services, or designee.

D. **Competent person** - an individual who is capable of identifying existing and foreseeable respirable crystalline silica hazards in the workplace and who has authorization to take prompt corrective measures to eliminate or minimize them.

E. **Employee Exposure -** the exposure to airborne respirable crystalline silica that would occur if the employee were not using a respirator.

F. **High-efficiency particulate air [HEPA] filter** - a filter that is at least 99.97 percent efficient in removing mono-dispersed particles of 0.3 micrometers in diameter.

G. **Objective data** - information, such as air monitoring data from industry-wide surveys or calculations based on the composition of a substance, demonstrating employee exposure to respirable crystalline silica associated with a particular product or material or a specific process, task, or activity. The data must reflect workplace conditions closely resembling or with a higher exposure potential than the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations.

H. **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 particular health care services required of this section.

I. **Respirable crystalline silica** - quartz, cristobalite, and/or tridymite contained in airborne particles that are determined to be respirable by a sampling device designed to meet the characteristics for respirable-particle-size-selective samplers specified in the International Organization for Standardization (ISO) 7708:1995: Air Quality—Particle Size Fraction Definitions for Health-Related Sampling.

J. **Specialist** – an American Board Certified Specialist in Pulmonary Disease or an American Board Certified Specialist in Occupational Medicine.

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III. Specified Exposure Control Methods

A. For each employee engaged in a task identified on Table 1, Modern Electric Co. shall fully and properly implement the engineering controls, work practices, and respiratory protection specified for the task on Table 1, unless the MEC assesses and limits the exposure of the employee to respirable crystalline silica in accordance with this section.

Table 1—Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protector factor (APF)	
		≤ 4 hours/shift	> 4 hours/shift
(i) Stationary masonry saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade	None	None
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
(ii) handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions when:		
	Used outdoors	None	APF 10
	Used indoors or in an enclosed area	APF 10	APF 10
(iii) Handheld power saws for cutting fiber cement board with blade diameter of 8 inches or less	For tasks performed outdoors only use saw equipped with commercially available dust collection system.	None	Non
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.		
	Dust collector must provide the air flow recommended by the tool manufacturer or greater and have a filter with 99% or greater efficiency		
(iv) Walk behind saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions when:		
	Used outdoors	None	None
	Used indoors or in an enclosed area	APF 10	APF10
(v) Drivable saws	For tasks performed outdoors only use saw equipped with integrated water delivery system that continuously feeds water to the blade.	None	None
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
(vi) Rig mounted core saws or drills	Use tool equipped with integrated water delivery system that supplies water to cutting surface.	None	None
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
(vii) Handheld and stand mounted drills including impact and rotary hammer drills	Use drill equipped with commercially available shroud or cowling with dust collector system.	None	None
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	Dust collector must provide the air flow recommended by the tool manufacturer or greater and have a filter with 99% or greater efficiency and a filter cleaning mechanism. Use HEPA filtered vacuum when cleaning hole.		

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Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protector factor (APF)	
		≤ 4 hours/shift	> 4 hours/shift
(viii) Dowel drilling rigs for concrete	For tasks performed outdoors only use shroud around drill bit with a dust collection system.	APF 10	APF10
	Dust collector must have a filter with 99% or greater efficiency and a filter cleaning mechanism		
(ix) Vehicle mounted drilling rigs for rock and concrete	Use dust collection system with close capture hood or shroud around drill bit with a low flow water spray to wet the dust at the discharge point for the dust collector or operate from within an enclosed cab and use water for dust suppression on drill bit	None	None
(x) Jack hammers and handheld powered chipping tools	Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact when:		
	Used outdoors	None	APF 10
	Used indoors or in an enclosed area	APF 10	APF 10
	Or Use tool equipped with commercially available shroud and dust collection system		
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.		
	Dust collector must provide the airflow recommended by the tool manufacturer, or greater ad have a filter with 99% or greater efficiency and a filter cleaning mechanism when:		
	Used outdoors	None	APF 10
	Used indoors or in an enclosed area	APF 10	APF 10
(xi) Handheld grinders for mortar remover (i.e., tuckpointing	Use grinder equipped with commercially available shroud and dust collection system.	APF 10	A{F 10
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.		
	Dust Collector must provide (25) cubic feet per minute (cfpm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separate or filter cleaning mechanism.		
(xii) Handheld grinders for uses other than mortar removal	For tasks performed outdoors only use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface	None	None
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	Or use a grinder equipped with commercially available shroud and dust collection system		
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	Dust collector must provide (25) cubic feet per minute (cfpm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism when:		
	Used outdoors	None	APF 10
	Used indoors or in an enclosed area	None	APF 10
(xiii) Walk behind milling machine and floor grinders	Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface	None	None
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.		

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Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protector factor (APF)	
		≤ 4 hours/shift	> 4 hours/shift
	Or use machine equipped with dust collection system recommended by the manufacturer	None	None
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.		
	Dust collector must provide the airflow recommended by the manufacturer or greater and have a filter with 99% or greater efficiency and a filter cleaning mechanism.		
	When used indoors or in an enclosed area, use a HEPA filtered vacuum to remove loose dust in between passes.		
(xiv) Small drivable milling machines less than half-lane	Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant.	None	None
	Operate and maintain machines to minimize dust emissions		
(xv) Large drivable milling machines half lane and larger	For cuts of any depth on asphalt only, use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust.	None	None
	Operate and maintain machines to minimize dust emissions		
	For cuts of four inches (4") in depth or less on any substrate use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust.	None	None
	Operate and maintain machine to minimize dust emissions		
	Or use a machine equipped with supplemental water spray designed to suppress dust. Water must be combined with a surfactant	None	None
(xvi) Crushing machines	Use equipment designed to delivery water spray or mist for dust suppression at crusher and other points where dust is generated (e.g., hoppers, conveyors, sieves/sizing or vibrating components and discharge points	None	None
	Operate and maintain machines in accordance with manufacturer's instructions to minimize dust emissions		
	Use a ventilated booth that provides fresh, climate controller air to the operator or a remote control station		
(xvii) Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g., hoe ramming, rock ripping) or used during demo activities involving silica-contained materials	Operate equipment from within an enclosed cab	None	None
	When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions	None	None
(xviii) Heavy equipment and utility vehicles for tasks such as grading and excavating, but not including demolishing, abrading or fracturing silica-containing materials	Apply water and/or dust suppressants as necessary to minimize dust emissions	None	None
	Or when the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab.	None	None

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B. When implementing the control measures specified in Table 1, each employer shall:

1. For tasks performed indoors or in enclosed areas, provide a means of exhaust as needed to minimize the accumulation of visible airborne dust;

2. For tasks performed using wet methods, apply water at flow rates sufficient to minimize release of visible dust;

3. For measures implemented that include an enclosed cab or booth, ensure that the enclosed cab or booth:

a) Is maintained as free as practicable from settled dust;

b) Has door seals and closing mechanisms that work properly;

c) Has gaskets and seals that are in good condition and working properly;

d) Is under positive pressure maintained through continuous delivery of fresh air;

e) Has intake air that is filtered through a filter that is 95% efficient in the 0.3-10.0 µm range (*e.g.*, MERV-16 or better)

f) Has heating and cooling capabilities.

C. Where an employee performs more than one task on Table 1 during the course of a shift and the total duration of all tasks combined is more than four (4) hours, the required respiratory protection for each task is the respiratory protection specified for more than four (4) hours per shift. If the total duration of all tasks on Table 1 combined is less than four (4) hours, the required respiratory protection for each task is the respiratory protection specified for less than four (4) hours per shift.

IV. Alternative Exposure Control Methods

A. **Permissible exposure limits (PEL)**

For tasks not listed in Table 1 or where MEC does not fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1, MEC shall ensure that no employee is exposed to an airborne concentration of respirable crystalline silica in excess of 50 µg/m^3, calculated as an 8-hour TWA.

B. **Exposure Assessment**

1. **General –** MEC shall assess the exposure of each employee who is or may reasonably be expected to be exposed to respirable crystalline silica at or above the action level.

2. **Performance option -** Assess the 8-hour TWA exposure for each employee on the basis of any combination of air monitoring data or objective data sufficient to accurately characterize employee exposures to respirable crystalline silica.

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3. **Scheduled monitoring option**

a) Perform initial monitoring to assess the 8-hour TWA exposure for each employee on the basis of one or more personal breathing zone air samples that reflect the exposures of employees on each shift, for each job classification, in each work area. Where several employees perform the same tasks on the same shift and in the same work area, MEC may sample a representative fraction of these employees in order to meet this requirement. In representative sampling, the employer shall sample the employee(s) who are expected to have the highest exposure to respirable crystalline silica.

b) If initial monitoring indicates that employee exposures are below the action level, the employer may discontinue monitoring for those employees whose exposures are represented by such monitoring.

c) Where the most recent exposure monitoring indicates that employee exposures are at or above the action level but at or below the PEL, the employer shall repeat such monitoring within six months of the most recent monitoring.

d) Where the most recent exposure monitoring indicates that employee exposures are above the PEL, the employer shall repeat such monitoring within three months of the most recent monitoring.

e) Where the most recent (non-initial) exposure monitoring indicates that employee exposures are below the action level, the employer shall repeat such monitoring within six months of the most recent monitoring until two consecutive measurements, taken seven or more days apart, are below the action level, at which time the employer may discontinue monitoring for those employees whose exposures are represented by such monitoring, except as otherwise provided in this section.

4. **Re-Assessment of Exposures -** Modern Electric Co. shall re-assess exposures whenever a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional exposures at or above the action level, or when MEC has any reason to believe that new or additional exposures at or above the action level have occurred.

5. **Methods of Sample Analysis -** MEC shall ensure that all samples taken to satisfy the monitoring requirements of this section are evaluated by a laboratory that analyzes air samples for respirable crystalline silica in accordance with OSHA Standard 1926.1153 App A.

6. **Employee notification of assessment results**

a) Within five (5) working days after completing an exposure assessment, MEC shall notify each affected employee in writing of the assessment results or post the results in an appropriate location accessible to all affected employees.

b) Whenever an exposure assessment indicates that employee exposure is above the PEL, MEC shall describe in the written notification the corrective action being taken to reduce employee exposure to or below the PEL.

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7. **Observation of Monitoring**

a) Where air monitoring is performed to comply with the requirements of this section, Modern Electric Co. shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to respirable crystalline silica.

b) When observation of monitoring requires entry into an area where the use of protective clothing or equipment is required for any workplace hazard, the employer shall provide the observer with protective clothing and equipment at no cost and shall ensure that the observer uses such clothing and equipment.

C. **Methods of Compliance**

1. **Engineering and work practice controls –** Modern Electric Co. shall use engineering and work practice controls to reduce and maintain employee exposure to respirable crystalline silica to or below the PEL, unless MEC can demonstrate that such controls are not feasible. Wherever such feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, MEC shall nonetheless use them to reduce employee exposure to the lowest feasible level and shall supplement them with the use of respiratory protection that complies with the requirements of this section.

2. **Abrasive Blasting** - In addition to the requirements of this section, Modern Electric Co. shall comply with other OSHA standards, when applicable, such as 29 CFR 1926.57 (Ventilation), where abrasive blasting is conducted using crystalline silica-containing blasting agents, or where abrasive blasting is conducted on substrates that contain crystalline silica.

V. Respirator Protection

A. Where respiratory protection is required by this section, Modern Electric Co. must provide each employee an appropriate respirator that complies with the requirements of this paragraph and 29 CFR 1910.134. Respiratory protection is required:

1. Where specified by Table 1 of paragraph (c) of this section; or

2. For tasks not listed in Table 1, or where MEC does not fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1

a) Where exposures exceed the PEL during periods necessary to install or implement feasible engineering and work practice controls;

b) Where exposures exceed the PEL during tasks, such as certain maintenance and repair tasks, for which engineering and work practice controls are not feasible; and

c) During tasks for which MEC has implemented all feasible engineering and work practice controls and such controls are not sufficient to reduce exposures to or below the PEL.

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B. **Respiratory Protection Program** - Where respirator use is required by this section, Modern Electric Co. shall institute a respiratory protection program in accordance with 29 CFR 1910.134.

C. **Specified Exposure Control Methods** - For the tasks listed in Table 1 in paragraph (c) of this section, if MEC fully and properly implements the engineering controls, work practices, and respiratory protection described in Table 1, MEC shall be considered to be in compliance with this section and the requirements for selection of respirators in 29 CFR 1910.134(d)(1)(iii) and (d)(3) with regard to exposure to respirable crystalline silica.

VI. Housekeeping

A. MEC shall not allow dry sweeping or dry brushing where such activity could contribute to employee exposure to respirable crystalline silica unless wet sweeping, HEPA-filtered vacuuming or other methods that minimize the likelihood of exposure are not feasible.

B. MEC shall not allow compressed air to be used to clean clothing or surfaces where such activity could contribute to employee exposure to respirable crystalline silica unless:

1. The compressed air is used in conjunction with a ventilation system that effectively captures the dust cloud created by the compressed air; or

2. No alternative method is feasible.

VII. Written Exposure Control Plan

A. Modern Electric co. shall establish and implement a written exposure control plan that contains describes at least the following elements:

1. Tasks in the workplace that involve exposure to respirable crystalline silica;

2. Engineering controls, work practices, and respiratory protection used to limit employee exposure to respirable crystalline silica for each task;

3. Housekeeping measures used to limit employee exposure to respirable crystalline silica; and

4. Procedures used to restrict access to work areas, when necessary, to minimize the number of employees exposed to respirable crystalline silica and their level of exposure, including exposures generated by other employers or sole proprietors.

B. MEC shall review and evaluate the effectiveness of the written exposure control plan at least annually and update it as necessary.

C. MEC shall make the written exposure control plan readily available for examination and copying, upon request, to each employee covered by this section, their designated representatives, the Assistant Secretary and the Director.

D. MEC shall designate a competent person to make frequent and regular inspections of job sites, materials, and equipment to implement the written exposure control plan.

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VIII. Medical Surveillance

A. **General:**

1. MEC shall make medical surveillance available at no cost to the employee, and at a reasonable time and place, for each employee who will be required under this section to use a respirator for 30 or more days per year.

2. MEC shall ensure that all medical examinations and procedures required by this section are performed by a PLHCP as defined in paragraph (b) of this section.

B. **Initial examination** - MEC shall make available an initial (baseline) medical examination within 30 days after initial assignment, unless the employee has received a medical examination that meets the requirements of this section within the last three years. The examination shall consist of:

1. A medical and work history, with emphasis on: Past, present, and anticipated exposure to respirable crystalline silica, dust, and other agents affecting the respiratory system; any history of respiratory system dysfunction, including signs and symptoms of respiratory disease (e.g., shortness of breath, cough, wheezing); history of tuberculosis; and smoking status and history.

2. A physical examination with special emphasis on the respiratory system.

3. A chest X-ray (a single posteroanterior radiographic projection or radiograph of the chest at full inspiration recorded on either film (no less than 14 x 17 inches and no more than 16 x 17 inches) or digital radiography systems), interpreted and classified according to the International Labor Office (ILO) International Classification of Radiographs of Pneumoconiosis by a NIOSH-certified B Reader.

4. A pulmonary function test to include forced vital capacity (FVC) and forced expiratory volume in one second (FEV_1) and FEV_1/FVC ratio, administered by a spirometry technician with a current certificate from a NIOSH-approved spirometry course.

5. Testing for latent tuberculosis infection.

6. Any other tests deemed appropriate by the PLHCP.

C. **Periodic Examinations** - MEC shall make available medical examinations that include the procedures described within this section at least every three years, or more frequently if recommended by the PLHCP.

D. **Information provided to the PLHCP** – MEC employer shall ensure that the examining PLHCP has a copy of this standard, and shall provide the PLHCP with the following information:

1. A description of the employee's former, current and anticipated duties as they relate to the employee's occupational exposure to respirable crystalline silica.

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2. The employee's former, current and anticipated levels of occupational exposure to respirable crystalline silica.

3. A description of any personal protective equipment used or to be used by the employee, including when and for how long the employee has used or will use that equipment.

4. Information from records of employment-related medical examinations previously provided to the employee and currently within the control of MEC.

5. PLHCP's written medical report for the employee – MEC shall ensure that the PLHCP explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of each medical examination performed. The written report shall contain:

a) A statement indicating the results of the medical examination, including any medical condition(s) that would place the employee at increased risk of material impairment to health from exposure to respirable crystalline silica and any medical conditions that require further evaluation or treatment;

b) Any recommended limitations on the employee's use of respirators;

c) Any recommended limitations on the employee's exposure to respirable crystalline silica; and;

d) A statement that the employee should be examined by a specialist if the chest X-ray provided in accordance with this section is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.

6. PLHCP's written medical opinion for MEC.

a) MEC shall obtain a written medical opinion from the PLHCP within 30 days of the medical examination. The written opinion shall contain only the following:

(1) The date of the examination;

(2) A statement that the examination has met the requirements of this section; and

(3) Any recommended limitations on the employee's use of respirators.

b) If the employee provides written authorization, the written opinion shall also contain either or both of the following:

(1) Any recommended limitations on the employee's exposure to respirable crystalline silica;

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(2) A statement that the employee should be examined by a specialist if the chest X-ray provided in accordance with this section is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.

c) MEC shall ensure that each employee receives a copy of the written medical opinion within 30 days of each medical examination performed.

7. Additional examinations

a) If the PLHCP's written medical opinion indicates that an employee should be examined by a specialist, the employer shall make available a medical examination by a specialist within 30 days after receiving the PLHCP's written opinion.

b) MEC shall ensure that the examining specialist is provided with all of the information that the employer is obligated to provide to the PLHCP.

c) MEC shall ensure that the specialist explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of the examination.

d) MEC shall obtain a written opinion from the specialist within 30 days of the medical examination.

IX. Communication of Respirable Crystalline Silica Hazards to Employees

A. **Hazard Communication** – MEC shall include respirable crystalline silica in the program established to comply with the hazard communication standard (HCS) (29 CFR 1910.1200). MEC shall ensure that each employee has access to labels on containers of crystalline silica and safety data sheets, and is trained in accordance with the provisions of HCS. MEC shall ensure that at least the following hazards are addressed: Cancer, lung effects, immune system effects, and kidney effects

B. **Employee Information and Training**

1. MEC shall ensure that each employee covered by this section can demonstrate knowledge and understanding of at least the following:

a) Health hazards associated with exposure to respirable crystalline silica;

b) Specific tasks in the workplace that could result in exposure to respirable crystalline silica;

c) Specific measures the employer has implemented to protect employees from exposure to respirable crystalline silica, including engineering controls, work practices, and respirators to be used;

d) The contents of this section

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e) The identity of the competent person designated by MEC

f) The purpose and a description of the medical surveillance program required by paragraph (h) of this section.

2. MEC shall make a copy of this section readily available without cost to each employee covered by this section.

X. Recordkeeping

A. **Air monitoring data.**

1. MEC shall make and maintain an accurate record of all exposure measurements taken to assess employee exposure to respirable crystalline silica, as prescribed in paragraph (d)(2) of this section.

2. This record shall include at least the following information:

a) The date of measurement for each sample taken;

b) The task monitored;

c) Sampling and analytical methods used;

d) Number, duration, and results of samples taken;

e) Identity of the laboratory that performed the analysis;

f) Type of personal protective equipment, such as respirators, worn by the employees monitored; and

g) Name, social security number, and job classification of all employees represented by the monitoring, indicating which employees were actually monitored.

3. MEC shall ensure that exposure records are maintained and made available in accordance with 29 CFR 1910.1020.

B. **Objective Data**

1. MEC shall make and maintain an accurate record of all objective data relied upon to comply with the requirements of this section.

2. This record shall include at least the following information:

a) The crystalline silica-containing material in question;

b) The source of the objective data;

c) The testing protocol and results of testing;

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d) A description of the process, task, or activity on which the objective data were based; and

e) Other data relevant to the process, task, activity, material, or exposures on which the objective data were based.

3. MEC shall ensure that objective data are maintained and made available in accordance with 29 CFR 1910.1020.

C. **Medical surveillance**.

1. Modern Electric Co. shall make and maintain an accurate record for each employee covered by medical surveillance under paragraph (h) of this section.

2. The record shall include the following information about the employee:

a) Name and social security number;

b) A copy of the PLHCPs' and specialists' written medical opinions; and

c) A copy of the information provided to the PLHCPs and specialists.

3. **MEC shall ensure that medical records are maintained and made available in accordance with 29 CFR 1910.1020.**

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SECTION 38

DRIVING SAFE

MODERN ELECTRIC CO.
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I. Purpose

Modern Electric Co. recognizes that our employees are our most valuable asset and the most important contributors to our continued growth and success. Modern Electric Co. will do everything possible to prevent workplace accidents and is committed to providing a safe working environment for all employees.

Motor vehicle accidents are a leading cause of work-related fatalities. The environment in which these accidents occur involves numerous complex factors. The purpose of Modern Electric Co.'s Driver Safety Policy is to provide the means to reduce such factors to eliminate unnecessary injuries and fatal circumstances. We value our employees not only as employees but also as human beings who are crucial to the success of their families, the local community and Modern Electric Co.

This policy applies to all employees, whether they are driving a company vehicle or a rental vehicle for company.

II. Driver Eligibility

A. Drivers must possess a valid driver's license for the type of vehicle to be operated, and keep the license(s) with them at all times while driving.

B. Any employee who is to operate a Modern Electric Co. vehicle must furnish a copy of their license upon being hired and the first week of every new-year.

C. Employees must notify their supervisor within 24 hours of being convicted or if they have received any moving violations or points on their license.

III. General Requirements

A. Only authorized drivers will operate motor vehicles during scope and course of their work

B. All drivers operating motor vehicles will have a current driver's license with proper endorsements for the vehicle being operated.

C. All drivers will wear seat belts.

D. All drivers will obey state and federal laws applicable to the operation of motor vehicles.

E. No driver shall operate a motor vehicle while under the influence of alcohol, illegal drugs, prescription or over the counter medications which could impair the judgment or reaction time while operating a motor vehicle.

F. While operating a motor vehicle, authorized employees will report any traffic violations or motor vehicle accident to the proper authorities. If involved in the accident, he authorized employee will notify their supervisor as soon as possible, after the accident.

G. All vehicles operated shall meet the requirements for the job to be performed and/or conditions of the area where the work is to be performed. All vehicles shall be maintained in proper working condition. Any maintenance problems which will reduce the vehicles ability to function safely will be forwarded to a supervisor immediately.

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H. All materials carried in or on the vehicle shall be properly secured using the manufacturer's recommendations for proper load weight, size and securing locations.

I. Modern Electric Co. is not responsible for any traffic violations or parking tickets acquired by violation of city ordinance, state or federal laws regarding your driving habits and operation of your motor vehicle. Any ticket issued is the employee's responsibility, even if the ticket is issued while conducting business for Modern Electric Co.

IV. Insurance Requirements

Employees who use their personal vehicles for company business are required to carry adequate limits of liability, with a minimum of $100,000 for property damage and $300,000 for bodily injury. A copy of the declaration page of your personal automobile insurance policy must be provided to Modern Electric Co. annually at your renewal date.

V. Driving Hazards

A good driver is someone who recognizes real and potential hazards such as:

A. **Reckless driving** - speeding, weaving through traffic, ignoring signs, signals, tailgating and dangerous passing.

B. MEC employees will follow all traffic signs and speed limits.

C. **Distracted drivers** - using cell phones, are putting on make-up, shaving, eating, drinking, writing, reading and/or having conversations with passengers in their vehicle.

1. Cell phone use is strictly prohibited while operating a company motor vehicle.

D. **Fatigue Drivers** - drivers that have been driving long periods of time which can cause poor judgment and slower reaction times.

1. Plan long trips ahead of time and make sure there are scheduled rest breaks.

E. **Vehicles in poor operating conditions** – brakes not working effectively, lights that are out, bald tires, etc.

1. Inspect vehicles before each use and report any problems to MEC immediately.
2. Never use a vehicle in poor operating conditions.

F. **Other drivers** – drivers impaired by alcohol and drugs, including prescription or over the counter drugs cause about 1/3 of all traffic accidents and present a danger.

G. **Driving under the influence** - For-cause or customer required drug and alcohol testing may be mandatory for certain sites or if an employee is involved in an accident. Testing will be conducted by a licensed medical facility designated by Modern Electric Co. Any positive results will be grounds for termination. Driving under the influence of alcohol or any other illegal substances will be grounds for termination.

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VI. Dangerous Conditions

A. When encountering such conditions listed below, slow the vehicle down and be cautious.

1. Bad Weather
2. Rain
3. Snow/Sleet/Ice
4. Fog
5. Severe wind

B. Roads

1. Sharp curves
2. Railroad tracks
3. Hills
4. Narrow or overly wide roads
5. Uneven surfaces
    a) Roads in disrepair
    b) Roads under construction
6. Obstacles on the road
    a) Debris from storms and homeowner's yards
    b) Children's toys
    c) Construction equipment
    d) Items fallen from other vehicles

C. Lighting

1. No lighting at night
2. Glaring sunlight
    a) This can occur during sunrise or sunset
    b) Sun visors or sunglasses can help

D. Heavy Traffic

1. Close location of the other cars
2. Cars that are switching in and out of lanes
3. Cars trying to pass each other.

E. Oncoming Traffic

F. Accidents caused by other vehicles

1. Can create extremely dangerous conditions for drivers approaching or involved

G. Cargo that shifts or moves during transport can cause loads to unbalance the vehicle.

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VII. Be a Defensive Driver

A. Recognize potentially hazardous situations in advance

B. Allow time to safely maneuver past hazards.

C. The defensive driver assumes that others drivers may make mistakes and is on guard in the event errors are made.

D. Adjust speed, position and attention to be able to maneuver safely if a hazard develops.

E. The defensive driver searches ahead of what is immediately in front

1. Have advance warning of approaching hazards.
2. scan far enough ahead to be able to react safely to approaching situations.
3. Watch for cars passing, merging, changing lanes or putting on their brakes.

F. Scan frequently to the side and rear for passing and/or approaching vehicles.

G. Avoid sudden stops

H. Give the vehicles behind you a warning by tapping quickly on your brakes once or twice.

I. Use turn signals and brakes well in advance to give drivers

VIII. Get Rest and Avoid Fatigue

A. Avoid fatigue which results in a trance-like state known as “highway hypnosis”. Fatigue deadens a drivers senses and slows reactions.

B. Take plenty of breaks.

1. Every two (2) hours
2. Stop at a rest stop, gas station, restaurant, etc. and walk around, stretch or get something to eat and/or drink.
3. Adjust your vehicle’s environment. Open a window, change the radio station.
4. Avoid using Cruise Control

IX. Road Rage

A. Avoid road rage. This is a violent anger caused by the stress and frustration of driving, which seems to be more and more common these days.

B. In extreme cases, road rage has turned into fights, shootings or even intentional crashes. Some common signs of a driver with road rage include:

1. Aggressive driving such as weaving in and out of traffic
2. Braking on purpose
3. Intentionally slowing down to anger other drivers
4. Honking the horn aggressively

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C. Be a courteous driver by allowing other vehicles to merge

D. Maintain a safe distance from cars in front of you

E. Focus on the road instead of on other drivers

F. Avoid eye contact with drivers who are exhibiting signs of road rage.

X. Seat Belts Saves Lives and is the Law

One of the safest choices drivers and passengers can make is to buckle up. Many Americans understand the lifesaving value of the seat belt. The National use rate was at 89.6% in 2018.

According to the National Traffic Safety Administration, in 2017, the use of seat belts in passenger vehicles saved an estimated 14,955 lives of occupants 5 and older. An additional 2,549 lives could have been saved in 2017 if all unrestrained passenger vehicle occupants 5 and older involved in fatal crashes had worn their seat belts.

A. A properly worn seat belt will prevent you from hitting the dashboard, steering wheel and windshield if you are involved in an accident.

B. Buckling up helps keep you safe and secure inside your vehicle, whereas not buckling up can result in being totally ejected from the vehicle in a crash, which is almost always deadly.

C. Air bags are not enough to protect you; in fact, the force of an air bag can seriously injure or even kill you if you're not buckled up.

D. Improperly wearing a seat belt, such as putting the strap below your arm, puts you and your children at risk in a crash.

E. You are 25 times more likely to be killed when thrown from a vehicle during an accident.

F. The seatbelt is designed to use your body's strong bones to absorb the shock, rather than damaging delicate internal organs.

G. Wearing a seat belt increases your chance of remaining conscious after a crash

H. A seat belt also keeps you in control of the vehicle if you are forced to swerve or brake suddenly. Instead of being tossed out of the seat and no longer in control of the vehicle, you are in place and in control in case more action is necessary.

XI. Cell Phone Usage

A. Cell phone to talk, text, e-mail, surf the internet, check social media or other uses is prohibited.

B. If a cell phone must be used while driving, hands-free operation is required and must not require two ear buds for operation; one ear must remain free to hear for possible road hazards.

C. The only exception to the cell phone usage is calls placed to 911. If placing or accepting an emergency call, it should be kept short, with hands-free option, if available. The vehicle should also be pulled over, if possible.

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XII. GPS Systems

Modern Electric Co. understands that sometimes, especially when traveling in unfamiliar areas, drivers require assistance with directions. GPS systems are extremely helpful devices, but they can also be distracting if used improperly. Employees must adhere to the following:

A. Mounted GPS systems may not block or obstruct the driver's view in any way.

B. GPS systems must be voice-narrated and must not require that the driver look away from the road to follow instructions.

C. Employees may not program the system while in motion.

D. Programming or otherwise engaging with the GPS screen may only occur while stopped or while pulled off the road.

XIII. Pre-Drive Inspection

The following should be done prior to driving:

A. Test your horn to make sure it works correctly.

B. Check all lights to ensure all are operating properly.

C. Vision is a vital part of safe driving. Make sure all windows, mirrors and lights are clean.

D. Check your brakes by stopping quickly while going only a few miles per hour; the vehicle should respond by stopping right away.

E. Make sure that when the steering wheel turns the tires turn.

F. Inspect your tire thread for signs of damage and be sure tires have adequate pressure.

1. If the vehicle is not equipped with a tire pressure sensor, keep a tire gauge in the vehicle to check the tire pressure on a regular basis.

G. Check for any leaks under the vehicle

XIV. Vehicle Owner's Manual

Follow the maintenance procedures and time lines described in your vehicle owner's manual.

A. Check spark plugs

B. Check wires

C. Inspect and if necessary, change belts and hoses.

D. Oil changes should be performed typically at the 3,000 mile mark.

E. Antifreeze or coolant levels must be maintained and checked during winter and summer.

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F. Have brakes inspected and inspected per the owner's manual requirements.

G. Make sure the battery is in good condition and maintains a good charge.

H. Tires should be changed per the tire manufacturer's recommendations

XV. Conduct Start-Up/Back-Up Check

A. Before start up or back, check the following:

1. Walk around vehicle and look underneath
2. Check mirrors for proper adjustment and blind areas on right and in front

B. Do not allow time for another hazard to approach

1. Start up slowly
2. Allow other vehicles and pedestrians to move away safely.

C. Tap horn in congested areas or recruit a signal person.

XVI. Right of Way

Generally, the driver who arrives last gives the right-of-way

A. You give the right-of-way when:

1. Entering traffic
2. Turning left in front of approaching traffic
3. Changing lanes.

B. Don't force other drivers to brake or steer because of your obstructive maneuver.

C. Assume other drivers will not see you and avoid you when you maneuver into their path.

D. Move into your intended path or direction only after you are assured you have been given the right of way and will not conflict with other traffic.

XVII. Using and Changing Lanes

A. Maintain a safe following distance.

B. Stay in your lane

C. Scan ahead of what is immediately in front of you and if you cannot see passed the vehicle in front of you, you are too close.

D. If you see trouble ahead, flash your brake lights to alert the driver behind you.

E. Scan to the right thoroughly before steering into the next lane.

F. Give right of way, do not take it.

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XVIII. Crossing Railroad Tracks

A. Stop and look both ways before crossing railroad tracks.

B. Do not shift gears while crossing railroad tracks

C. Never stop on railroad tracks.

XIX. Passing

A. Safe passing maneuvers require well developed skills and judgment.

B. Passing tasks include:

1. Checking sight
2. Distance Ahead
3. Checking mirror for rear traffic
4. Checking for traffic passing you
5. Estimating speed and position of approaching vehicles
6. Estimating time you need to safely pass

    a) Accelerating
    b) Steering
    c) Checking for traffic entering from side roads.

C. Before you pass, check to be certain no one is passing you.

D. Signal your intentions to pass.

E. Assume the driver in front of you does not know you are passing.

F. Watch carefully for vehicles that may be entering the roadway

G. Assume vehicles approaching from the opposite direction will not see you or slow down

H. Watch for vehicles passing other vehicles from the opposite direction.

I. If the vehicle you are trying to pass speeds up, let it go.

J. Don't get into a dangerous race

K. Don't take risks

L. If in doubt, don't pass

XX. Pedestrians

A. Most pedestrian accidents occur when the pedestrian walks into the path of an approaching vehicle.

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B. Pedestrians often misjudge the speed and closeness of a vehicle and assume you can and will slow down for them

C. They think that because they can see you, you can see them.

D. Anticipate pedestrians making such errors and be prepared to compensate.

E. When maneuvering close to pedestrians, anticipate the unexpected.

F. It is difficult for pedestrians to judge how fast you are approaching.

G. Pedestrians will often assume that you see them and that you will slow down for them to complete their crossing.

H. At night especially, pedestrians assume you can see them because they can see your headlights.

I. Don't assume they will give you the right-of-way

J. Improper trailer tracking in turns may trailers to run onto the sidewalk. Turn wide enough to avoid this and go very slowly.

K. Pedestrians all too often walk or stand in the blind spots in front and to the right of your vehicle.

L. Scan around vehicle thoroughly when pedestrians are present

XXI. Ice, Slush and Gravel

A. Increase distance enough to avoid a rear end collision if other driver brakes hard.

B. Use moderation in judging safe speed. To maintain a safe stopping distance, slow down, but not so much that you become a hazard to drivers behind you.

C. Apply brakes gently and steer without jerky movements.

D. Beware lightly loaded wheel lock up easily during braking; this induces jack-knifing.

E. Beware of traveling to slowly on slick, banked curves. The vehicle might slide sideways into opposing traffic or off the road.

XXII. Fog, Darkness, Rain and Snow

A. Reduced visibility conditions include twilight, darkness, rain, snow, and fog.

B. Use moderation in judging safe speed.

C. To maintain a safe stopping distance during reduced visibility, slow down, but not so much that you become a hazard to drivers behind you.

D. When encountering any fog, slow down.

1. There may be a stalled or slow vehicle hidden in the fog

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2. Turn on your headlamps (low beam) or fog lamps to increase your visibility and your chances of being seen by other motorists.

3. Use emergency flashers in extreme conditions.

E. Keep vehicle clean, especially headlights, windshield, and taillights.

F. Be prepared to get off road and wait for conditions to improve if necessary.

XXIII. Emergency Supplies

Make sure you always are prepared and have the following items in your vehicle:

A. Spare tire and tire jack

B. Flares or other emergency signal devices

C. Flashlight

D. First aid and tool kit

E. Jumper cables

F. Fire extinguisher

G. Spare fuses

H. Anti-freeze/coolant

XXIV. Emergency Stopping

A. If you stall while driving, turn on emergency flashers immediately and try to coast to the shoulder if safe to do so.

B. If you stall and stop on the roadway, turn on emergency flashers immediately and set up reflective triangles.

C. Controlling and extinguishing fires safely requires special knowledge, be sure you know how to handle a fire emergency and how to use a fire extinguisher. If not, do not handle it. Get away and call for help.

D. Replace the fuses or bulbs if you have the tools and knowledge to safely perform the task. If not, call for help.

E. If you have a cell phone, call for help.

XXV. Emergency Signals

A. When you stop your vehicle on a highway or shoulder, the vehicle's flashers must be on.

B. Flashers must remain on until other warning devices are activated, as well as when warning devices are being picked up.

C. A second warning device must be placed facing approaching traffic (behind your vehicle) about 100 feet away in the center of the lane/shoulder where the vehicle is stopped.

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D. A third warning device must be placed facing away traffic (front of vehicle) about 100 feet away where the vehicle is stopped.

E. Never attach any flame producing emergency signal, such as a flare, to any part of the vehicle.

XXVI. Respond Safely to a Vehicle Crash

A. Remain calm

B. Move the cars off to the side of the road and have all vehicles turn off their ignition.

C. Check on all drivers and passengers.

D. Call police to report crash and medical services, if necessary.

E. Collect information from involved drivers and passengers.

1. Names
2. Insurance information
3. Make, model and color of vehicle
4. Driver's license numbers

F. Draw a picture of accident scene or take pictures.

G. Do not blame or discuss fault.

H. Ask the police officer for their name so you can later request a copy of the police report.

XXVII. Key Points

You are your employer's most valuable asset! The way that you drive says everything about you and your company. Make a positive statement by following these work-related safe driving practices.

A. Be well rested before driving.

B. Stay focused and alert so your aware of driving hazards and dangerous conditions.

C. Avoid distractions

1. Adjusting radio and other controls
2. Eating or drinking
3. Talking on the phone
4. Texting

D. Avoid taking medication that makes you drowsy.

E. If you are impaired by alcohol or any drug, do not drive.

F. Wear your seatbelt at all times, driver and passenger(s).

G. Know how to respond to emergencies.

H. Stay safe and avoid aggressive driving Follow safe driving practice in all driving conditions.

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Employee Acknowledgement

Motor vehicle accidents are a leading cause of work-related fatalities. The environment in which these accidents occur involves numerous complex factors. The purpose of Modern Electric Company's Driver Safety Policy is to provide the means to reduce such factors to eliminate unnecessary injuries and fatal circumstances. We value our employees not only as employees but also as human beings who are crucial to the success of their families, the local community and Modern Electric Co.

Modern Electric Co. encourages its employees to take a proactive approach in identifying potential hazards by promptly reporting them to their supervisor.

A motor vehicle report (MVR) will be requested minimally once per year. Management reserves the right to use its discretion in determining an unsatisfactory MVR. As a guideline, (2) violations in the past three years will be grounds for an unsatisfactory MVR and may be cause for termination and/or disciplinary actions.

Modern Electric Co. conducts mandatory random drug and alcohol testing. Driving under the influence of alcohol or other illegal substances is grounds for termination.

Drivers will be supplied with an accident claim kit, a pen and a disposable camera or cell phone camera. Drivers are required to document details of the accident: traffic flow, speed limits, stop lights/signs, weather conditions, citations issued, etc. Pictures should be taken to document the extent of damage to all vehicles involved. REPORT ACCIDENTS IMMEDIATELY TO YOUR DISPATCHER OR SUPERVISOR.

If you are not allowed to use a company vehicle, you are prohibited to use your personal vehicle for business, unless approved by upper management.

Company Vehicles are prohibited to be used for personal use.

I have read and understand Modern Electric Co.'s Driver Safety Policy, its requirements and expectations of me as an employee.

_____
Employee Name (please print)

_____ _____
Employee Signature Date

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SECTION 39

RADIATION SAFETY PROGRAM

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I. General Requirements

A. Modern Electric Co.'s radiation safety program along with 29CFR 1910.1096 and 10CFR 20.1101 include provisions for project sites to keep radiation doses to workers "as low as reasonably achievable" (ALARA)

B. To satisfy this requirement MEC requires that all project sites participate in the ALARA program

C. All workers will be advised of ALARA program and it is the project sites responsibility to help keep dose equivalents ALARA

D. Once a year, the site will review the summaries of the types and amounts of by-product material used, occupation doses, changes in radiation safety procedures, safety measures and continuing education and training of all personnel who work with or near the by- product material.

E. The project proponent will conduct all of these tasks in order to ensure that MEC personnel are assured with reasonable level of safety and collective occupational doses ALARA.

F. If the reviews of performance indicate that the goals of ALARA are not met, the project proponent will take steps to reach those goals.

II. Radiation

A. **Radiation** – includes alpha rays, beta rays, gamma rays, X-rays, neutrons, high-speed electrons, high-speed protons and other atomic particles; but such term does not include sound or radio waves, visible light, infrared or ultraviolet light.

B. **Radioactive Material** – any material that emits, by spontaneous nuclear disintegration, corpuscular or electromagnetic emanations.

C. **Restricted Area** – any area access to which is controlled by the employer for purposes of protection of individuals from exposure to radiation or radioactive material.

D. **Unrestricted Area** – any area access to which is not controlled by the employer for purposes of protection of individuals from exposure to radiation or radioactive materials.

E. **Dose** – quantity of ionizing radiation absorbed, per unit of mass, by the body or by any portion of the body. When the provisions in this section specify a dose during a period of time, the dose is the total quantity of radiation absorbed, per unit of mass, by the body or by any portion of the body during such period of time.

F. **Rad** – a measure of the dose of any ionizing radiation to body tissues in terms of the energy absorbed per unit of mass of the tissue. One rad is the dose corresponding to the absorption of 100 ergs per gram of tissue (1 millirad (mrad) = 0.001 rad).

G. **Rem** – a measure of the dose of any ionizing radiation to body tissue in terms of its estimated biological effect relative to a dose of 1 roentgen (r) of X-rays (1 millirem (mrem) = 0.001 rem). The relation of the rem to other dose units depends upon the biological effect under consideration and upon the conditions for irradiation.

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Each of the following is considered to be equivalent to a dose of one (1) Rem:

1. A dose of 1 roentgen due to X- or gamma radiation;

2. A dose of 1 rad due to X-, gamma, or beta radiation;

3. A dose of 0.1 rad due to neutrons or high energy protons;

4. A dose of 0.05 rad due to particles heavier that protons and with sufficient energy to reach the lens of the eye;

5. If it is more convenient to measure the neutron flux or equivalent, than to determine the neutron dose in rads, as provided in above paragraph (3)(G)(3), 1 rem of neutron radiation ay, for purposes of the provisions in this section be assumed to be equivalent to 14 million neutrons per square centimeter incident upon the body; or, if there is sufficient information to estimate with reasonable accuracy the approximate distribution in energy of the neutrons, the incident number of neutrons per square centimeter equivalent to 1 rem may be estimated from the table below:

Neutron Flux Dose Equivalents

Neutron energy (million electron volts (Mev)	No. of neutrons per square centimeter equivalent to a dose of 1 rem (neutrons/cm^2)	Average flux to deliver 100 millirem in 40 hrs (neutrons/cm^2 per sec.)
Thermal	970 x 10^6	670
0.0001	720 x 10^6	500
0.005	820 x 10^6	570
0.02	400 x 10^6	280
0.1	120 x 10^6	80
0.5	43 x 10^6	30
1.0	26 x 10^6	18
2.5	29 x 10^6	20
5.0	26 x 10^6	18
7.5	24 x 10^6	17
10	24 x 10^6	17
10 – 30	14 x 10^6	10

H. For determining exposures to X- or gamma rays up to 3 Mev, the dose limits specified in this section may be assumed to be equivalent to the “air dose”. For the purpose of this section, air dose means that the dose is measured by a properly calibrated appropriate instrument in air at or near the body surface in the region of the highest dosage rate.

III. Signs and Labels

A. All areas where work is conducted using radioactive materials or radiation shall be properly labeled using appropriate signs and symbols.

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B. The symbol used shall be the conventional radiation caution colors (magenta or purple on yellow background and of the conventional three bladed design.



C. All radiation signs shall be posted in a conspicuous location and be visible to all workers and visitors.

D. The sign shall bear the standard radiation symbol with the word “Caution” and proper phrasing for the type or level of radiation in the area (e.g. Radiation Area, High Radiation Area, Airborne Radioactivity Area, Radioactive Materials, etc.)



IV. Exposure

A. Ionizing Radiation

1. Restricted Areas

a) *Modern Electric Co., shall not possess, use or transfer sources of ionizing radiation in such a manner as to cause any employee or individual in a restricted area to receive in any period of one calendar quarter (3 month period) a dose of radiation in excess of those listed below.*

	Rems per Calendar Quarter
Whole body: Head and Trunk; active blood-forming organs; lens of eyes; or gonads	1 ¼
Hands and forearms; feet and ankles	18 ¾
Skin of whole body	7 ½

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V. Air and Personnel Monitoring

A. Personnel Monitoring

1. Occupational exposure to radiation must be monitored by external devices and or bioassay when an adult is likely to receive, in one year from sources external to the body, a dose in excess of 10 percent of the limits given in the permissible exposure to radiation.

2. Minors and declared pregnant women likely to receive, in one (1) year from sources external to the body, an dose in excess of 10% of any of the applicable limits. These limits must be a summation of external and internal doses.

3. Modern Electric Co. will follow the occupational dose limits requiring personnel monitoring as outlined in the federal guidelines. When volatile materials are used for research purposes the RSO will also ask that personal monitoring be conducted.

4. The use of individual monitoring devices for external dose is required for:

a) Adults who are likely to receive an annual dose in excess of any of the following: (each evaluated separately)

(1) 0.5 rems (0.005Sv) deep-dose equivalent.
(2) 1.5 rems (0.015 Sv) eye dose equivalent.
(3) 5 rems (0.05 Sv) shallow-dose equivalent to the skin.
(4) 5 rems (0.05 Sv) shallow-dose equivalent to any extremity.

b) Minors who are likely to receive an annual dose in excess of any of the following: (each evaluated separately)

(1) 0.05 rem (0.5mSv) deep-dose equivalent.
(2) 0.15 rem (1.5 mSv) eye-dose equivalent.
(3) 0.5 rem (0.005 Sv) shallow-dose equivalent to the skin,
(4) 0.5 rem (0.005 Sv) shallow-dose equivalent to any extremity.

c) Declared pregnant women who are likely to receive an annual dose from occupational exposure in excess of 0.05 rem (0.5 mSv) deep-dose equivalent, although the dose limit applies to the entire gestation period.

d) Individuals entering a high or a very high radiation area. Internal exposure monitoring (not necessarily individual monitoring devices) is required. There are no such designated areas at Modern Electric Co.

e) Adults likely to receive in one year an intake in excess of 10% of the applicable ALI's for ingestion and inhalation.

f) For minors and declared pregnant women likely to receive in one year a committed effective dose equivalent in excess of 0.05 rem (0.5 mSv).

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B. **Monitoring of External Exposures**

1. The personnel monitoring devices level depending on the area working and exposure level this will be determined by the RSO and Project Proponent.

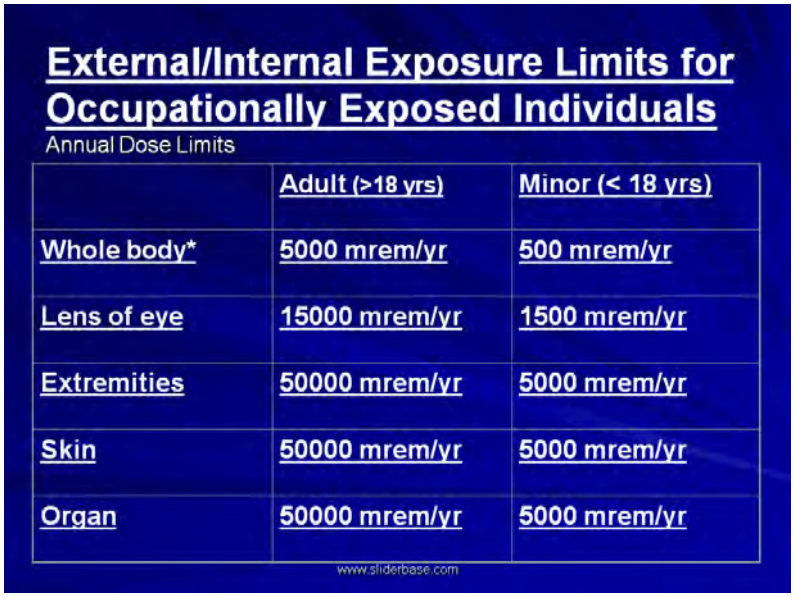
2. All Necessary monitoring devices and medical surveillance will be provided by the project site and/or project proponent. MDH forms and NRC Forms 4 and 5 will be kept and filed, if this monitoring demonstrates that personnel were exposed to detectable levels of radiation. These forms are required only if recommended doses be exceeded by calculation or by demonstration through monitoring.

C. **Placement of Personnel Monitoring Devices**

1. If individual dosimeters are used, the monitoring device should be placed near the location expected to receive the highest dose during the year. For example, the badge should usually be worn on the lapel of the shirt. The finger-badge dosimeters should be worn on the index finger of the hand most likely to contact the radioactive material (Example: right hand index finger of right handed person) under the disposable glove which must be worn whenever working with radioactive materials.

2. Individual personal dosimeters should be removed and stored in a dark area away from extremes of sunlight, temperature or humidity at the end of the workday. Personal dosimeters should not be worn home or worn at any time outside of the work area. If inadvertent wearing of dosimeters outside of the work area occurs, notify the RSO summarizing any activities conducted during that time which might cause erroneous dosimeter results for that month. If work no longer requires a personnel-monitoring device, notify the RSO immediately so that ordering of dosimeters can be discontinued.

D. **Occupational Exposure Limits**



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VI. Preventing Personnel & Facility Contamination

MEC management, the RSO, RSC and all contractors must participate in the "**As Low as Reasonably Achievable" (**ALARA) program. The initial training, refresher courses and individual training will be provided by the proponent and/or project site, which will also give the guidelines and workers' responsibilities for maintaining ALARA. In addition, the following guidelines are some of which will be used at MEC to keep exposure levels ALARA:

A. Work areas must be labeled with the "Caution Radioactive Materials" sign or marked with the radioactive warning label.

B. Minimizing time spent in areas where radiation exposure may occur.

1. Example: Plan emergency response missions efficiently so that first responders enter and leave areas where they may be exposed or become contaminated as few times as possible, and so that they spend as little time as possible in those areas.

C. Maximizing distance between a worker and a source of radiation exposure.

1. Example: Focus response operations in areas farther from the source of radiation. This is particularly important in situations involving nuclear detonations where dangerous fallout and heavy damage may limit the number of survivable victims in areas closest to the blast zone. In general, radiation intensity decreases rapidly with distance; intensity is inversely proportional to the square of the distance from the source.

D. Using proper hazard controls, including shielding workers from a radiation source and contamination. Shielding may include the use of personal protective equipment (PPE).

1. Example: Shield your body from radiation by staying on the opposite side of a cinder block wall from a radiation source.

VII. Emergency Signals

A. All personnel working in areas where radioactive materials are used or stored shall be familiar with the emergency signals in use by the facility to order an evacuation.

B. All personnel shall be trained on proper emergency procedures for evacuation and isolation of the incident to assist in prevention of contamination to personnel and the environment.

VIII. Training

MEC will ensure that all employees and personnel working in or visiting an area with a radioactive hazard have received proper training as prescribed by the Nuclear Regulatory Commission (NRC), as well as any applicable OSHA or governing agency requirements.

IX. Recordkeeping

MEC will maintain records of the radiation exposure of all employees for whom personnel monitoring is required under the OSHA Recordkeeping requirements (29 CFR 1904), as well as the agency's substance/hazard-specific standards, HAZWOPER standard (29 CFR 1910.120) and other. MEC will advise each of his or her employees of their individual exposure at least annually.

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SECTION 40
PANDEMIC PREPAREDNESS PROGRAM

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I. What is a Pandemic

A pandemic is a global disease outbreak. An influenza pandemic occurs when a new influenza virus emerges for which there is little or no immunity in the human population; begins to cause serious illness; and then spreads easily person-to-person worldwide. A worldwide influenza pandemic could have a major effect on the global economy, including travel, trade, tourism, food, consumption and eventually, investment and financial markets. Planning for pandemic influenza by business and industry is essential to minimize a pandemic's impact.

It is difficult to predict when the next influenza pandemic will occur or how severe it will be. Wherever and whenever a pandemic starts, everyone around the world is at risk. Countries might, through measures such as border closures and travel restrictions, delay arrival of the virus, but cannot stop it. During a pandemic, transmission can be anticipated in the workplace among co-workers in general work settings. A pandemic would cause high levels of illness, death, social disruption, and economic loss. Everyday life would be disrupted because so many people in so many places become seriously ill at the same time.

Education and outreach are critical to preparing for a pandemic. Understanding what a pandemic is, what needs to be done at all levels to prepare for pandemic influenza, and what could happen during a pandemic helps us make informed decisions both as individuals and as a nation.

II. The Difference between Seasonal, Pandemic and Avian Influenza

A. **Seasonal influenza** - the periodic outbreaks of respiratory illness in the fall and winter in the United States. Outbreaks are typically limited; most people have some immunity to the circulating strain of the virus. A vaccine is prepared in advance of the seasonal influenza; it is designed to match the influenza viruses most likely to be circulating in the community.

B. **Pandemic influenza** - a worldwide outbreak of influenza among people when a new strain of the virus emerges that has the ability to infect humans and to spread from person to person. During the early phases of an influenza pandemic, people might not have any natural immunity to the new strain, so the disease would spread rapidly among the population. A vaccine to protect people against illness from a pandemic influenza virus may not be widely available until many months after an influenza pandemic begins. Pandemics can vary in severity from something that seems simply like a bad flu season to an especially severe influenza pandemic that could lead to high levels of illness, death, social disruption and economic loss. It is impossible to predict when the next pandemic will occur or whether it will be mild or severe.

C. **Avian influenza (AI)** - also known as the bird flu, is caused by a virus that infects wild birds and domestic poultry. Some forms of the Avian Influenza are worse than others. Avian influenza viruses are generally divided into two groups, low pathogenic and highly pathogenic. Low pathogenic Avian Influenza naturally occurs in wild birds and can spread to domestic birds. In most cases, it causes no signs of infection or minor symptoms in birds. In general, these low path strains of the virus pose little threat to human health. Low pathogenic Avian Influenza virus H5 and H7 strains have the potential to mutate into highly pathogenic Avian Influenza and are therefore, closely monitored. Highly pathogenic Avian Influenza spreads rapidly and has a high death rate in birds.

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Highly pathogenic H5N1 is one of the few avian influenza viruses to have crossed the species barrier to infect humans and it is the most deadly of those that have crossed the barrier. Most cases of H5N1 influenza infection in humans have resulted from contact with infected poultry or surfaces contaminated with secretions/excretions from infected birds.

Because all influenza viruses have the ability to change, scientists are concerned that H5N1 virus one day could be able to sustain human to human transmission. Because these viruses do not commonly infect humans, there is little or no immune protection against them in the human population. If H5N1 virus were to gain the capacity to sustain transmission from person to person, a pandemic could begin.

III. How a Severe Pandemic Influenza Could Affect Workplaces

Unlike natural disasters or terrorist events, an influenza pandemic will be widespread, affecting multiple areas of the United States and other countries at the same time. A pandemic will also be an extended event, with multiple waves of outbreaks in the same geographic area; each outbreak could last from 6 to 8 weeks. Waves of outbreaks may occur over a year or more. Your workplace will likely experience:

A. **Absenteeism** - A pandemic could affect as many as 40 percent of the workforce during periods of peak influenza illness. Employees could be absent because they are sick, must care for sick family members or for children if schools or day care centers are closed, are afraid to come to work, or the employer might not be notified that the employee has died.

B. **Change in patterns of commerce** - During a pandemic, consumer demand for items related to infection control is likely to increase dramatically, while consumer interest in other goods may decline. Consumers may also change the ways in which they shop as a result of the pandemic. Consumers may try to shop at off-peak hours to reduce contact with other people, show increased interest in home delivery services, or prefer other options, such as drive-through service, to reduce person-to-person contact.

C. **Interrupted supply/delivery** - Shipments of items from those geographic areas severely affected by the pandemic may be delayed or cancelled.

IV. How Influenza Can Spread Between People

Influenza is thought to be primarily spread through large droplets (droplet transmission) that directly contact the nose, mouth or eyes. These droplets are produced when infected people cough, sneeze or talk, sending the relatively large infectious droplets and very small sprays (aerosols) into the nearby air and into contact with other people. Large droplets can only travel a limited range; therefore, people should limit close contact (within 6 feet) with others when possible. To a lesser degree, human influenza is spread by touching objects contaminated with influenza viruses and then transferring the infected material from the hands to the nose, mouth or eyes. Influenza may also be spread by very small infectious particles (aerosols) traveling in the air. The contribution of each route of exposure to influenza transmission is uncertain at this time and may vary based upon the characteristics of the influenza strain.

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V. Respiratory Protection

Although influenza viruses are thought to be transmitted primarily by droplets through the air and contact with contaminated surfaces, it is possible that transmission could also occur by small particulates. Because of this, during a pandemic use a NIOSH-certified respirator for work involving close contact with people who are or may be ill with the pandemic virus. N95 respirators provide the minimum level of protection needed. A surgical mask is not a respirator.

Who needs to wear a Respirator?

A. **Very High Exposure Risk** - Workers with high potential exposure to known or suspected sources of pandemic virus during specific medical or laboratory procedures – for example, cough induction procedures, bronchoscopy, some dental procedures, invasive specimen collection, or manipulating lab cultures. These workers may need supplied-air or powered air-purifying respirators.

B. **High Exposure Risk** - Workers with a high potential for exposure to known or suspected pandemic sources - for example, doctors, nurses, and other hospital staff who enter patients' rooms; and emergency responders transporting sick patients.

C. **Other Workers** – Workers, whose work may not normally put them at Very High or High Exposure Risk but who, during a pandemic are performing high-risk tasks such as isolating and quarantining people who are ill. Respiratory Protection Program Respirators must be used in the context of a comprehensive respiratory protection program, (see OSHA standard 29 CFR 1910.134 or www.osha.gov) which includes: • Medical evaluation • Training • Fit testing • Written program

VI. Steps To Reduce the Risk of Exposure to Pandemic Influenza in the Workplace

The best strategy to reduce the risk of becoming infected with influenza during a pandemic is to avoid crowded settings and other situations that increase the risk of exposure to someone who may be infected. If it is absolutely necessary to be in a crowded setting, the time spent in a crowd should be as short as possible. Some basic hygiene and social distancing could include the following:

A. Get vaccinated! Vaccination is the most important way to prevent the spread of the flu.

B. Stay at home if you are sick. The CDC recommends that workers who have a fever and respiratory symptoms stay at home until 24 hours after their fever ends (100 degrees Fahrenheit [37.8 degrees Celsius] or lower), without the use of medication. Not everyone who has the flu will have a fever. Other symptoms could include a runny nose, body aches, headache, tiredness, diarrhea, or vomiting

C. Avoid touching your nose, mouth, and eyes.

D. Wash your hands frequently with soap and water for at least 20 seconds; use an alcohol-based hand rub if soap and water are not available.

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E. Clean your hands after coughing, sneezing, or blowing your nose.

1. When using soap and water, rub soapy hands together for at least 20 seconds, rinse hands with water, and dry completely.

2. If soap and water are not available, use an alcohol-based hand rub as a helpful interim measure until hand washing is possible.

F. Covering your coughs and sneezes with a tissue, or cough and sneeze into your upper sleeves if tissues are not available. Wash your or hands or use a hand sanitizer after they cough, sneeze or blow their noses.

G. Avoid close contact with coworkers. Avoid shaking hands and always wash your hands after contact with others. Even if employees wear gloves, wash your hands upon removal of the gloves in case your hand(s) become contaminated during the removal process.

H. Keeping frequently touched common surfaces clean (e.g. desks, phones, computers, office equipment, doorknobs, faucets, handrails, etc. Be sure that any cleaner used is safe and will not harm your coworkers or your office equipment.

I. Refrain from using coworker's phones, desks, offices or other work tools and equipment. If you must use anything of your coworkers, disinfect it afterwards.

J. Reducing or eliminating unnecessary social interactions can be very effective in controlling the spread of infectious diseases. Minimize meetings or gatherings. Use of e-mail, phones and text messages to communicate with each other are recommended. When meetings are necessary, avoid close contact by keeping a separation of at least six (6) feet, where possible and assure that there is proper ventilation in the meeting room.

K. Stay healthy! Maintain a healthy lifestyle; attention to rest, diet, exercise and relaxation. A person's overall health impacts their body's immune system and can affect their ability to fight off, or recover from, an infectious disease

VII. Workers Right

A. Working conditions that do not pose a risk of serious harm

B. Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply.

C. Review records of work-related injuries and illnesses.

D. File a complaint asking OSHA to inspect the workplace if you believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.

E. Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

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SECTION 41

PANDEMIC RESPONSE PLAN

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I. Purpose

Modern Electric Co. adopts this plan for employees to train on how to respond to a threat of influenza or other pandemic that causes serious widespread illness. The safety director will act as coordinator the pandemic response plan.

II. Requirements

A. Create a culture of infection control in the workplace that is reinforced during the influenza season.

B. Establish contingency plans to maintain delivery of services during times of significant and sustained worker absenteeism.

C. Where possible, establish mechanisms to allow employees to provide services from home.

D. Establish relationships with other industry members to provide mutual assistance of services during a pandemic.

III. Specific Requirements

The Modern Electric Co. Safety Director will assign a management level team and other appropriate staff to assist the Safety Director. This team will be known as the Pandemic Response Team. A back up employee will be chosen for each position to assume their duties in case of illness. Each response team member and backup will be kept current on all emergency procedures and this list will be kept with this plan and updated as needed.

A. **Duties of Safety Director:**

1. Monitor issues and information related to pandemics to keep the plan up to date.

2. Recommend any changes to the plan as circumstances warrant.

3. Conduct employee training.

4. Attend external training seminars.

5. Implement the plan, should it become necessary.

B. **Duties of the Pandemic Response Plan Team:**

1. Identify and communicate to the Safety Director which employees, vendors, suppliers and systems are essential to maintaining operations at their locations.

2. Communicate with public health agencies, emergency responders and others regarding the plan and their capabilities should an outbreak occur.

3. Identify and communicate to the coordinator the names of possible ancillary employees who could perform certain job duties in the case of a pandemic (e.g. consultants, temporary workers, retired workers).

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4. Develop and communicate to the Safety Director and emergency communication plan for their locations, including identification of key personnel, vendors and clients.

IV. Training

Employees will be trained to:

A. Proper hand washing and use of sanitizers.

B. Trained on pertinent health issues related to the specific disease.

C. Disease containment plans.

D. Receive proper immunization shots.

E. Know chain of command, communications and contact numbers.

F. Keep the work area clean.

G. Understanding of Safety Data Sheets (SDS's).

V. Hand Washing Facilities

Hand washing and use of hand sanitizers is encouraged by Modern Electric Co. management. Hand washing facilities, hand sanitizers, tissues no touch trash cans, hand soap, and disposable towels will be provided by Modern Electric Co. for the use of all employees.

VI. Social Distancing Office Design

The office space design is configured so that there is minimum contact between employees. All Modern Electric Co. employees are assigned personal offices or cubicles. This decreases the possibility of contact by limiting large or close contact by office employees.

VII. Office Cleaning

Modern Electric Co. employs an outside cleaning company that provides cleaning services to its office space. The cleaning services are provided on a schedule of two days a week with the contractor using environmental friendly cleaning products. As part of the service provided all surfaces including desktops, key boards, kitchen area, rest rooms, faucets, door knobs and handrails are cleaned and disinfected.

VIII. Social Distancing Field Forces

Modern Electric Co. will make every attempt to protect field forces working in the field. Because field locations are under client control and multi-employer work sites. Modern Electric Co. employees will be given guidance regarding the hazards related to pandemics.

IX. Oversight

The Modern Electric Co. Safety Director will have complete oversight of the Pandemic Response Plan and can delegate his authority to a management employee on the team.

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X. Implementing, Testing and Revision of the Plan

Writing the plan may seem difficult, but ensuring the plan works can only be achieved by testing the plan. There are numerous ways available to accomplish this without having to wait for an actual emergency.

The Modern Electric Co. Safety Director will coordinate with the Pandemic Response Team to conduct a drill annually, asses the hazard to which the workers may be exposed to and report the findings. The risked of exposure will be evaluated and lessons will be implemented to ensure workers use controls to prevent exposure. Control measures may include a combination of engineering, administrative, safe work practices and PPE. When dealing with a pandemic circumstance

Following these measures during upcoming flu seasons will enhance the ability to respond to a pandemic outbreak.

- Practice good hygiene
- Avoid close contact
- Stay home when ill
- Avoid touching eyes, nose or mouth

XI. Testing the Plan

Testing the plan can also be accomplished by conducting exercises. Exercises range from low stress to full scale, hands on drills. A tabletop exercise is the easiest way to begin testing the plan. This type of exercise involves having discussions regarding a scenario that challenges the plan and the decision makers during an emergency. Functional exercises take on an additional level of complexity, in that they actually require participants to conduct functional components of the plan. This usually involves planning specific scenarios, creating pretend data and present issues that target an area within the plan to be tested. **At the conclusion of testing the plan, there will be a critique of the exercises to allow modifications should deficiencies be found.**

XII. Definitions of Flu Terms

A. **Seasonal (common) flu** - a respiratory illness that can be transmitted person to person. Most people have some immunity, and a vaccine is available.

B. **Avian (bird) flu** - caused by influenza viruses that occur naturally among wild birds. The H5N1 variant is deadly to domestic fowl and can be transmitted from birds to humans. There is no human immunity and no vaccine available.

C. **Pandemic flu – a** virulent human flu that causes a global outbreak, or pandemic, of serious illness. Because there is little natural immunity, the disease can spread easily from person to person. Currently, there is no pandemic flu

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SECTION 42

HAZARD IDENTIFICATION & RISK ASSESSMENT PROGRAM

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I. Identifying and Assessing Hazards

One of the "root causes" of workplace injuries, illnesses, and incidents is the failure to identify or recognize hazards that are present, or that could have been anticipated. A critical element of any effective safety and health program is a proactive, ongoing process to identify and assess such hazards.

Some hazards, such as housekeeping and tripping hazards can and should be fixed as they are found. Fixing hazards on the spot emphasizes the importance of safety and health and takes advantage of a safety leadership opportunity.

To identify and assess hazards, employers and workers must:

A. **Collect and review information about the hazards present or likely to be present in the workplace**. Information on workplace hazards may already be available to employers and workers, from both internal and external sources.

1. Collect, organize, and review information with workers to determine what types of hazards may be present and which workers may be exposed or potentially exposed. Information available in the workplace may include:

a) Equipment and machinery operating manuals.

b) Safety Data Sheets (SDS) provided by chemical manufacturers.

c) Self-inspection reports and inspection reports from insurance carriers, government agencies, and consultants.

d) Records of previous injuries and illnesses, such as OSHA 300 and 301 logs and reports of incident investigations.

e) Workers' compensation records and reports.

f) Patterns of frequently-occurring injuries and illnesses.

g) Exposure monitoring results, industrial hygiene assessments, and medical records (appropriately redacted to ensure patient/worker privacy).

h) Existing safety and health programs (lockout/tagout, confined spaces, process safety management, personal protective equipment, etc.).

i) Input from workers, including surveys or minutes from safety and health committee meetings.

j) Results of job hazard analyses, also known as job safety analyses.

Information about hazards may be available from outside sources, such as:

- OSHA, National Institute for Occupational Safety and Health (NIOSH) and Centers for Disease Control and Prevention (CDC)
- Trade associations, labor unions, state and local OSHA committees/coalitions ("COSH groups"), and worker advocacy groups.
- Safety and health consultants.

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B. **Conduct initial and periodic workplace inspections of the workplace to identify new or recurring hazards**. Hazards can be introduced over time as workstations and processes change, equipment or tools become worn, maintenance is neglected, or housekeeping practices decline. Setting aside time to regularly inspect the workplace for hazards can help identify shortcomings so that they can be addressed before an incident occurs.

1. Conduct regular inspections of all operations, equipment, work areas and facilities. Have workers participate on the inspection team and talk to them about hazards that they see or report.

2. Be sure to document inspections, so you can later verify that hazardous conditions are corrected. Take photos or video of problem areas to facilitate later discussion and brainstorming about how to control them and for use as learning aids.

3. Include all areas and activities in these inspections, such as storage and warehousing, facility and equipment maintenance, purchasing and office functions, and the activities of on-site contractors, subcontractors, and temporary employees.

4. Regularly inspect both plant vehicles (e.g., forklifts, powered industrial trucks) and transportation vehicles (e.g., cars, trucks).

5. Use checklists that highlight things to look for. Typical hazards fall into several major categories, such as those listed below; each workplace will have its own list:

   a) General housekeeping
   b) Slip, trip, and fall hazards
   c) Electrical hazards
   d) Equipment operation
   e) Equipment maintenance
   f) Fire protection
   g) Work organization and process flow (including staffing and scheduling)
   h) Work practices
   i) Workplace violence
   j) Ergonomic problems
   k) Lack of emergency procedures

6. Before changing operations, workstations, or workflow; making major organizational changes; or introducing new equipment, materials, or processes, seek the input of workers and evaluate the planned changes for potential hazards and related risks.

Note: Many hazards can be identified using common knowledge and available tools. For example, you can easily identify and correct hazards associated with broken stair rails and frayed electrical cords. Workers can be a very useful internal resource, especially if they are trained in how to identify and assess risks.

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C. **Investigate injuries, illnesses, incidents, and close calls/near misses to determine the underlying hazards, their causes, and safety and health program shortcomings**. Identifying workers' exposure to health hazards is typically more complex than identifying physical safety hazards. For example, gases and vapors may be invisible, often have no odor, and may not have an immediately noticeable harmful health effect. Health hazards include chemical hazards (solvents, adhesives, paints, toxic dusts, etc.), physical hazards (noise, radiation, heat, etc.), biological hazards (infectious diseases), and ergonomic risk factors (heavy lifting, repetitive motions, vibration). Reviewing workers' medical records (appropriately redacted to ensure patient/worker privacy) can be useful in identifying health hazards associated with workplace exposures.

1. **Identify chemical hazards** - review SDS and product labels to identify chemicals in your workplace that have low exposure limits, are highly volatile, or are used in large quantities or in unventilated spaces. Identify activities that may result in skin exposure to chemicals.

2. **Identify physical hazards** - identify any exposures to excessive noise (areas where you must raise your voice to be heard by others), elevated heat (indoor and outdoor), or sources of radiation (radioactive materials, X-rays, or radiofrequency radiation).

3. **Identify biological hazards** - determine whether workers may be exposed to sources of infectious diseases, molds, toxic or poisonous plants, or animal materials (fur or scat) capable of causing allergic reactions or occupational asthma.

4. **Identify ergonomic risk factors** - examine work activities that require heavy lifting, work above shoulder height, repetitive motions, or tasks with significant vibration

5. **Conduct quantitative exposure assessments** - when possible, using air sampling or direct reading instruments.

6. **Review medical records** - to identify cases of musculoskeletal injuries, skin irritation or dermatitis, hearing loss, or lung disease that may be related to workplace exposures.

Note: Identifying and assessing health hazards may require specialized knowledge. Small businesses can obtain free and confidential occupational safety and health advice services, including help identifying and assessing workplace hazards, through OSHA's On-site Consultation Program.

D. **Conduct incident investigations including injuries, illnesses, close calls/near misses and reports of other concerns**. Provide a clear indication of where hazards exist. By thoroughly investigating incidents and reports, you will identify hazard that are likely to cause future harm. The purpose of an investigation must always be to identify the root causes (and there is often more than one) of the incident or concern, in order to prevent future occurrences.

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1. Develop a clear plan and procedure for conducting incident investigations so that an investigation can begin immediately when an incident occurs. The plan should cover items such as:

    a) Who will be involved
    b) Lines of communication
    c) Materials, equipment and supplies needed
    d) Reporting forms and templates

2. Train investigative teams on incident investigation techniques, emphasizing objectivity and open-mindedness throughout the investigation process.

3. Conduct investigations with a trained team that includes representatives of both management and workers.

4. Investigate close calls/near misses.

5. Identify and analyze root causes to address underlying program shortcomings that allowed the incidents to happen.

6. Communicate the results of the investigation managers, supervisors and workers to prevent recurrence.

Effective incident investigations do not stop at identifying a single factor that triggered an incident. They ask the questions "Why?" and "What led to the failure?" For example, if a piece of equipment fails, a good investigation asks: "Why did it fail?" "Was it maintained properly?" "Was it beyond its service life?" and "How could this failure have been prevented?" Similarly, a good incident investigation does not stop when it concludes that a worker made an error. It asks such questions as: "Was the worker provided with appropriate tools and time to do the work?" "Was the worker adequately trained?" and "Was the worker properly supervised?"

Note: OSHA has special reporting requirements for work-related incidents that lead to serious injury or a fatality (29 CFR 1904.39). OSHA must be notified within 8 hours of a work-related fatality, and within 24 hours of an amputation, loss of an eye, or inpatient hospitalization.

E. **Consider hazards associated with emergency or non-routine situations**. Emergencies present hazards that need to be recognized and understood. Non-routine or infrequent tasks, including maintenance and startup/shutdown activities, also present potential hazards. Plans and procedures need to be developed for responding appropriately and safely to hazards associated with foreseeable emergency scenarios and non-routine situations.

1. Identify foreseeable emergency scenarios and non-routing tasks, taking into account the types of material and equipment in use and the location within the facility. Scenarios such as the following may be foreseeable:

    a) Fires and explosions
    b) Chemical releases
    c) Hazardous material spills
    d) Startups after planned or unplanned equipment shutdowns
    e) Non-routing tasks, such as infrequently performed maintenance activities
    f) Structural collapse

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g) Disease outbreaks
h) Weather emergencies and natural disasters
i) Medical emergencies
j) Workplace violence

F. **Determine the severity and likelihood of incidents that could result for each hazard identified and use this information to prioritize corrective actions.** Characterize the nature of identified hazards, identify interim control measures, and prioritize the hazards for control

The next step is to assess and understand the hazards identified and the types of incidents that could result from worker exposure to those hazards. This information can be used to develop interim controls and to prioritize hazards for permanent control.

1. Evaluate each hazard by considering the severity of potential outcomes, the likelihood that an event or exposure will occur, and the number of workers who might be exposed.

2. Use interim control measures to protect workers until more permanent solutions can be implemented.

3. Prioritize the hazards so that those presenting the greatest risk are addressed first. Note, however, that employers have an ongoing obligation to control all serious recognized hazards and to protect workers.

Note: "Risk" is the product of hazard and exposure. Thus, risk can be reduced by controlling or eliminating the hazard or by reducing workers' exposure to hazards. An assessment of risk helps employers understand hazards in the context of their own workplace and prioritize hazards for permanent control.

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SECTION 43

SUBCONTRACTOR MANAGEMENT PLAN

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I. Purpose

The purpose of this program is to ensure that we verify our subcontractor's competencies, establishes oversight methods and monitoring of their work in order to ensure safe and environmentally compliant work is performed at all times.

II. General Requirements

The use of subcontractors must be pre-approved by Modern Electric Co. in accordance with our Subcontractor Management Plan. Subcontractors will be pre-qualified by reviewing their safety programs, safety training documents and safety statistics.

III. Subcontractor Relations Requirements

A. **Competency**

1. Subcontractors must be competent and capable to perform their assigned duties in a safe and environmentally sound manner.

2. A verification process must be conducted to ensure that on-site subcontractors are competent and capable of performing their assigned duties in a safe and environmentally sound manner.

3. The MEC manager hiring any subcontractor is accountable for verifying the written preapproval of the subcontractor per the Subcontractor Management Plan prior to any work being performed. This includes a review of:

   a) Safety history (osha logs, emr, etc.)
   b) Safety program
   c) Insurance
   d) Appropriate licenses
   e) Registrations

4. Every subcontractor shall also submit a copy of their health and safety program for review. The program shall include specific details of:

   a) Fire Prevention
   b) Hazard Communication
   c) Substance Abuse
   d) Accident Management
   e) Employee Safety Training
   f) New Employee Orientation
   g) Hazardous Energy Control
   h) Fall Protection
   i) Employee Discipline and Management Commitment to Safety

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5. The scope of work for the subcontractor will include a list of documentation required to meet regulatory and client requirements appropriate to the subcontracted work. The MEC manager hiring any subcontractor is accountable for obtaining, verifying and keeping copies of all required and appropriate documentation prior to any work being allowed to start by the subcontractor.

B. **Communication**

1. Prior to the start of work, Modern Electric Co. and any subcontractor will:

   a) Establish clear lines of communication that includes an effective reporting relationship. The aim of this process is to improve HSE performance by facilitating the interface of Modern Electric Co. activities with those of the client, other contractors and subcontractors.

   b) Define roles and responsibilities. Aligning various interests and areas of responsibility requires good working relationships between the client, contractors and subcontractors. This is particularly true if the subcontractor activities are difficult to monitor (e.g. distributed work groups, remote locations, transportation).

2. Attend Modern Electric Co.'s safety orientation prior to working on the project. Modern Electric Co. clients may require an additional orientation. Safety orientations shall be scheduled through the MEC Safety Director.

3. Incorporate a written Job Hazard Analysis (JHA) process. The JHA process shall address all anticipated or scheduled work activities anticipating potential hazards and unsafe conditions BEFORE THE WORK BEGINS, and will develop, communicate and implement appropriate precautions that could prevent accidents and avoid injuries.

4. A pre-construction meeting shall be held for every project. The subcontractor shall present their site-specific safety plan, job hazard analysis (JHA), and site logistics plan for the project at this meeting. The meeting shall be held at least two (2) weeks prior to the project when feasible at a location identified by MEC. A review of project guidelines shall be performed at this meeting along with specific project related requirements.

5. The awarded Subcontractors will be required to have their Project Manager and/or Supervisor attend the GC's preconstruction meeting

6. Project kickoff meetings shall be held before work starts and be documented to ensure the subcontractor is completely aware of the reporting and communications requirements between MEC, its client and the subcontractor. The roles and responsibilities of MEC, its client and the subcontractor will be included and documented in the pre-work meeting held prior to work starting.

7. Conduct toolbox talks on a weekly basis on a topic specific to work activities. Copies shall be provided to MEC.

8. Conduct document audits of the project on a daily basis and provide the results of those audits to Modern Electric Co. Project Manager by the end of each day. Included in the audit shall be specific measures instituted to remedy any safety violation. Site safety walks are required periodic throughout the day.

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9. All subcontractors shall be thoroughly familiar with the contents of MEC's safety expectations.

C. **Emergency Planning**

1. Prior to the start of work, MEC and any subcontractor will establish an emergency action plan. MEC and any subcontractor will communicate the emergency response procedures and capabilities. Subcontractors must follow the emergency planning requirements for any Modern Electric Co. client location.

D. **Oversight**

1. An appropriate level of oversight and monitoring must and will be put in place to verify subcontractor performance for the life of the contract. Modern Electric Co. should periodically review the HSE performance of all subcontractors and verify compliance with regulatory and work-specific requirements, safety key performance indicators and other agreed upon requirements.

2. MEC and each subcontractor shall meet no less than every 3 months and at the end of the project to formally evaluate the subcontractor's regulatory and work-specific compliance and performance. The meeting shall be documented and if the client wishes to attend, an invitation will be sent to the appropriate client representative.

3. In addition, subcontractors are required to follow or implement the work practices and systems described below while performing work at Modern Electric Co. or client worksites:

a) Attend all safety orientations, included in any pre-job meeting or kick-off meeting provided by Modern Electric Co. or client prior to any work beginning.

b) Monitor its employees for substance abuse and report nonconformities to Modern Electric Co.

c) Be included in Modern Electric Co. tailgate safety meetings, job safety analysis or hazard assessments and on the job safety inspections.

d) Perform a pre-job safety inspection that includes equipment.

e) Report all injuries, spills, property damage incidents and near misses.

f) Comply with Modern Electric Co. and client safety and environment rules, policies, guidelines or procedures.

g) Implement Modern Electric Co. safety practices as applicable.

h) Clean up and restore the worksite after the job is over.

i) Ensure compliance with regulations at all times.

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SECTION 44
NFPA 70E POLICY

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I. Protection against Arc Flash

A. **Policy:** An arc flash is a "dangerous condition associated with the release of energy caused by an electric arc." An arc flash is an explosion causing severe burns, injuries and/or death depending on the severity.

Most workers realize that electrical shock is potentially life threatening, but many do not understand that wearing clothing that is not flame resistant can result in severe harm or death if it is ignited in an electrical arc flash.

B. **Purpose:** While it is the policy of Modern Electric Co. to de-energize the power source before performing any work on the system, we understand that at times it is necessary to be exposed to the energy source (e.g. investigative work). Before the point of exposure, we need to protect the worker from a potential arc flash that is always possible due to the presence of a power source. The means of proper PPE and levels of protection are simplified with the use of fire resistant garments that meet the hazard risks.

Keep in mind that the use of these suits, are only needed when you are being exposed to energy, or you are attempting to tie-in or are making contact with the power source. Once the potential for an arc flash is either removed or isolated, and the worker is protected, the protective suit is no longer needed (e.g. the panel cover is back on).

It is the policy of Modern Electric Co. that all employees use the following PPE in order to protect themselves against Arc Flash occurrences.

C. **Exposure to <u>under</u> 600 volts:**

1. Nomex full body jump suit
2. Properly rated gloves
3. Dielectric hard hat
4. Full amber face shield
5. Dielectric booties to slip over work boots

Examples of work performed at this level *(not intended to be all inclusive of every type of work)*

1. Removing any panel covers or barriers of energized equipment to perform investigative functions or inspections.

2. Working in a panel with the line side energized and the panel cover removed.

3. Installing a breaker into an energized electrical panel.

4. Pulling cables or wiring into energized panels.

5. Pulling or installing fuses into energized parts.

D. **Exposure to <u>over</u> 600 volts**:

1. Full body 40 cal high voltage suit, complete with a full head hood, dielectric booties and properly rated high voltage gloves.

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Examples of work performed at this level *(not intended to be all inclusive of every type of work)*

1. Removing any gear covers or barriers of energized equipment to perform investigative functions or inspections.

2. Installing protective blankets or insulating devices on Buss Work (e.g. rubbering up) in an active High Voltage Substation.

3. Racking in a breaker into an energized electrical cabinet.

4. Pulling cables or wiring into energized switchgear.

5. Pulling or installing cut-outs on a utility pole.

Contact your Foreman or Supervisor to obtain a MEC Arc Flash Protection which will have all of the above mentioned PPE. Check the kits beforehand to insure that all of the high voltage PPE has a current inspection certification, do NOT use if it has expired.

E. Employees shall be trained in safety related work practices and procedural requirements as necessary to provide protection from the electrical hazards associates with their respective jobs. Employees shall be trained to identify and understand the relationship between electrical hazards and possible injury.

F. The contract employer shall advise the host employer of:

1. Any unique hazards presented by the contract employers work

2. Any unanticipated hazards found during the contract employers work that the host employer did not mention

3. The measures the contractor took to correct any hazards reported by the host employer to prevent such hazards from recurring in the future

G. Unqualified persons shall not be permitted to enter spaces that are required to be accessible to qualified employees, unless the electric conductors and equipment involved are in an electrically safe work condition.

H. Qualified personnel permitted to work within the Limited Approach Boundary of exposed energized electrical conductors and circuit parts operating at 50 volts or more shall, at a minimum, be additionally trained in all of the following:

1. The skills and techniques necessary to distinguish exposed energized electrical conductors and circuit parts from the other parts of electrical equipment.

2. The skills and techniques necessary to determine the nominal voltage of exposed energized electrical conductors and circuit parts.

3. The decision-making process necessary to determine the degree and extent of the hazard, the personal protective equipment and job planning necessary to perform the task safely.

4. The approach distances specified in NFPA 70E Table 130.4 (C) (a) and the corresponding voltages to which the qualified person will be exposed to.

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NFPA 70E Table 130.4 (C) (a)

Approach Boundaries to Energized Electrical Conductors or Circuit Parts for Shock Protection for Alternating Current Systems (all dimensions are distances from energized electrical conductor or circuit parts to employee)

1	2	3	4	5
		Limited Approach Boundary[b]		
Nominal System Voltage Range, Phase to Phase[4]	**Exposed Movable Conductor**	**Exposed Fixed Circuit Part**	**Restricted Approach Boundary[b]; Includes Inadvertent Movement Adder**	**Prohibited Approached Boundary[b]**
50V	Not specified	Not specified	Not specified	Not specified
50V – 300V	3.0 m (10 ft. 0 in.)	1.0 m (3 ft. 6 in.)	Avoid contact	Avoid contract
301V – 750V	3.0 m (10 ft. 0 in.)	1.0 m (3 ft. 6 in.)	0.3 m (1 ft. 0 in.)	25 mm (0 ft. 1 in.)
751V – 15Kv	3.0 m (10 ft. 0 in.)	1.5 m (5 ft. 0 in.)	0.7 m (2 ft. 2 in.)	0.2 m (0 ft. 7 in.)
15.1Kv – 36Kv	3.0 m (10 ft. 0 in.)	1.8 m (6 ft. 0 in.)	0.8 m (2 ft. 7 in.)	0.3 m (0 ft. 10 in.)
36.1Kv – 46kV	3.0 m (10 ft. 0 in.)	2.5 m (8 ft. 0 in.)	0.8 m (2 ft. 9 in.)	0.4 m (1 ft. 5 in.)
46.1kV – 72.5kV	3.0 m (10 ft. 0 in.)	2.5 m (8 ft. 0 in.)	1.0 m (3 ft. 3 in.)	0.1 m (2 ft. 2 in.)
72.6kV – 121kV	3.3 m (10 ft. 8 in.)	2.5 m (8 ft. 0 in.)	1.0 m (3 ft. 4 in.)	0.8 m (2 ft. 9 in.)
138kV – 145kV	3.4 m (11 ft. 0 in.)	3.0 m (10 ft. 0 in.)	1.2 m (3 ft. 10 in.)	1.0 m (3 ft. 4 in.)
161kV – 169kV	3.6 m (11 ft. 8 in.)	3.6 m (11 ft. 8 in.)	1.3 m (4 ft. 3 in.)	1.1 m (3 ft. 9 in.)
230kV – 242kV	4.0 m (13 ft. 0 in.)	4.0 m (13 ft. 0 in.)	1.3 m (4 ft. 3 in.)	1.6 m (5 ft. 2 in.)
345kV – 363kV	4.7 m (15 ft. 4 in.)	4.7 m (15 ft. 4 in.)	2.8 m (9 ft. 2 in.)	2.6 m (8 ft. 8 in.)
500kV – 550kV	5.8 m (19 ft. 0 in.)	5.8 m (19 ft. 0 in.)	3.6 m (11 ft. 10 in.)	3.5 m (11 ft. 4 in.)
765kV – 800kV	7.2 m (23 ft. 9 in.)	7.2 m (23 ft. 9 in.)	4.9 m (15 ft. 11 in.)	4.7 m (15 ft. 5 in.)

Approach Boundaries to Energized Electrical Conductors or Circuit Parts for Shock Protection for Direct Current Voltage Systems

1	2	3	4	5
		Limited Approach Boundary[b]		
Nominal Potential Difference	**Exposed Movable Conductor[c]**	**Exposed Fixed Circuit Part**	**Restricted Approach Boundary[b]; Includes Inadvertent Movement Adder**	**Prohibited Approached Boundary[b]**
< 100V	Not specified	Not specified	Not specified	Not specified
100V – 300V	3.0 m (10 ft. 0 in.)	1.0 m (3 ft. 6 in.)	Avoid contact	Avoid contract
301V – 1kV	3.0 m (10 ft. 0 in.)	1.0 m (3 ft. 6 in.)	0.3 m (1 ft. 0 in.)	25 mm (0 ft. 1 in.)
1.1kV – 5kV	3.0 m (10 ft. 0 in.)	1.5 m (5 ft. 0 in.)	0.5 m (1 ft. 5 in.)	0.1 m (0 ft. 4 in.)
5.1kV – 15kV	3.0 m (10 ft. 0 in.)	1.5 m (5 ft. 0 in.)	0.7 m (2 ft. 2 in.)	0.2 m (0 ft. 7 in.)
15.1kV – 45kV	3.0 m (10 ft. 0 in.)	2.5 m (8 ft. 0 in.)	0.8 m (2 ft. 9 in.)	0.4 m (1 ft. 5 in.)
45.1kV – 75kV	3.0 m (10 ft. 0 in.)	2.5 m (8 ft. 0 in.)	1.0 m (3 ft. 2 in.)	0.7 m (2 ft. 1 in.)
75.1kV – 150kV	3.3 m (10 ft. 8 in.)	3.0 m (10 ft. 0 in.)	1.2 m (4 ft. 0 in.)	1.0 m (3 ft. 2 in.)
150.1kV – 250kV	3.6 m (11 ft. 8 in.)	3.6 m (11 ft. 8 in.)	1.6 m (5 ft. 3 in.)	1.5 m (5 ft. 0 in.)
250.1kV – 500kV	6.0 m (20 ft. 0 in.)	6.0 m (20 ft. 0 in.)	3.5 m (11 ft. 6 in.)	3.3 m (10 ft. 10 in.)
500.1kV – 800kV	8.0 m (26 ft. 0 in.)	8.0 m (26 ft. 0 in.)	5.0 m (16 ft. 5 in.)	5.0 m (16 ft. 5 in.)

[b] This term describes a condition in which the distance between the conductor and a person is not under the control of the person. The term normally is applied to overhead line conductors supported by poles.

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NFPA 70E Table 130.7 (C) (11)
Protective Clothing Characteristics
Typical Protective Clothing Systems

Hazard Risk Category	Clothing Description (Typical number of clothing layers is given in parenthesis)	Required Minimum Arc Rating of PPE (J/cm^2 (cal/cm^2)
0	Non-melting, flammable materials (e.g. untreated cotton, wool, rayon, silk or blends of these materials) with a fabric weight of at 4.5 oz/yd^2	N/A
1	FR shirt and FR pants or FR coverall	16.74 (4)
2	Cotton underwear – conventional short sleeve and brief/shorts, plus FR shirt and FR pants (1 or 2)	33.47 (8)
3	Cotton underwear plus FR shirt and FR pants plus FR coverall, cotton underwear plus FR coveralls (2 or 3)	104.6 (25)
4	Cotton underwear plus FR shirt and FR pants plus multiplayer flash suit (3 or more)	167.36 (40)

I. Modern Electric Co. safety related work practices for working within the Limited Approach boundary are:

1. Conducting daily evaluations and safety inspections through the shifts.
2. Anticipating unexpected events and conduct a job hazard analysis.
3. All electrical parts are considered live until zero (0) energy is verified.
4. Work permits shall be utilized and posted on site. (e.g. lockout/tagout & hot work)
5. Electrical flash arc hazard analysis will be conducted and the appropriate personal protective equipment identified.

J. Hazard Analysis should contain even severity, frequency, probability and avoidance to determine the level of safe practices employed. A hazard/risk evaluation shall be completed before work is started within the Limited Approach boundary of energized electrical conductors and circuit parts operating at 50 volts or more or where an electrical hazard exists.

1. Gather task information and determine risk limits
2. Document task/hazard pairs
3. Estimate risk factors for each task/hazard pair
4. Assign safety measures for each task/hazard pair
5. If risk is acceptable, document results
6. If risk is not acceptable, re-evaluate task/hazard.

K. A job briefing should be held before starting each job and include all employees involved. The briefing should cover hazards associated with:

1. Work procedures involved
2. Special precautions

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3. Energy source controls

4. PPE requirements

L. Test instruments, equipment and their accessories shall meet the requirements of the ANSI/ISA-61010-1 Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use – Part 1 for rating and design requirements for voltage measurements and test instruments intended for use on electrical systems 1000V and below. When test instruments are used for the testing for the absence of voltage on conductors or circuit parts operating at 50V or more, the operation of the test instrument shall be verified before and after an absence of voltage test is performed.

M. All insulating PPE must be inspected before each day's use and immediately following any incident that can be suspected of having caused damage. Insulating gloves shall be given an air test, along with the inspection. Such tests include the following:

1. Blankets – before first issue and every 12 months

2. Gloves – before first issue and every 6 months

3. Sleeves - before first issue and every 12 months. Covers and line hose shall be tested if insulating value is suspected.

N. Work on energized electrical conductors or circuit parts that are not placed in an electrically safe work condition, shall be considered energized electrical work and shall be performed by written permit only.

O. Employees shall not enter spaces containing electrical hazards unless illumination is provided that enables the employees to perform the work safely. Where lack of illumination or an obstruction precludes observation of the work to be performed, employees shall not perform any task within the Limited Approach Boundary of energized electrical conductors or circuit parts operating at 50V or more or where an electrical hazard exists.

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SECTION 45

STOP WORK PROGRAM

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I. Purpose

The purpose of this plan and procedure is to ensure that all employees are given the responsibility and authority to stop work when employees believe that a situation exists that places themselves, their coworker(s), contracted personnel or the public at risk or in danger; could adversely affect the safe operation or cause damage to the facility or result in a release of chemicals into the environment and to provide methods to resolve issue.

Maintaining a diligent questioning attitude is vital to safe execution of work and is a cornerstone to effective safety management.

This procedure extends the authority to stop work in situations where an employee believes there is a need to clarify work instructions or to propose additional controls.

This procedure is applicable to all contractors and subcontracts working on any of MEC's projects and site.

All management, supervisors and employees will be trained on the "Stop Work" program and policies prior to being assigned any project.

II. Responsibilities

A. **Employees**: Employees have responsibility and authority to:

1. Initiate a "stop work" immediately or decline to perform an assigned task without fear of reprisal when the employee believes a situation exists which places him or her, a coworker, the environment is at risk.

2. To discuss and resolve work and safety concerns. The "stop work" may include discussions with coworkers, supervision or safety representative to resolve work related issues, address potential unsafe conditions, clarify work instructions, propose additional controls, etc.

3. Report any activity or condition that the employee believes is unsafe or for which they have initiated a "stop work". Notification should be made to the affected worker(s) and to the supervisor or their supervisor's designee at the location where the activity or condition exists.

4. Notify their supervisor if a raised "stop work" issue has not been resolved to their satisfaction through established channels prior to the resumption of work.

5. Contact their safety representative or union safety representative with a concern or to initiations a "stop work", if the employee prefers to remain anonymous.

B. **Management/Supervisor** - Management and Supervisors are committed to promptly resolve issues resulting from an employee raised stop work. Management (e.g. Directors, Managers, Supervisors, Foreman) responsibilities are to:

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1. Resolve any issues that have resulted in an individual stopping a specific task(s) or activity.

2. Provide feedback to individuals and the affected work group who have exercised their "stop work" responsibility on the resolution of their concern, prior to resuming work. If the employee that issued a "stop work" is not available due to reasons such as vacation, a shift change or training, then the supervisor provides the feedback to the safety representative, prior to resuming work.

3. Notify the safety representative and the Union safety representative when bargaining unit personnel are affected or if a raised stop work issue has not been resolved.

4. Notify the facility representative if the Contractors Stop Work action affects their operations.

5. Ensure no actions are taken as reprisal or retribution against individuals who raise safety concerns or stop an activity they believe is unsafe.

6. If a "stop work" is not brought up by a bargaining unit employee, but does affect bargaining unit personnel, then also notify the union safety representative.

7. Review all "stop work" intervention reports for causes, steps taken to correct concerns and develop plans to eliminate future "stop work" occurrences of similar health and safety concerns through training, engineering and administrative controls.

C. **Safety Representative** – The safety rep is responsible for:

1. Assisting employees, supervision and management in the resolution of safety issues and concerns.

2. Immediately contacting management and workers to resolve issues when an employee has called a situation to their attention and has not been resolved.

3. Discuss resolution(s) with employees involved in a "stop work" where resolution was completed after their shift, when they were unavailable or where he/she acted as their representative in reaching a resolution.

4. Working as the agent of an employee that prefers to remain anonymous to workers directly in the resolution to the "stop work".

5. Document all "stop work" interventions, including the reasons why the "stop work" was issued and all steps taken to rectify the concern(s).

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SECTION 46

COMPRESSED GAS CYLINDERS

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I. Introduction

Compressed and liquefied gases have the potential for creating hazardous working environments. Most of this information is general and applies to ALL compressed and liquefied gases. Compressed and liquefied gases are routinely used in various construction and industrial worksites. This "Gas Cylinder Safety Guideline" applies to all systems, employees and subcontractors who use or otherwise handle compressed or liquefied gases. It is the intent of this guideline to provide information on the safe usage of compressed and liquefied gases at work locations and afford employee protection from potential health and physical hazards associates with gas and cylinder usage. MEC promotes the safe use of gases by offering training and information on the proper storage, handling, usage and disposal of gases and gas cylinders. Only trained and qualified personnel shall be allowed to use compressed and liquefied gases. Training should include the associated hazards of the materials, necessary safety precautions, personal protective equipment (PPE) and emergency response procedures. Appropriate Safety Data Sheets (SDS's) or other gas supplier product information shall be made accessible to compressed gas users.

II. Storage of Compressed and Liquefied Gas

Proper storage is critical for the safe usage of compressed and liquefied gases. Cylinder storage areas should be prominently posted with hazard information regarding the gases stored. The NFPA 704 diamond with a cylinder indicated in the "specific hazard" (white) section of the diamond and the corresponding 2 flammability, health and reactivity hazard section also marked is an accepted of signage.

A. **Storage Requirements**: (all gas cylinders)

1. Not be stored in exists or egress routes.

2. Not be stored in damp areas, near salt or corrosive chemicals, fumes, heat or where exposed to the weather.

3. Not be stored longer than one (1) year without use.

4. Stored within a well-ventilated area.

5. Stored in an upright position.

6. Secured with chain or appropriate belt above midpoint, but below shoulder. Laboratory cylinders less than 18" tall may be secured by approved stands or wall brackets.

7. Capped when not in use or attached to a system. (if cylinder will accept a cap)

8. Kept at 20 feet away from all flammable, combustible or incompatible substances. Storage areas that have a non-combustible wall at least five (5) feet in height and with a fire resistance rating of at least 30 minutes may be used to segregate gases of different hazard classes in close proximity to each other.

9. Stored so cylinders are used in the order in which they received and stored so that fully cylinders remain separate from empty cylinders.

10. Stored so that gases with the same hazard class are store in the same area. Inert gases are compatible with ALL other gases and may be stored together.

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III. Compressed and Liquefied Gas Handling

The following requirements shall apply to ALL gas cylinders

A. Compressed Gases shall be handled only by properly trained persons. Training must include contents of this guideline, as well as any specific information relevant to the gas being used and emergency information outlined in MEC's HASP, available at construction site office.

B. Safety shoes are required when moving cylinders.

C. Cylinders should not be dragged or physically carried. Hand trucks designed for transporting cylinders must be used to transport the cylinders. Cylinder caps shall be secured during transport.

D. Prevent damage t cylinders. Locate cylinders where they will be protected from physical damage by striking or falling objects and/or corrosion or damage from public tampering.

E. No person other than the gas supplier shall attempt to mix gases in a cylinder.

F. Containers shall not be used for any other purpose than holding the contents as received.

G. Damaged or leaking cylinders must be reported to the project manager or local safety office immediately for proper disposal. See disposal information in section 6 of this guideline.

H. Cylinders shall not be picked up by the cap.

I. Ropes, chains and sling shall not be used to suspend cylinders unless cylinder was designed for such.

J. Magnets shall not be used for cylinders.

K. Where appropriate lifting attachments have not been provided on the cylinder/container, suitable cradles or platforms to hold the containers shall be used for lifting.

L. The user shall not paint cylinders.

M. Leaking, defective, fire burned and corroded containers shall not be shipped without the approval of the supplier.

IV. Compressed and Liquefied Gas Use

The following are general "good practice" guidelines when using gas cylinders and compresses gases.

A. General Requirements

1. Ensure regulator pressure control valve is relieved (i.e., closed) before attaching to tanks.

2. Close valves on gas cylinders when a system is not in use.

3. Remove all pressure from regulators not currently used. (open equipment valves downstream AFTER the regulators are closed)

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4. Shut off valves must not be installed between pressure relief devices and the equipment they are to protect.

5. Use pressure relief valves in downstream lines to prevent high pressure buildup in the event that a regulator valve does not seat properly and a tank valve is left on.

6. Relief valves should be vented to prevent potential buildup of explosive or toxic gases.

7. Never allow flames or concentrated heat sources to come in contact with a gas cylinder.

8. Never allow a gas cylinder to become part of an electrical circuit.

9. Never partially open a tank valve to remove dust or debris from the cylinder inlet.

10. Never use cylinder gas as compressed air.

11. Pressurized regulators slowly and ensure that valve outlets and regulators are pointed away from all personnel hen cylinder valves are open.

12. Cylinders which require a wrench to open the main valve shall have the wrench left in place on the cylinder valve while it is open. Use adequately sized wrenches (12" long) to minimize ergonomic stress when turning tight tank valves. Never apply excessive force when trying to open valves. Cylinders with "stuck" valves should be returned to suppliers to have valves repaired.

13. Do not attempt to open a corroded valve; it may be impossible to reseal.

14. Valves should only be opened to the point where gas can flow into the system at the necessary pressure. This allows for quicker shutoff in the event of a failure or emergency.

15. Use a cylinder cap hook to loosen tight cylinder caps. Never apply excessive force or pry off caps. Return to supplier to remove "stuck" caps.

16. Keep piping, regulators and other apparatus gas tight to prevent gas leakage.

17. Confirm gas tightness by using compatible leak test solutions (e.g., soap and water) or leak test instruments.

18. Release pressure from systems before connections are tightened or loosened and before any repairs.

19. Do not use Teflon tape on CGA fittings (straight thread) where the seal is made by metal-to-metal contact. Use of Teflon tape causes the threads to spread and weaken, increasing the likelihood of leaks.

20. Never use adapters or exchange fittings between tanks and regulators.

21. Fluorescent light can be used to check for grease or oil in regulators and valves.

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B. **Labeling: (all gas cylinders)**

1. Know the contents of each cylinder you are using.

2. Use only the vendor label for positive identification of contents of the cylinder. Be aware that color coding may be inconsistent from vendor to vendor.

3. Mixed gases shall be clearly labeled with the contents of the cylinder.

4. Empty cylinders shall be labeled with the word empty or the abbreviation “MT”.

a) Preferred labeling includes:

(1) Identity of the material
(2) Statement of Hazard.
(3) Associated signal work (example)

NITROGEN
CAUTION: HIGH PRESSURE GAS CAN
CAUSE RAPID SUFFOCATION

b) Excellent sources of warning and hazard information that should be contained on cylinders are Air Products, Metheson and other gas company catalogs, CGA Pamphlet C-7: “Precautionary Labeling and Marking of Compressed Gas Cylinders”, as well as the manufacturer or distributor of the gas.

C. **Manifolds, Valves and Regulators:**

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

2. Use only approved valves, regulators, manifolds, piping and other associated equipment in any system that requires compressed gas. Care must be taken to ensure that pressure gauges on regulators are correct for the pressure of the gas cylinder used. With the exception of lecture bottles, threads, configurations and valve outlets are different for each class of gases to prevent mixing of incompatible gases.

3. CGA Pamphlet V-1: Standard for Compressed Gas Valves lists the appropriate valve for each gas. Manufacturers and distributors should also be able to identify the valves and associated equipment required for each gas.

4. Lecture bottles use universal threads and valves, some of which are interchangeable. Label all associated equipment with the gas name to prevent unintentional mixing of incompatible materials.

5.

5. Valves and regulators should undergo periodic maintenance and repair. A visual inspection should be performed before each usage to detect any damage, cracks, corrosion or other defects. Long term maintenance or replacement periods vary with the types of gases used, the length of use and conditions of usage. Consult the supplier for recommended valve and regulator maintenance schedules.

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6. Valves and regulator maintenance histories should be known before usage. Valves that pass visual inspection are still subject to failure, therefore, it is critical that toxic of poisonous gases are used in ventilated enclosures and have local exhaust ventilation in place for downstream pressure relief valves, etc.

7. Valves and regulators should only be repaired by qualified individuals. Valve and regulator manufacturers, gas supply companies or valve and regulator specialty shops should be consulted for any repair(s) needed.

V. Gases with Specific Hazard Classes

The following information regarding specific classes of gases is offered as additional guidance to be used in conjunction with the general usage requirements.

A. **Corrosive Gases**: (ex. Chlorine, hydrogen chloride, fluorine, hydrogen fluoride, hydrogen sulfide, carbon monoxide and carbon dioxide)

1. Metals become brittle when used in corrosive gas service, check equipment and lines frequently for leaks.

2. A diaphragm gauge should be used with corrosive gases that would destroy a steel or bonze gauge. Check with gas supplier for recommended equipment.

3. Remove regulators after use and flush with dry air or nitrogen.

B. **Cryogenic Liquids and Gases**: (ex. Liquid oxygen, hydrogen, helium and liquid neon) Cryogenic liquids and their boil-off vapors rapidly freeze human tissues and cause embrittlement of many materials which may crack or fracture under stress.

All cryogenic liquids produce large volumes of gas when they vaporize at ratios of 600:1 to 1440:1, gas: liquid and may create oxygen deficient conditions.

The following information applies to the use and handling of cryogenics:

1. Use appropriate PPE, including insulated gloves and eye protection (goggles and face shield) during any transfer of cryogenic liquid.

2. In the event of skin contact with a cryogenic liquid, do not rub skin. Place the affected part of the body in a warm water bath, not to exceed 40° C (105° F).

3. Use only equipment, valves and containers designed for the intended product and service pressure and temperature.

4. Inspect containers for loss of insulating vacuum. If the outside jacket on a container is cold or has frost spots, some vacuum has been lost. Empty contents into another cryogenic container and remove the damaged unit from service. Repairs should be made by the manufacturer or an authorized company.

5. Transfer operations involving open cryogenic containers such as “dewars” must be conducted slowly to minimize boiling and splashing of the cryogenic fluid.

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6. Ice or other foreign matter should not be allowed to accumulate beneath the vaporizer or the tank. Excessive ice buildup could result in the discharge of excessively cold gas or structural damage to the cryogenic container or surroundings.

7. All cryogenic systems including piping must be equipped with pressure relief devices to prevent excessive pressure build up. Pressure reliefs must be directed to a safe location. Do not tamper with pressure relief valves or the settings for the valves.

8. Hot air, steam or hot water should be used to thaw frozen equipment. **DO NOT** use water to thaw liquid helium equipment.

C. **Flammable Gases**: (e.g., Acetylene, hydrogen, methane, propane and isobutene). The following information applies to the use and handling of flammable gases.

1. Flammable gases, except for protected fuel gases, shall not be used near ignition sources. Ignition sources include open flames sparks, sources of heat, oxidizing agent and ungrounded or non-intrinsically safe electrical or electronic equipment.

2. Portable fire extinguishers shall be available for fire emergencies. The fire extinguisher must be compatible with the apparatus and the material in use.

3. Flames shall not be used for detecting leaks. A compatible leak detection solution shall be used for leak detection.

4. Spark proof tools shall be used when working with or on a flammable compressed gas cylinder or system.

5. Access doors to areas which use or store flammable gases shall post “NO OPEN FLAMES”.

6. Manifold systems shall be designed and constructed by competent personnel who are thoroughly familiar with the requirements for piping of flammable gases. Manifolds should comply with the standards of a recognized safety authority such as Underwriters Laboratories, Inc., Federal, State, Local or Insurance Company. Specifications must be identified before starting design and construction. Consultation with the gas supplier before installation of manifolds is recommended.

D. **Fuel, High Pressure and Oxidizing Gases:**

1. Fuel Gases - these gases often use a combination of flammable and oxidizing gases. Use of fuel gases must comply with OSHA 29 CFR1910.253 – Oxygen-Fuel Gas Welding and Cutting, 29 CFR1910.102-Acetylene, Pamphlet SB-8: Use of Oxy-Fuel Gas Welding and Cutting Apparatus and the requirements of the NFPA Standard 51: Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting and Allied Processes is required.

2. High Pressure Gases – these can be rated up to 3,000 lbs per square inch (psi). Typical uses include MIG welding gas mixtures, cryogenics, non-toxic gas distribution, medical gas distribution and emergency oxygen services. In addition to any gas specific hazards, high pressure gases should carry the following label: “CAUTION: HIGH PRESSURE GAS”

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3. Oxidizing Gases – are non-flammable gases (ex. Oxygen chlorine, fluorine and nitrous oxide), but in the presence of an ignition source and fuel, can support and vigorously accelerate combustion. Do not use oil in any apparatus where oxygen will be used. Gauges and regulators for oxygen shall bear the warning sign "OXYGEN-USE NO OIL".

E. **Toxic and Highly Toxic Gases**:

1. All gases with an NFPA Health Hazard rating of three (3) or four (4) must be stored and used in accordance to applicable regulations.

2. Unless otherwise indicated, all gases must be stored in a continuously mechanically ventilated gas cabinet, fume hood or other enclosure.

3. Small quantities (ex., lecture cylinders) or dilute concentrations of these gases may be stored outside of a ventilated enclosure with the approval of site management and the safety officer.

4. Audible alarms should be utilized in ventilated hoods that are dedicated to toxic gas usage or storage.

5. Standard Operating Procedures (SOP's) for processes or procedures which use corrosive, toxic or highly toxic gases shall be developed that include emergency response actions. All affected employees shall be trained on the contents of these procedures.

VI. Gas Cylinder Disposal

A. If possible, purchase compressed gas only from manufacturers that will agree to take back the empty cylinder.

B. A cylinder is considered empty when the container pressure is at atmosphere pressure.

C. Refillable cylinders should be returned to materials handling personnel or directly to the vendor.

D. If a refillable cylinder is encountered that does not have a manufacturer label, contact materials handling personnel to see if they can identify the manufacturer through stamp marks on the cylinder.

E. Maintain manufacturer labels and label the cylinder with an "EMPTY" or "MT" tag.

F. Materials handling personnel or the vendor should be contacted for disposal of partially full cylinders.

G. Proper identification of the contents of all cylinders is required and is the responsibility of the cylinder owner.

H. Disposal fees for unknown cylinders are the contractor's expense.

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VII. Handling Compressed Gas Cylinder Leaks and Emergencies

A. Pre-planning – despite strict adherence to safety practices, accidents involving gases may occur on the job. The amount of damage sustained by personnel and property from these accidents will be directly related to the quality of the sites emergency plan and procedure. Users of compressed gas cylinders must be familiar with the necessary safety precautions. Standard Operating Procedures (SOP's) for using compressed gases shall include a discussion of possible accident scenarios, appropriate employee responses and take into account the following factors:

1. Nature of operation (equipment used and type of injury that might be inflicted).

2. Potential location of a release or spill (outdoors versus indoors, in a laboratory, corridor or storage area, on a table, in a hood or on the floor).

3. Quantities of material that might be released and the type of containment (compressed gas tank size, manifold systems, etc.)

4. Chemical and physical properties of the compressed gas (physical state, vapor pressure and air or water re-activity).

5. Hazardous properties of the compressed gas (its toxicity, corrosive state and flammability).

6. The availability and locations of emergency supplies and equipment.

7. Contingency plan which identifies building evacuation routes, emergency telephone numbers, chemical containment procedures, fire extinguisher usage, etc., should be posted at the worksite.

B. **Minor leaks** – occasionally a gas cylinder or one of its component parts may develop a leak. Most of these leaks occur at the top of the cylinder in areas such as the valve threads, pressure safety device, valve stem and valve outlet. The following information applies to the remediation of minor leaks:

1. If possible, verify suspected leaks using a flammable gas detector or soapy water solution (a flame should not be used for detection). If the leak cannot be stopped by tightening a valve gland or packing nut, emergency action procedures should be initiated and site safety management must be notified.

2. For flammable, inert or oxidizing gas, move the cylinder to an isolated, well ventilated area away from combustible materials. Post signs that describe the hazards.

3. For corrosive and toxic gases, move the cylinder to an isolated, well ventilated area and use suitable means to direct the gas into tan appropriate chemical neutralizer. Post signs that describe the hazards.

4. If it is necessary to move a leaking cylinder through populated portions of the building, place a plastic bag, rubber shroud or similar device over the top and tape it (duct tape preferred), to the cylinder to confine the leaking gas.

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C. **Major Leaks**: In the event of a large gas release or if an accident take place in which readily available PPE is inadequate to ensure worker safety, activate the following emergency procedure:

1. Immediately call 911 and report the incident

2. Activate building and area fire alarms (or chemical safety alarms, if applicable).

3. Evacuate the area, securing entrances and providing assistance to others on the way out.

4. Provide emergency response officials with details upon their arrival.

D. **Accidents Involving Personnel Injury**:

1. For medical emergencies, call the site emergency response number or 911

2. Assist person(s) involved and administer immediate first aid which may include:

a) Washing under a safety shower

b) Removing contaminated clothing

c) Irrigating the eyes at an eyewash station

d) Administering artificial respiration

e) Notify personnel in adjacent areas of any potential hazards (e.g., activate building or area alarms).

f) Move injured personnel only if necessary to prevent their exposure to further harm.

E. **Fire and Fire-Related Emergencies**:

1. For all fires, immediately call the site emergency response number or 911.

2. Small isolated fires within the laboratory may be extinguished using the appropriate portable fire extinguisher if personnel are confident that they can safely extinguish the fire.

3. For large or rapidly spreading fires, the following procedures should be followed:

a) Call the site emergency response number or 911 and report the fire.

b) Active building and area alarms

c) Evacuate the building, shutting doors and providing assistance to others on the way out.

d) Provide fire and/or police officials with the details of the problem upon their arrival

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SECTION 47

FATIGUE MANAGEMENT

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I. What Causes Worker Fatigue?

Several factors including too little, poor quality or interrupted sleep over a period of time can cause fatigue. Fatigue is the body's signal that a rest period is needed. Long work hours and extended and irregular shifts may be stressful physically, mentally and emotionally. The body operates on a circadian rhythm sleep/wake cycle. It is naturally programmed for sleeping during night hours. Demanding work schedules may disrupt the body's natural cycle, leading to increased fatigue, stress and lack of concentration.

II. What are the Effects of Demanding Work Schedules?

Long work hours and extended and irregular shifts may lead to fatigue and to physical and mental stress. Working extended shifts may also involve prolonged exposure to potential health hazards such as noise, chemicals, and others. These exposures could exceed established permissible exposure limits (PELs) or violate other health standards. Modern Electric Co. will implement measures to monitor and limit worker exposures to health and physical hazards in the workplace as required by the Occupational Safety and Health Act.

III. What Are the Effects of Worker Fatigue?

A. Worker fatigue increases the risk for illnesses and injuries. Accident and injury rates are 18% greater during evening shifts and 30% greater during night shifts when compared to day shifts. Research indicates that working 12 hours per day is associated with a 37% increased risk of injury.

B. Decreased alertness from worker fatigue has been a contributing factor in:

1. Industrial disasters, such as the 2005 Texas City BP oil refinery explosion, the 2009 Colgan Air Crash, the explosion of the space shuttle Challenger and the nuclear accidents at Chernobyl and Three Mile Island.

2. Increased sleep problems and risk for injury among full-time employees in relation to the number of hours worked per week.

3. Direct or indirect links to increased costs from lost productivity, increased injury, illness costs, increased time off the job due to illness and increased workers' compensation costs.

IV. Training

Many of the new risk control measures will involve training. Training is not a suitable control measure in itself, but is essential to good risk control. Training gives the workforce the skills and knowledge they need to work with risk controls for fatigue. It also provides appropriate information about the fatigue hazards and risks in the workplace.

A. The education and awareness training will include coverage of issues such as:

1. The nature of the fatigue

2. The warning signals of fatigue

3. Possible effects of fatigue

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4. Factors that decrease or exacerbate the likelihood or effects of fatigue

5. Control measures

B. Training must be available to employees on all shifts during working hours.

C. All site personnel, including contractors, must be informed of the fatigue management plan and have the skills and knowledge they need to fulfill their roles and responsibilities. In addition, employees must be sure to inform the supervisor if they are fatigued or if a co-worker shows signs of being fatigued. MEC will also provide education and awareness about the fatigue policy procedures annually and/or on an as needed basis and when new employees are hired, managers or supervisors are appointed or promoted or changes are made.

V. Prevention

To reduce the risk of worker fatigue in the workplace, Modern Electric Co. will:

A. Monitor staffing issues such as workload, work hours, understaffing and worker absences, scheduled and unscheduled, which can contribute to worker fatigue.

B. Arrange schedules to allow frequent opportunities for rest breaks and nighttime sleep.

C. Provide equipment to the employees to assist in the movement of large items and for repetitive tasks to reduce the impact on the employee.

D. Anti-fatigue mats and other ergonomic equipment shall be provided for employees who are working at a static location during their shift

E. Provide worker education and training addressing the hazards of worker fatigue, the symptoms of worker fatigue, the impact of fatigue on health and relationships, adequate quality and quantity of sleep and the importance of diet, exercise and stress management strategies to minimize the adverse effects of fatigue.

VI. What Can Workers Do?

Workers can promote restful, healthy sleep by following *sleep hygiene* recommendations. Here are some suggestions:

A. Make sure that your sleep period is 7-9 hours daily without disruptions.

B. Try to sleep at the same time every day.

C. Avoid drinks with caffeine prior to bedtime to improve sleep quality.

D. If working evening or nights, make sure that sleep has occurred within the last 8 hours before going to work.

E. If napping before work, make sure that the duration is less than 45 minutes or greater than 2 hours to allow for a complete sleep/wake cycle.

F. Make sure that the sleeping environment is comfortable, cool, dark and quiet.

G. Exercise regularly. Eat a balanced diet. Maintain a healthy weight.

H. If you have difficulty sleeping, keep a sleep diary and talk to your doctor.

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SECTION 48

WORKING NEAR WATER

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I. Introduction

Working over or near water can present and magnify hazards in the form of drowning, working at elevation, electrocution, inclement weather and cold stress.

II. Procedure

A. No horseplay or other unsafe acts that could cause injury to personnel while working over or near water.

B. Safety nets must be provided when workplaces are more than 25 feet above the ground, water surface or other surfaces where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines or safety belts are impractical. If such conditions are expected, contact the safety manager for support in the use of safety nets.

C. Watercraft will only be operated by trained personnel or competent-in-country partners.

D. Personnel are discouraged from jumping to or from any craft which is not secured and from jumping between crafts when a gangplank should be used.

E. Precautions should be taken to prevent falling from the work platform in the form of railings and toe boards.

F. Personnel should tie off to a safety line.

G. In areas subject to tidal flow or rising water levels, the Safety Manager or competent person will monitor the water level to ensure the employees will not be trapped in a work area by the water.

H. Fall protection should be provided when working over or near water where there is a potential for falling or slipping into the water. USCG-approved personal flotation devices (PFD's), shall be available to any person(s) working over or near water and worn when the risk of drowning is present.

1. PFD's should be designed to float unconscious or helpless people face up.

2. Prior to and after each use, PFD's and life preservers shall be inspected for defects which would alter their strength or buoyancy (e.g., rips, tears, holes).

3. All defective units shall be removed from the site and replaced; Defective units will not be used.

4. Working where there is a clear potential for drowning should be avoided wherever possible.

I. Life saving rings shall also be available at the spacing at every 200 feet.

1. USCG approved life rings (rope attachment not required) and ring buoys (rope attachment required), should have attached at least 90 feet of 3/8" solid braid polypropylene rope or equal.

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2. The life rings or ring buoys shall be readily available for emergency rescue operations.

3. One (1) ring buoy or life ring shall be provided on each lifesaving skiff.

J. At least one (1) lifesaving skiff shall be immediately available at locations where employees are working over or adjacent to water.

1. Personnel trained in launching and operation the skiff shall be readily available during working hours.

2. Skiffs shall be kept afloat or ready for instant launching. At a minimum, skiffs shall be equipped as follows:

a) Four (4) oars (two if the skiff is motor powered).

b) Oarlocks attached to gunwales or the oars.

c) One (1) ball pointed boat hook. One (1) ring buoy with 90 feet of 3/8" solid braid polypropylene rope or equivalent line attached.

d) PFD's equaling the skiff fating for the maximum number of personnel allowed on board.

e) First aid kit

K. The maximum number of passengers and weight that can safely be transported shall be posted on all launches, motorboats and skiffs. This number shall not be exceeded and in no case shall the number of passengers (including crew) exceed the number of PFD's aboard.

L. Outboard motors and skiffs shall meet the minimum flotation requirements of the USCG. A certification tag affixed to the hull is satisfactory evidence of compliance.

M. An efficient whistle or signal device shall be provided on all powered vessels to give signals required by the navigation rules applicable to the waters on which the vessel is operated.

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SECTION 49

MOBILE EQUIPMENT PROGRAM

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I. General Requirements

A. At the beginning of each shift, the operator shall inspect and check the assigned equipment, reporting immediately to his/her supervisor any malfunction of the clutch or of the braking system, steering, lighting or control system and locking/tagging out the equipment if necessary.

B. The operator shall make sure the warning signal is operating when the equipment is backing up.

C. Unauthorized personnel shall not be permitted to ride on equipment unless it is equipped to accommodate riders safely.

D. The operator shall use access provided to get on or off equipment. Do not jump to the ground!

E. No operator shall operate mobile equipment without the protection of an enclosed cab or approved eye protection.

F. Before starting the engine, the driver shall fasten seat belts and adjust them for a proper fit.

G. The operator shall not use or attempt to use any vehicle in any manner or for any purposed other than for which it is designed.

H. The operator shall not load the vehicle/equipment beyond its established load limit and shall not move a load(s) which because of the length, width or height, that have not been centered and secured for safe transportation.

I. The operator of a gasoline or diesel vehicle shall shut off the engine before filling the fuel tank and shall see that the nozzle of the filing hose makes contact with the filling neck of the tank. No one shall be on the vehicle during fueling operations except as specifically required by design. There shall be no smoking or open flames in the immediate area during fueling operation.

II. Training

A. Authorization to operate mobile equipment will be issued to employees qualifying under appropriate training and proficiency testing.

B. Only authorized employees shall be allowed to operate mobile equipment.

C. Re-training shall be required for unsatisfactory/unsafe performance of job assignments.

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SECTION 50

IN PLANT RAIL SAFETY

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I. Procedure

A. In all cases, pedestrians and employees shall cross at existing designated pedestrian rail crossings where provided.

B. Vehicle crossings are not intended as pedestrian crossings, unless they are so identified and/or located and no other pedestrian crossings exist in the area.

C. Never attempt to crawl under rail equipment or climb over moving rail equipment.

D. Never attempt to cross in front of moving equipment.

E. Never position any part of the body in a potential pinch point. Rail equipment can move in either direction at any time.

F. Prior to performing work within six (6) feet of any railroad track, permission must be obtained from the railroad supervisor or designated person to take the track out of service. If required, complete a client work permit prior to beginning work.

II. Training

A. Management shall determine if this program is required for regulatory compliance within his/her region. If this program is deemed necessary, then management shall determine which employees within his/her region is required to receive this training.

B. Management shall select a training facility or use an in-house qualified trainer to supply the training. Only trained personnel can be involved in working on or near rails or tracks at a client facility

C. Appropriate training based on complexity of the job and potential hazards related to in-plant rail shall be provided to all applicable employees.

D. Assessments shall be used to determine whether the personnel have the knowledge and have demonstrated skills to safely perform their work assignments.

E. Re-training and testing shall be required for unsatisfactory/unsafe performance of job assignments.

F. All training shall be conducted and documented in advance of working on or near in plant rails.

III. PPE Requirements

A. Approved hard hats, high visibility clothing, approved metatarsal boots, gloves and approved safety glasses with permanently attached side shields shall be worn in designated areas associated with rails.

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SECTION 51

BEHAVIOR BASED SAFETY PROGRAM

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Modern Electric Co. has adopted this Behavior Based Safety program for all projects and office locations. This applies to all Modern Electric Co. employees and their subcontractors.

I. Observations

A. Observations provide direct and measurable information on employee work practices identifying both safe and unsafe behaviors.

B. Upon completion of an observation, the observer will:

1. Review observation with the employee and begin with positive comments.
2. Reinforce safe behaviors.
3. Describe and discuss any unsafe behaviors observed.
4. Request an explanation of his/her unsafe behavior with open ended questions.
5. Re-emphasize consequences to observed employee.

II. Trend Analysis

A. MEC will compare these measurements and track these results by an acceptable method so that numerical and statistical comparisons can be made over time.

B. Once trend analysis is complete, appropriate action plans must be developed to address unsafe behaviors. Action planning will include:

1. Evaluate unsafe behaviors from trend analysis and prioritize.
2. Develop action plan for unsafe behaviors based on comments and feedback.
3. Designate responsible parties and time frames within the plan.
4. Define who is responsible for action planning.
5. Ensure management support.

III. Training

Employees should be aware they may be observed at any time.

A. All MEC employees shall receive training upon initial hire or at any other time deemed necessary by the MEC Safety Director. This training will include:

1. Program objectives and incident metrics reviewed.
2. How to conduct the observation and complete the observation form.
3. Learn what do the behaviors mean?
4. Feedback training and role play (mentoring and coaching).

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SECTION 52

EMERGENCY ACTION PLAN

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I. General Requirements

Modern Electric Co. has established this written emergency action plan to notify all employees for procedures to take in the event of an emergency. A copy of this plan shall be maintained in all work locations and shall be available to all Modern Electric Co. employees.

All MEC employees shall be provided the name and contact information to report all emergencies at the beginning of each shift.

All MEC employees shall receive training on this plan on an annual basis at a minimum.

A. **Fire Emergency:**

1. When a fire is discovered:

   a) Activate the nearest fire alarm (if installed) or sound the emergency signal on the project by three (3) long blasts of the air horn.

   b) Notify your supervisor immediately

   c) Notify the local fire department or call 911.

   d) If a fire alarm is not available, notify site personnel immediately to leave the building and/or project site using the designated escape routes.

   e) Remain outside until the supervisor and or designated authority announces that it is safe to re-enter.

2. Fight the fire ONLY if:

   a) The fire is small and is not spreading to other areas.

   b) Escaping the area is possible by backing up to the nearest exit.

   c) The fire extinguisher is in working condition and personnel have been trained to use it.

B. **Plan Review:**

1. The emergency action plan shall be reviewed with all employees outside of annual training when:

   a) The plan is developed or the employee is assigned initially to a job.
   b) When the employee's responsibilities under the plan change.
   c) When the plan is changed.

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SECTION 53

GENERAL WASTE MANAGEMENT PLAN

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I. Guidelines

These Guidelines aim to provide a tool for waste management planning and promote the development of more coherent and appropriate planning throughout Modern Electric Co.

When implementing waste management planning it is the responsibility of each individual to follow Modern Electric policies and procedures.

Waste management planning is continuously reviewed and revised at Modern Electric Co. to match increasing complexity of waste issues and sustainability standards. The solution to many waste management problems require the involvement of several participants/authorities and coherent planning to help avoid the unnecessary duplication effort and thus benefit's all participants to work together.

II. Purpose

Waste management plans have a key role to play in achieving sustainable waste management. Their purpose is to give an outline of waste streams and treatment options. More specifically, they aim to provide a planning framework.

III. Planning

A. Modern Electric Co. shall estimate the waste that will be generated prior to work being performed so that the need for containers and waste removal can be determined. Trash and scrap materials will be considerate waste.

B. Waste materials shall be properly stored and handled to minimize the potential for a spill or impact to the environment. During outdoor activities, receptacles will be covered with a tarp to prevent dispersion of waste materials and to control the potential for run-off.

C. Modern Electric Co. will properly segregate waste materials to ensure opportunities for reuse or recycling.

D. All Modern Electric Co. employees will be instructed on the proper disposal method for wastes. This will include general instruction on disposal of non-hazardous wastes, trash, and scrap materials. If wastes generated are classified as hazardous, employees will be trained to ensure proper disposal. This training will be conducted at the beginning of each shift and conducted by the supervisor.

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SECTION 54

SHORT SERVICE EMPLOYEE PROGRAM

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I. Scope

This program applies to all Modern Electric Co. employees or subcontractors brought in to do a specialized job that the regular work force is not trained to do, do not have the specialized equipment required, or not permitted to perform or assist in a particular task.

The length of service required is a very short duration and generally confined to a very specific area of the site. This period is generally determined to be a few hours, a day or several days, possibly longer if needed.

Subcontractors working on a Modern Electric Co. site must follow all requirements for Short Service Employees as outlined.

II. Definition

Modern Electric Co. has determined that the definition of a Short Service Employee is based on criteria determined or may be established by the host facility and based on the following:

A. Length of employment very limited, less than 6 months with the employer.

B. Type of specific job or service being performed.

C. Not part of permanent site work force.

D. May not be required to attend full safety training program; may receive a modified version covering basic policies and requirements depending on the job being performed.

E. Shall follow all SSHASP policies and procedures.

F. May not be able to work along requiring a member of the regular work force or security to be present at all times. A work crew of less than 5 employees may not have more than one Short Service Employee.

G. May be required to wear uniquely colored hard hats or other clothing or some form of identification to be work such as a badge or hard hat sticker and may include passes for vehicles on site

III. Requirements

Modern Electric Co. shall notify and/or obtain permission from, as required by the host facility, that the Short Service Employees will be working at the site. They must:

A. Provide names of workers and or company as required.

B. Type of work being performed.

C. Location of work.

D. Duration of work, start and end dates.

E. Who will be overseeing Short Service Employees.

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IV. Procedure

Modern Electric Co. shall establish a program that outline s the procedures for monitoring the work performed by Short Service Employees. They are as follows:

A. An experienced Supervisor or Foreman will be assigned to monitor the work site

B. Additional safety audits will be performed if it determined they are required based on the nature of the work, location to potentially hazard areas and past performance.

C. Short Service Employees shall be monitored for compliance with Health, Safety and Environmental policies and procedures. Once the Short Service Employee has demonstrated competency and compliance with HSE policies and procedures, the contractor may remove the high visibility identifier.

A mentoring system shall be implemented to provide guidance to Short Service Employees and assist with their department. A mentor may only be assigned to one (1) crew that includes Short Service Employees and he/she must remain on the site.

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SECTION 55

WORKING ALONE

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I. Purpose

Modern Electric Co. will provide a safe work environment for its employees. In doing so, Modern Electric Co. will take all reasonable and practical measures to eliminate or minimize injury or incident risks associated with the nature of work by establishing site specific procedures for employees working alone.

II. Objectives

To minimize risk to employees who may work alone and assistance is not readily available, Modern Electric Co. will:

A. Conduct written hazard assessments to identify existing or potential hazards.

B. Take measures to eliminate or control the hazards of working alone at MEC sites.

C. Ensure that affected employees are informed of the hazards and methods used to control or eliminate them.

D. Provide an effective system for communication between any employee who work alone and persons capable of assisting the employee.

E. Ensure all incidents (working related or otherwise) are reported, investigated and documented.

F. Review the Working Alone plan at least annually or more frequently if there is a change in work arrangements which could adversely affect an employee's well-being or a report that the system is not working effectively.

III. Responsibilities

A. **Modern Electric Co. Safety Manager:**

1. Conducts a hazard assessment to identify existing or potential hazards related to the nature of the work or the work environments given the circumstances of the work when working alone.

2. Responsible for the review, implementation and maintenance of the local worksite Working Alone plan.

3. Communicate this policy and its procedures to employees who work alone.

4. Annually review the effectiveness of the hazard controls and procedures and make improvements as required.

B. **Worksite Project Manager:**

1. Responsible for the implementation and maintenance of the Working Alone plan for their project and ensuring all assets are made available for compliance.

2. Take all reasonable and practical steps to minimize or eliminate identified working alone risks.

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3. Review the hazard assessment results and provide recommendations to management to minimize or eliminate identified working alone risks.

4. Review annually the effectiveness of the policy and guidelines and make changes as required by consulting with management staff and employee representatives.

5. Respond to employee concerns related to working alone and communicate these to management.

6. Report all incidents of work site incidents immediately.

7. Participate in work site hazard assessments and the implementing of procedures to eliminate or control hazards of working alone.

IV. Safe Work Procedures

This procedure applies if an employee is working alone at a work site where assistance is not readily available if there is an emergency or the employee is ill or injured.

A. **Worksite Assessment**:

1. Will anticipate work and travel time, weather, communication, type of work, employee medical conditions and training.

2. Shall address hazards and identify control measures in order to minimize risk associated with working alone.

3. Will be conducted on a project by project or site basis as circumstances vary between locations and conditions. To assess this hazard Modern Electric Co. should review records, past incidents and identify measures or actions needed to correct any hazards. The assessment should involve:

a) Participation by employees through methods such as one-on-one interviews, kick off safety meetings, etc.

b) The assessment should utilize information from employees about their experiences working alone, their current concerns and their suggestions for improvement.

c) Consideration for the time interval between checks and the procedure to follow in case the employee cannot be contacted, including provisions for emergency rescue.

V. Plan

Modern Electric Co. must develop and implement a written procedure for checking the well being of a worker assigned to work alone or in isolation under conditions which present a risk of disabling injury, if the worker might not be able to secure assistance in the event of injury or other misfortune.

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A. **Worker Working Alone Does not respond** - Considerations such as length of time missing, weather conditions, physical fitness, etc. must be factored into the site specific working alone program. The program must specify procedures for emergency response including provisions for contacting appropriate local officials. The program shall identify specific criteria to determine when an employee search is necessary. The minimum requirements include:

1. If the working alone employee fails to respond at the scheduled contact time repeated contact efforts will be made for 1 hour.

2. If the employee working alone is not contacted with 1 hour of the scheduled contact a designated individual will be dispatched for a search to the working location if within close proximity. If the working alone employee is not found then the closest police (city) or governmental search and rescue authority shall be notified to conduct a search.

3. If the employee working alone is not within close proximity and does not respond to repeated contact efforts then the closest police (city) or governmental search and rescue authority shall be notified to conduct a search.

VI. Communication and Regular Contact Person System

A. Each site specific Working Alone Plan shall address having an established contact person.

B. Workers must carry a cellular phone or electronic monitoring device at all times while working alone. The use of a radio, cellular/satellite phone, electronic monitoring device or another form of direct reliable correspondence shall be used to establish an effective means of communication between the lone employee and designated check person.

C. A check-in/check-out process where employees are monitored or contacted at regular intervals will be established. Individuals must be monitored at regular intervals, or the individual contacts Modern Electric Co. at pre-determined intervals based on determinations made in the risk assessment.

D. Individual(s) by job function responsible for establishing contact with the affected employee, as well as a back-up form of communication will be established for each site specific plan. The Safety Manager, Project Manager or designee is responsible for check-in with the lone employee at regular intervals.

E. Backup form of communication in the event primary communication (cell phone or land line) is unavailable will be via satellite phone or if electronic communication is not practicable or readily available at the worksite.

F. Modern Electric Co. must ensure that a representative of Modern Electric Co. or another competent employee visits the employee at regular intervals.

G. Modern Electric Co. shall document communication employee status at the check in intervals.

H. These visits or contacts shall be at intervals of time appropriate to the nature of the hazards associated with the employee's work.

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SECTION 56

FIT FOR DUTY

MODERN ELECTRIC CO.
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I. Purpose

Modern Electric Co. full and part-time staff are expected to report for work fit for duty, which means able to perform their job duties in a safe, appropriate and an effective manner free from the adverse effects of physical, mental, emotional and personal problems.

II. Fitness for Duty Process

It is the goal of Modern Electric Co. to provide a safe workplace for all employees. To accomplish this goal we have adopted the following fitness for duty policy requirements. Supervisors will work with the human resources department when they have a concern about an employee's fitness for duty. All requirements will be verified through documentation.

A. **Pre-Employment Testing (Physical/Medical Suitability)**

Employees are physically capable of performing their job function. Pre-employment physicals (medical exams) and physical evaluations are required to be included in the hiring (post-hire/pre-placement) process, and also when changing into certain job functions, transfers and different environments or in a post-injury returning to work situation (based on the severity of the injury).

B. **Training and Safe Work Requirements (Skills and Knowledge)**

Employees must have the required skills to perform their assigned tasks. This is evaluated and documented by any or all of the following for evaluation of the employee's required skills:

1. Prior employment reference checks
2. Certifications, licenses or other documentation verification
3. Task testing
4. On the job monitoring
5. Performance evaluations
6. Training and training retention

Employees are properly trained for their assigned tasks. Employees must receive training specific to their assigned task. Examples might be welding, instrumentation, scaffold building, equipment operator qualifications, respirator fit test, etc. based on a training matrix that reflects the job description and/or tasks being performed. All training is to be documented.

Safe work practices and procedures must be followed and in place prior to work beginning. Employees shall follow ours and our client's safety requirements. Examples may include, hot work permitting, confined space, lockout tagout, process safety management, electrical safety, operator safety and other standard work practices, safety rules or procedures.

III. Personal Medical Reporting Requirements

Employees must report all medications to their supervisor they are taking that could impair their ability to work safely. Over-the-counter medications such as allergy or cold and flu medications could also impair one's ability to perform safely and must also be reported to their supervisor. The reporting must occur before the employee arrives for work or arranges for transportation to a remote site.

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IV. Client Drug and Alcohol Testing Requirements

Drug and alcohol testing for pre-employment, post-accident or random as prescribed by the host facility shall be implemented. Procedures must include and be implemented for drug and alcohol testing as prescribed by DOT or the host client facilities.

V. Employee Activity and Behavior

We will monitor employee activities and behaviors to determine if employees should be removed from the work site based on our drug and alcohol program requirements. Employee's activities and behaviors will be monitored to determine if employee should be removed from the work site if their ability to perform their duties safely is questioned.

VI. Fit for Duty Examination

A. **Confidentiality**

Medical Records and other related records are protected by state and federal confidentiality laws and MEC. The medical record of fitness for duty examination will be maintained in the Human Resources office. Employee medical records will not be released to unauthorized personnel without written consent or subpoena in accordance with state and federal laws.

B. **Self-Referrals**

Employees are responsible for notifying their supervisor if they are fatigued to the point of not being able to perform their duties safely. Employees must be responsible for ensuring they are physically and mentally fit to perform their job functions safely. Employees must take responsibility for their own safety as well as not reporting to work in a condition as to endanger the safety of their fellow workers.

Disciplinary action may occur for an employee reporting to work in a condition which could endanger their safety or the safety of any other person(s). See below for Management Referral in case there is a question of the employee's ability to work safely.

C. **Management Referral - Management Personnel Responsibility**

Management personnel are responsible for monitoring the attendance, performance and behavior of their employees. When an employee's performance and/or behavior (including the odor of alcohol or possible use of any illegal substance) appears to be unsafe, ineffective and/or inappropriate, it is every manager's responsibility to challenge the employee's behavior and the ability to function, remove the employee from the job, refer the employee for a Fit for Duty exam immediately and conduct appropriate follow up.

Due to the safety issues involved, supervisors have a special responsibility to implement this policy in a consistent and fair manner.

VII. Procedure

When any manager or their designee observes an employee who is not performing his/her job safely, appropriately, and effectively, or an odor of alcohol is present, or whose behavior is inappropriate, that manager is to remove the employee from her/his duty immediately and call Human Resources to continue the Fitness for Duty procedure. The employee will be referred to a medical provider for a fit for duty exam.

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A. The Fitness for duty evaluation may include testing for chemical (e.g. alcohol and drug) levels, referral for psychiatric evaluation or any other evaluation or follow-up deemed necessary.

B. The manager or designee must document the reasons for the fitness for duty request by recording the employee's behavior and noting the names of any witnesses who observed that behavior. Documentation must be submitted to Human Resources by the next business day.

C. The employee is required to cooperate fully with the manager and medical personnel. The employee must sign consent forms for both the fitness examination and communication of its results in confidence to Human Resources. Refusal to cooperate will be considered insubordination and will be grounds for disciplinary action. The employee should be suspended pending investigation, which could result in termination.

D. Medical personnel will advise Human Resources if the employee is fit or not fit for duty. The medical results of the fitness for duty exam will be communicated to Human Resources.

E. If medical personnel determine that the employee is FIT FOR DUTY, the employee must contact Human Resources on the next general business day and the manager in consultation with Human Resources will determine discipline in situations where misconduct may have occurred.

F. If medical personnel determine that the employee is NOT FIT FOR DUTY:

1. The manager makes every effort to arrange for safe transportation home for the employee.

2. The employee must contact Human Resources on the next business day.

3. The manager, in consultation with Human Resources, will determine discipline in situations where misconduct has occurred.

G. Subsequent Fitness for Duty Exams

Dependent upon the reason for the fitness exam, employees who violate this policy a second time may be subject to progressive discipline, up to and including termination of employment.

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SECTION 57

HEAT ILLNESS PREVENTION

MODERN ELECTRIC CO.
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I. Purpose

This Heat Illness Prevention Program has been developed to provide workers with the training and equipment necessary to protect them from heat related exposures and illnesses.

II. Training

All employees who are or may be exposed to potential heat related illnesses will receive training on the following:

A. The environmental and personal risk factors that cause heat related illnesses

B. The employer's procedures for identifying, evaluating, and controlling exposures to the environmental and personal risk factors for heat illness

C. The importance of frequent consumption of small quantities of water, up to four (4) cups per hour under extreme conditions of work and heat

D. The importance of acclimatization

E. The different types of heat illness and the common signs and symptoms of heat illness

F. The important of immediately reporting the employer, directly or through the employee's supervisor, symptoms, or signs of heat illness in themselves or in co-workers

G. The employer's procedures for responding to symptoms of possible heat illness, including how emergency medical services will be provided should they become necessary

H. Procedures for contacting emergency medical services and if necessary, for transporting employees to a point where they can be reached by an emergency medical service provider

I. How to provide clear and precise directions to the work site

III. Supervisor Responsibilities

A. All supervisors will be provided a copy of this program and training documents prior to assignment of employees working in environments where heat exposures may occur.

B. Supervisors will be provided the procedures to follow to implement the applicable provisions of this program.

C. Supervisors will be provided the procedures to follow when an employee exhibits symptoms consistent with possible heat illness, including emergency response procedures.

IV. Provision of Water

A. Employees shall have access to potable water.

B. Water shall be provided in sufficient quantity at the beginning of the work shift to provide one quart per employee per hour for drinking the entire shift for a total of two (2) gallons per employee per 8-hour shift.

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C. Employees may begin the shift with smaller quantities of water if effective procedures for replenishment of water during the shift have been implemented to provide employees one quart or more per hour.

V. Access to Shade

A. Employees suffering from heat illness or believing a preventative recovery period is needed shall be provided access to an area with shade that is either open to the air or provided with ventilation or cooling for a period of no less than five (5) minutes.

B. Such access to shade shall always be permitted.

C. Shade areas can include:

1. Trees
2. Buildings
3. Canopies
4. Lean-to's
5. Other partial and/or temporary structures that are either ventilated or open to air movement.

Note: The interior of cars or trucks are not considered shade unless the vehicles are air conditioned or kept from heating up in the sun in some other way.

VI. Heat Stress Disorders

A. Heat Rash (Prickly Heat)

1. Symptoms:

   a) Red blotches & extreme itchiness in areas persistently damp with sweat.
   b) Prickling sensation on the skin when sweating occurs.

2. Treatment:

   a) Cool environment
   b) Cool shower
   c) Thorough drying

Heat rashes typically disappears in a few days after exposure. If the skin is not cleaned frequently enough, the rash may become infected.

B. **Heat Cramps**

1. Symptoms:

   a) Loss of salt through excessive sweating
   b) Cramping in back, legs and arms

2. Treatment:

   a) Stretch and massage muscles
   b) Replace salt by drinking commercially available carbohydrate/electrolyte replacement fluids.

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C. **Heat Exhaustion**

Heat exhaustion occurs when the body can no longer keep blood flowing to supply vital organs and at the same time, send blood to the skin to reduce body temperature.

1. Symptoms:

   a) Weakness
   b) Difficulty continuing work
   c) Headache
   d) Breathlessness
   e) Nausea or vomiting
   f) Feeling faint or fainting

2. Treatment:

   a) Call 911
   b) Help victim to cool off by:
      (1) Resting in a cool place
      (2) Drinking cool water
      (3) Removing unnecessary clothing
      (4) Loosening clothing
      (5) Showering or sponging with cool water

Note: It takes 30 minutes to cool the body down once a worker becomes overheated and suffers heat exhaustion.

D. **Heat Stroke**

Heat stroke occurs when the body can no longer cool itself and body temperature rises to critical levels.

1. Symptoms:

   a) Confusion
   b) Irrational behavior
   c) Convulsions
   d) Lack of sweating
   e) Hot, dry skin
   f) Abnormally high body temperature

2. Treatment:

   a) Call 911
   b) Provide immediate, aggressive, general cooling by:
      (1) Immersing victim in tub of cool water, or
      (2) Place in cool shower, or
      (3) Spray with cool water from a hose, or
      (4) Wrap victim in cool, wet sheets and fan rapidly
      (5) Transport victim to hospital
      (6) **DO NOT** give anything by mouth to an unconscious victim

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VII. Safe Work Procedures

A. Supervisor Responsibilities:

1. Give workers frequent breaks in a cool area away from heat.
2. Adjust work practices as necessary when workers complain of heat street.
3. Oversee heat stress training and acclimatization for new workers and for workers who have been off the job for a period of time.
4. Monitor the workplace to determine when hot conditions arise.
5. Increase air movement by using fans where possible.
6. Provide potable water in required quantities.
7. Determine whether workers are drinking enough water.
8. Make allowances for workers who must wear PPE that retains heat and restricts the evaporation of sweat.
9. Schedule hot jobs for the cooler part of the day; schedule routine maintenance and repair work in hot areas for the cooler times of the day.
10. Make available to all workers, cooling devices (hard hat liners, bubs, neck bands) to help rid bodies of excessive heat.

B. Workers Responsibilities:

1. Follow instructions and training for controlling heat stress.
2. Be alert to symptoms in yourself and others.
3. Determine if any prescription medications you are required to take can increase heat stress.
4. Wear light, loose-fitting clothing that permits the evaporation of sweat.
5. Wear light colored garments that absorb less heat from the sun.
6. Drink small amounts of water – approximately one (1) cup every 15 minutes.
7. Avoid beverages such as tea or coffee.
8. Avoid eating hot, heavy meals.
9. Do not take salt tablets unless prescribed by a physician/

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APPENDIX A

SITE INFORMATION

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Site Information

Project: _____ **Location:** _____ **MEC Job No.:** _____

Start Date: _____ **Orientation: (Y/N)** _____ **Site Specific H&S Plan Required: (Y/N)** _____

Scope of Work: _____

Training/Fit Test Info: _____ **Equip. Needed:** _____

Site Hazards: _____ **Handouts:** _____

OSHA 30 Personnel: _____

MEC Project Manager: _____ **Phone No.:** _____

MEC Site Superintendent: _____ **Phone No.:** _____

MEC Site Foreman: _____ **Phone No.:** _____

General Contractor: _____ **Phone No.:** _____

GC Site Superintendent: _____ **Phone No.:** _____

GC Site Foreman: _____ **Phone No.:** _____

In Case of an Emergency, call 911

For serious injuries, please go to the nearest emergency room at one of the following hospitals:

Nearest Hospital(s): _____ _____

Hospital Address(s): _____ _____

Hospital No.(s): _____ _____

You should only go to the ER if absolutely necessary (ex. serious head injury, heart attack, etc.) All other medical attention should be received from a walk-in clinic.

Nearest Medical Clinic: _____ **Phone No.:** _____

Clinic Address: _____

Local Fire Dept: _____ **Phone No.:** _____

Local Police Station: _____ **Phone No.:** _____

Additional Emergency Phone Numbers:

3E (MSDS on Demand)	1.800.451.8346
Agency for Toxic Substances and Disease Registry (ATSDR)	1.888.422.8737
National Response Center	1.800.424.8802
CMA Chemical Referral Center	1.800.262.8200
National Poison Control Center	1.800.222.1222

Other: _____

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APPENDIX B

NEW HIRE TRAINING FORMS

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New Hire Training Orientation

__Personal Protective Equipment

__ Proper Work Attire

__ Fall Protection

__ Personal Conduct

__ Lock Out Tag Out

__ Electrical Work Practices NFPA 70e

__ Housekeeping

__ Injury and Accident Reporting

__ Emergency Information

__ Proper Ladder inspection and Use

__ SDS and Work Documentation

__ Aerial and Scissor Lifts

__ Hazcom Program

__ Red Flag/Zero Tolerance Policies

Please check off any training certificates/licenses below that you hold.
You MUST e-mail copies of ALL certificates/licenses to Terri Lugo at terri@modernelectric.com.
CERTIFICATES/LICENSES MUST BE SENT INDIVIDUALLY.
Please do not e-mail several in one photo.
(You can obtain copies from the local if needed).

___OSHA 30 ____ OSHA 10 ___NFPA 70e ___Lull License ___Forklift ___Confined Space

___Aerial Lift ___First Aid/CPR/First Responder Training ___ Other (***please list them below)***

_____

_____

I certify that an authorized employee of Modern Electric Co. has taken time to describe all contents of their Safety Program. I understand the contents of this program and agree to all rules and regulations that have been set forth.

_____ Employee Signature

_____ Orientation Supervisor

_____ Employee Name (Print)

_____ Date of Orientation

_____ Project Name and Number

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INITIAL NEW HIRE SAFETY TRAINING

EMPLOYEE: _____ SOCIAL SECURITY #: _____

GIVEN BY: _____ TRAINING DATE: _____

PROJECT NAME AND NUMBER: _____

TRAINING PROVIDED: Check (✓)

Review of Modern Electric Co.'s New Hire Safety Training Guide _____

Review of Hazard Communication Standard _____

Location of the Written Hazard Communication Program _____

Location of Material Safety Data Sheets _____

Review of Employee's Responsibilities _____

Review of Electrical Safety-Related Work Documentation Standards
Including Lockout/Tag-out Procedures _____

Please check off any training certificates/licenses below that you hold.
You MUST e-mail copies of ALL certificates/licenses to Terri Lugo at terri@modernelectric.com.
CERTIFICATES/LICENSES MUST BE SENT INDIVIDUALLY.
Please do not e-mail several in one photo.
(You can obtain copies from the local if needed).

_____ OSHA 10 _____ OSHA 30 _____ Confined Space _____ Aerial Lift

_____ Forklift _____ Lull License _____ Asbestos _____ Other

I have received Modern Electric Co.'s Safety Program Guide and Hazard Communication Program Training and agree to abide by all safety rules.

_____ _____
Employee Signature Print Name

_____
Date

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APPENDIX C

JOB SAFETY FORMS

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Designated Competent Person Acknowledgement Form

10 Hour OSHA Certification Required

Project Name: _____ **MEC Job No.:** _____

Location: _____

Site Superintendent: _____ **Phone No.:** _____

Definition: A Competent Person is a person who has the ability and has been thoroughly trained to recognize hazards and has the knowledge and authority to correct them.

Responsibility: The designated Competent Person is responsible for recognizing and correcting all safety hazards. This person has the authority to stop work in the event of any potential safety concern on the jobsite. This representative is the contact person non safety related issued and shall be on site full when a hazard exists.

Acknowledgement:

Modern Electric Co. has assigned the below listed employee to be the Competent Person for the above mentioned project. We acknowledge that this individual has been thoroughly trained and is experienced in hazard recognition. This individual has the authority to stop work and correct hazards in the event of a potential hazardous or imminent dangerous situation.

_____ _____
Supervisor Signature Date

I, _____, acknowledge that I have been thoroughly trained and have the knowledge and experience to perform the duties as a competent person for the above mentioned project. I understand that I have the responsibility and authority to correct hazards and to stop work in the event of a potential hazardous or imminent dangerous situation.

Areas of Competency:

☐ Aerial Lift ☐ Asbestos ☐ Compressed Air ☐ Confined Space

☐ Cranes/Derricks ☐ Demolition ☐ Excavation ☐ Fall Protection ☐ First Aid/CPR

☐ Hearing Protection ☐ Ladders ☐ Lead Abatement ☐ Respiratory Protection

☐ Scaffolding ☐ Other _____

_____ _____
Competent Person Signature Print Name

_____ _____
Date OSHA Certificate No.

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JOB HAZARD ANALYSIS

Project/Activity: _____ **Location:** _____ **MEC Job No.** _____

MEC Project Manager: _____ **MEC Project Superintendent:** _____

MEC Competent Person: _____ **Name of Analyst:** _____

Job Hazard Analysis (JHA) Prepared For: _____ **Date Prepared:** _____

Project/Activity Start Date: _____

Training Required:	Tools & Equipment Required	PPE Required:

Qualified Personnel Required: Yes No **Fit for Duty:** Yes No **LOTO:** Yes No

Have instructions and expectations for the work activities been communicated? Yes No

Does the work crew have the competence, experience, and training to complete this work safely? Yes No

If not, please list any exceptions: _____

Have adequate resources been made available to complete this task safely? Yes No
(ex., tools, equipment, material, information, processes, time, access, authority)

List any resources lacking: _____

Is the area and environment you are working in clean, unclutters and maintained? Yes No

List any issues: _____

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Sequence of Basic Job Steps	Identified Safety & Environmental Hazards	Precautionary Actions and Control Procedures to be Take
• Setup & mobilization • Daily review of JSA prior to any work • Review with crew • Complete required checklist and toolbox talks • Receive material and tools from truck • Material Handling • Transport to work/laydown area	• Miscommunication (crew not understanding the task) • Outdoor/Indoor Condition • Slips, trips and falls • Abrasions, cuts and lacerations • Strains and sprains	• Check in with site foreman prior to start of work • Review JSA and assure all parties have knowledge of activities. All workers shall understand scope of work PRIOR to JSA sign off. Do not sign or perform any work if there are any questions or not understanding the scope. • Visually inspect job for hazards. All material must be stacked and off ground to prevent trip hazard. • ANSI cut level 2 gloves when handling material, if needed. • Ensure proper lifting and bending techniques are understood by all workers. Avoid awkward positions when possible. • Obtain assistance when lifting over 50 lbs.
• Use of hand tools	• Scrapes and lacerations	• Use proper PPE at all times. Use proper hand placement. Make sure worker is trained in each tool being used.
• Ladder Use	• Equipment failure • Falls from Height • Tip overs • Workers below struck by falling tools and/or material	• Practice safe ladder use. • Only “non-conductive” ladders may be used. • Inspect ladder prior to use and take out of service if damaged or any broken or bent rungs, steps or spreaders and ensure rungs are free from oil/grease and all slipping hazards. • Ladder must meet a 300 lb. capacity. • Ensure bracing bars are always fully extended and all four feet are evenly supported on the floor. • Remain within the framework of the ladder. • Do not overreach or twist while reaching. • Wear proper PPE as required. • Put all tools in toolbelt – never carry with hands while climbing ladder and use caution not to drop tools, material or equipment from top of ladder.
• Housekeeping	• Slips, trips and falls	• Always keep work area clean and organized. Keep materials off ground. •
• Cleanup and mobilization	• Slips, trips and falls • Hand lacerations • Eye hazard • Sprains, strains	• Be aware of uneven walking working surfaces. • Use proper lifting techniques and good ergonomic practices • Level 2 cut resistant gloves will be worn to prevent hand lacerations. • Eye protection will be worn to prevent any eye injuries. • Stretch and take breaks to avoid muscle fatigue. • Place all debris in designated dumpster. Ensure dumpster is closed or covered at the end of the day and during bad weather.

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• Pandemic Precautions	• COVID-19	• Wear masks • Wear nitrile gloves • Practice social distancing (6' apart) • If you have symptoms such as shortness of breath, fever, cough, immediately notify site foreman and safety director and leave the site. • Stay home if you have any of the above symptoms • Wash hands/hand sanitize frequently • Ensure adequate disinfectant spray, hand sanitizer and wash stations are available on-site. • Follow Modern Electric Co. Pandemic Response Plan
•	•	•
•	•	•
•	•	•
•	•	•
•	•	•

SUPERVISOR SIGNATURE: _____ **TITLE:** _____ **DATE:** _____

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DISTRACTED WORKING CHECKLIST

PAY ATTENTION OR PAY THE PRICE!

Examples of craft distraction: Mind off the task due to:

1. Loud noises
2. Talking, yelling
3. Daydreaming
4. Stress
5. Rushing
6. Lack of sleep
7. Medication
8. Illness

Results of craft distractions working:

1. Accident
2. Injury to self or others
3. Death of self or others
4. Damage to property

How to avoid becoming a distracted worker:

1. Make sure you are MENTALLY and PHYSICALLY fit for duty and not tired, stressed, or sick, etc.
2. Devote your full-time attention to the task at hand
3. Remain calm while performing task, try not to get upset or frustrated. If you do, back off and take a short break to re-focus.
4. Try to minimize other thoughts of outside issues.
5. Be more visible on the jobsite. Utilize Hi-Vis clothing or vests to alert others so they know your position.
6. Keep conversations that could be distracting with co-workers to a minimum, especially during hazardous tasks.
7. Utilize hearing protection to minimize external noise.
8. Know your surroundings and be aware of any concurrent work in your area before you start, don't get surprised.
9. Plan your work, have correct tools and material on hand and keep work area organized and clean.
10. Try to avoid high levels of schedule stress as you will have a greater probability of being involved in an accident.
11. Ensure completion of pre-task planning daily.

Although some workplace distractions are unavoidable, many can be controlled or prevents. No matter what the distraction, your first concern should be to keep your mind and your focus on safety – your safety and that of others working around you. Be aware of any distractions you may be causing and take responsibility for not interrupting others. Let the supervisor know about repeated and/or unsafe distractions.

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Lockout Tagout Log

Project Name: _____ Location: _____

MEC Job No.: _____ Project Super: _____ Project Foreman: _____

Employee Name	Lock No.	Bldg. No.	Equipment Designation	Date Locked	Initials	Date Unlocked	Initials

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EMPLOYEE WARNING REPORT

Employee's Name: _____ Violation Date: _____

Location Violation Occurred: _____ Time: _____ Circle One am or pm

Type of Violation: ☐ Attendance ☐ Carelessness ☐ Disobedience ☐ Safety ☐ Tardiness ☐ Work Quality ☐ Exceeding Speed Limit ☐ Other

Explain Other: _____

Company Statement:	Employee Statement: Check Proper Box: ☐ I concur with the Company's Statement ☐ I disagree with the Company's Statement for the following reason: I have entered my statement of the above matter. Employee's Signature: _____ Date: _____
Warning Decision Approved By: _____ (Name) _____ (Title) _____ (Date)	

List all previous warnings below: When warned and by whom

Previous Warning: 1st Warning
Date: _____
Verbal: _____
Written: _____

Previous Warning: 2nd Warning
Date: _____
Verbal: _____
Written: _____

Previous Warning: 3rd Warning
Date: _____
Verbal: _____
Written: _____

I have read this "Warning Decision" and understand it.

_____
Employee's Signature Date

_____
Signature of Preparer Title Date

_____
Supervisor's Signature Date

Copy Distribution

☐ Employee ☐ Supervisor ☐ Foreman
☐ Union Rep. ☐ Personnel Dept.

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MOTOR VEHICLE RECORDS CONSENT FORM

Disclosure under Fair Credit Reporting Act and Consent to procure consumer report for employment purposes.

The undersigned, _____ hereby authorizes Modern Electric Co. or its insurance agency, _____, to obtain copies of consumer reports, including motor vehicle reports pertaining to me for employment purposes and for use in rating and/or underwriting insurance for which the above named employer may apply and any renewal thereof.

Print Full Name as it appears on your license: _____

Drivers License No.: _____ State: _____

Date of Birth: _____

_____ _____
Signature of applicant/employee Date

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APPENDIX D

HAZARD & TOXIC SUBSTANCES

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HAZARDOUS AND TOXIC SUBSTANCES IN THE WORKPLACE

	PRODUCT COMMON NAME	WORK AREA TO BE USED	TYPE OF HAZARD
1	Ideal 77 & Ideal 31 Wire Ease	All	Irritant
2	PVC Cement, Conduits and Fittings	All	Toxic, Irritant
3	Ridgid Threading	All	Irritant
4	Ridgid Pipe, EMT Tubing	All	Irritant, Dust
5	Krylon Paint	All	Toxic, Irritant
6	Noalox	All	Irritant
7	AA Batteries	All	None
8	Gas (Exxon)	All	Toxic, Irritant
9	WD-40	All	Irritant
10	3M Cold Shrink Kits & CC-2 Prep Kits	All	Irritant
11	Ocal Spray Patch	All	Toxic, Irritant
12	Chico X Fiber	All	Irritant
13	Duxseal	All	Irritant
14	Cadweld Molds	All	Dust, Irritant
15	Cadweld Shot Powder	All	Dust, Irritant
16	GE Silicone	All	Irritant
17	Masonary Patching Cement	All	Dust, Irritant
18	Rocktite Cement	All	Dust, Irritant
19	Bernzomatic	All	None
20	Great Stuff Expanding Foam	All	Irritant
21	PK49SP Gray Panelboard Spray Paint	All	Irritant
22	Upside down Paint	All	Irritant
23	KOPR-Shield	All	Irritant
24	GOJO Hand Cleaner	All	Irritant
25	Hilti Firestop	All	Irritant
26	Denatured Alcohol	All	Toxic
27	3M 3570G Connector Sealing	All	Irritant
28	3M Part A Connector Sealing	All	Irritant
29	3M Part B Connector Sealing	All	Irritant
30	3M Fire Barrier CP-25WB+	All	Irritant
31	Erico Cadweld Starting & Plus Welding Material	All	Dust, Irritant
32	Raychem Hot Melt Adhesives/Mastics	All	Toxic
33	Raychem S1189 Stress Relief Material	All	Toxic
34	Raychem Heat Shrink Polymeric Products	All	Toxic
35	Mineral Wool	All	Irritant
36	Hilti HIT-RE-500	All	Irritant
37	Tyco S1189 Stress Relief Material	All	Irritant
38	Tyco Heat Shrinkable Non Flame Retardant Polyolefin Products	All	Toxic
39	Tyoc S-1251 Mastic and S-1243 Mastic	All	Irritant
40	Raychem S-1308 Stress Patch	All	Toxic
41	Raychem Heat Shrinkable Polymeric Products	All	Irritant
42	Raychem DCC Grease	All	Irritant
43	LPS PF Solvent	All	Irritant
44	TDUX and RDSS Lubricant	All	Irritant

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HAZARDOUS AND TOXIC SUBSTANCES IN THE WORKPLACE

SUBSTANCES USED BY OTHERS TRADES

PROJECT: _____ MEC JOB NO.: _____

JOBSITE ADDRESS: _____

GENERAL CONTRACTOR: _____

GC PROJECT FOREMAN: _____

PRODUCT COMMON NAME	WORK AREA PRODUCT TO BE USED	TYPE OF HAZARD

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APPENDIX E

INCIDENTS, ACCIDENTS & NEAR MISS REPORTS

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INCIDENT REPORT

(STOLEN GOODS)

Date: _____ Time: _____

Job Name: _____ Job #: _____

Job Location: _____

Description of Incident: _____

_____

_____

Items Taken: *(Make, Model & Serial Number, if known)*

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Reported: *(Date, Time, Name of Local Authority and Officer's Name, if known.)*
Attach Police Report, if possible

_____

_____

If not reported, please state why: _____

_____

Submitted By: _____

Instructions: This form must be completed within 24-Hours of theIncident/Accident that results in any work related first aid injury / illness, property damage, significant spill/release or near-miss.

INCIDENT REPORT NUMBER

PART 1: To be completed by the individual reporting the incident and the Supervisor / Investigator as dictated by the Employee

PROJECT	LOCATION OF INCIDENT	DATE OF OCCURRENCE	TIME OF OCCURRENCE

GENERAL INFORMATION		DATE REPORTED	TIME REPORTED
EMPLOYEE NAME:		*Supervisor:*	*Supervisor:*
OCCUPATION:			
COMPANY:		*Safety Dept:*	*Safety Dept:*
YRS/MTHS EXPERIENCE:			
WITNESS:		**DATE REPORT WRITTEN:**	

INVESTIGATION TEAM MEMBERS:		DATE OF INVESTIGATION:	DATE OF FOLLOW-UP: (if applicable)
NAME:			
NAME:			
NAME:			

Primary Incident Details *(multiple selections possible)*

INCIDENT	
FIRST AID	
MEDICAL AID	
LOST TIME INJURY	
ENVIRONMENTAL	
EQUIPMENT/PROPERTY	

Complete this section if the report is the result of a spill

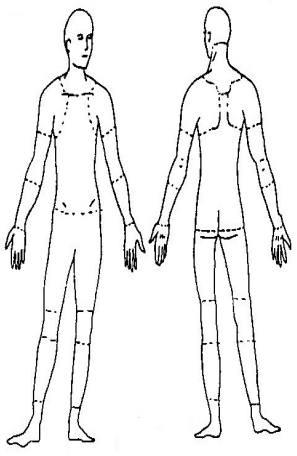
Spill Location?		Est. Quantity		ADDITIONAL DETAILS
GROUND			*Litres*	
WATER		Spill Material		
CONTAINMENT				
Other		TDG UN No.		

Secondary Incident Details *(most applicable)*

NATURE OF INCIDENT/ACCIDENT	
PROPERTY DAMAGE	
Vehicle	
Equipment	
Building/Structure	
Fire	
MATERIAL LOSS	
LOSS OF PROCESS	
ENVIRONMENTAL RELEASE	
OBSERVED HAZARD	
WORKPLACE HARASSMENT	
HSE NON-COMPLIANCE	
OTHER	

NATURE OF INJURY			
Abrasion, scrapes		Cut, laceration, puncture	
Amputation		Hernia	
Broken bone		Illness	
Bruise		Sprain, strain	
Burn (heat)		Damage to a body system:	
Burn (chemical)			
Concussion (to the head)		Other:	
Crushing Injury			

BODY PART AFFECTED: (shade all that apply) →



ESTIMATED COST OF DAMAGE / REPAIR (if applicable):							
CLASSIFICATION OF INCIDENT (circle if applicable):	**A**	**B**	**C**	**D**	**E**	**F**	

PART 2: Description of the Incident

DESCRIBE HOW THE ACCIDENT/INCIDENT OCCURRED; *Include what the person(s) was doing, trying to do and anything unusual:*
ACTIONS TAKEN / SERIES OF EVENTS FOLLOWING THE ACCIDENT/INCIDENT:
WHAT PERSONAL PROTECTIVE EQUIPMENT WAS BEING USED (if applicable)?

IF A SPILL WAS INVOLVED, WHERE WAS THE CONTAMINATED MATERIAL PLACED *(check all that apply):*		
LANDFILL	☐	**EXPLAIN (i.e. volume of contaminated material, location of placement, etc):**
DRUMS	☐	
OTHER	☐	

PERSON(S) INVOLVED TRAINED FOR THE TASK?	YES ☐	NO ☐	**RECORDS ATTACHED?** ☐

NUMBER OF ATTACHMENTS:		**WRITTEN WITNESS STATEMENTS?**	YES ☐	NO ☐	N/A ☐

PHOTOGRAPHS, MAPS, DRAWINGS?	YES ☐	NO ☐	N/A ☐

WAS THERE A JOB HAZARD ANALYSIS (JHA) FOR THE TASK?	YES ☐	NO ☐	**ATTACHED?** ☐

PART 3: Investigation to Prevent Reoccurrence

PART 3A: WHY DID THE INCIDENT/ACCIDENT HAPPEN? (BASIC ROOT CAUSE ANALYSIS):

UNSAFE WORKPLACE CONDITIONS (check all that apply):

1	☐	Inadequate guard / barriers
2	☐	Unguarded hazard
3	☐	Safety device is defective / or has been removed
4	☐	Inadequate warning
5	☐	Tool or equipment defective
6	☐	Inadequate ventilation / hazardous environment
7	☐	Workstation layout is hazardous
8	☐	Congested work areas
9	☐	Unsafe lighting
10	☐	Inadequate housekeeping
11	☐	Temperature (high / low) exposure
12	☐	Unsafe Ventilation
13	☐	Lack of needed personal protective equipment
14	☐	Lack of appropriate equipment / tools
15	☐	Inadequate maintenance
16	☐	Unsafe clothing
17	☐	No training provided / insufficient training
18	☐	Other: _____

UNSAFE ACTS BY PEOPLE (check all that apply):

18	☐	Operating without permission / authority
19	☐	Inadequate training / skill for the task
20	☐	Failure to secure / warn / make safe
21	☐	Failure to follow procedures
22	☐	Operating at unsafe speed
23	☐	Inadequate Lockout
24	☐	Making a safety device inoperative
25	☐	Using defective equipment
26	☐	Using equipment in an unapproved way
27	☐	Unsafe lifting by hand
28	☐	Improper loading for the task
29	☐	Inadequate maintenance / inspection of work area
30	☐	Taking an unsafe position or posture
31	☐	Distraction, teasing, horseplay
32	☐	Failure to wear personal protective equipment
33	☐	Failure to use the available equipment /tools
34	☐	Other: _____

3B : Why did the unsafe conditions exist? Job Factors:

- ☐ A Lack of supervision
- ☐ B Inadequate Engineering
- ☐ C Inadequate Maintenance
- ☐ D Inadequate Standards
- ☐ E Inadequate tools / mis-use

3C: Why did the unsafe acts occur? Personal Factors:

- ☐ F Lack of Skill
- ☐ G Stress
- ☐ H Improper Motivation
- ☐ I Other: _____

HAVE THERE BEEN SIMILAR INCIDENT / ACCIDENTS PRIOR TO THIS INCIDENT?	YES ☐	NO ☐	Unknown ☐
HAS A RISK ASSESSMENT BEEN CONDUCTED FOR THIS TASK OR SIMILAR TASK IN THE PAST?	YES ☐	NO ☐	Unknown ☐

PART 4: Preventing Future Incidences

WHAT CHANGES HAVE BEEN IMPLEMENTED TO PREVENT THIS INCIDENT / ACCIDENT FROM HAPPENING AGAIN?

☐ Stop this acitivity	☐ Guard the hazard	☐ Retrain the Employee
☐ Redesign task steps	☐ Redesign work area	☐ Train the Supervisor(s)
☐ Routinely inspect for the hazard	☐ Personal protective Equipment	☐ Enforce existing Policy
☐ Write a new Polocy / Rule		☐ Other:

PREVENTATIVE / FOLLOW-UP ACTIONS IMPLEMENTED OR TO BE IMPLEMENTED:

CAUSE CODE (ID Number or	ACTIONS IMPLEMENTED / TO BE IMPLEMENTED	DUE DATE	PERSON RESPONSIBLE	DATE COMPLETED

PART 5: To be completed by Safety Department

EXTERNAL REPORTING

REPORTED TO:		REPORTED TO:		REPORTED TO:	
DATE REPORTED:		DATE REPORTED:		DATE REPORTED:	
TIME REPORTED:		TIME REPORTED:		TIME REPORTED:	
NAME OF OFFICIAL:		NAME OF OFFICIAL:		NAME OF OFFICIAL:	
REPORT NUMBER:		REPORT NUMBER:		REPORT NUMBER:	

RISK ASSESSMENT RATING

PROBABILITY		HIGHEST CONSEQUENCE		RISK ASSESSMENT RATING
	+		=	0

CORPORATE REPORTING

REPORTED TO:	
DATE REPORTED:	
TIME REPORTED:	
REPORTED TO:	
DATE REPORTED:	
TIME REPORTED:	

COMMENTS	SIGNATURE	TITLE	DATE
		Employee	
		Supervisor	
		Safety Officer	
		HSE Manager	
		General Manager	

INCIDENT REPORT CLOSE-OUT SIGNATURE

(to be signed stating report is complete and action items are signed-off)

NAME:		DATE:		TITLE:		SIGNATURE:	

☐ B Inadequate Engineering	☐ E Inadequate tools / mis-use	☐ G Stress
☐ C Inadequate Maintenance		☐ H Improper Motivation

HAVE THERE BEEN SIMILAR INCIDENT / ACCIDENTS PRIOR TO THIS INCIDENT?	YES	☐	NO	☐	Unknown	☐
HAS A RISK ASSESSMENT BEEN CONDUCTED FOR THIS TASK OR SIMILAR TASK IN THE PAST?	YES	☐	NO	☐	Unknown	☐

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APPENDIX F

FIRST AID

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OSHA MANDATORY FIRST AID KITS

OSHA STANDARD 1910.266 APP A

The following list sets forth the minimally acceptable number and type of first-aid supplies for first-aid kits required of the logging standard. The contents of the first-aid kit listed should be adequate for small work sites, consisting of approximately two to three employees. When larger operations or multiple operations are being conducted at the same location, additional first-aid kits should be provided at the work site or additional quantities of supplies should be included in the first-aid kits:

1. Gauze pads (at least 4 x 4 inches).
2. Two (2) large gauze pads (at least 8 x 10 inches).
3. Box adhesive bandages (band-aids).
4. One (1) package gauze roller bandage at least 2 inches wide.
5. Two (2) triangular bandages.
6. Wound cleaning agent such as sealed moistened towelettes.
7. Scissors.
8. At least one blanket.
9. Tweezers.
10. Adhesive tape.
11. Latex gloves.
12. Resuscitation equipment such as resuscitation bag, airway or pocket mask.
13. Two (2) elastic wraps.
14. Splint.
15. Directions for requesting emergency assistance.

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APPENDIX G

OSHA INSPECTION PROCEDURE & INSPECTION REPORT FORMS

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Worksite Inspection Safety Audit Checklist

Date of Inspection/Audit:	Job Number:	Job Name:
Area of Inspection:		
INSPECTED BY:		

JOB SITE	YES	NO	N/A	COMMENTS
Ramps or steps provided.				
Free of slipping and tripping hazards.				
Free of protrusion – nails, rebar, etc.				
Wall or floor openings covered or barricaded.				
Barricades / guards provided.				

TOOLS	YES	NO	N/A	COMMENTS
Inspected and in good general condition				
Guards in place and serviceable.				
Electrical tools grounded & double insulated.				
Being used properly.				

ELECTRICAL	YES	NO	N/A	COMMENTS
Cords and cables grounded and in good condition.				
GFCI provided and used. Tested within last month				
Distribution panels closed and secured.				
Lock out/Tag out (LOTO) system in place and being used				
Proper PPE being worn when working on live panels				

LADDERS	YES	NO	N/A	COMMENTS
Inspected before use to ensure in good condition				
4:1 Ratio.				
Properly secured.				
Damaged ladders removed from service.				

MOBILE EQUIPMENT (Lifts, Lulls, Forklifts, etc.)	YES	NO	N/A	COMMENTS
Operating personnel properly trained with up-to-date license				
Warning devices operative.				
Equipment inspected and In good mechanical condition.				
Being used in proper manner & suitable for application				

MATERIAL STORAGE	YES	NO	N/A	COMMENTS
Storage area orderly.				
Stacked material secured.				

PERSONAL PROTECTION	YES	NO	N/A	COMMENTS
Hard hats.				
Eye protection.				
Gloves				
Hearing protection				
Respirators and masks.				
Safety harness / lanyards.				
Proper clothing & Footwear.				

GENERAL	YES	NO	N/A	COMMENTS
Weekly toolbox meeting held.				
Emergency procedure posted.				
Is there a designated eating area				
Sanitary facilities available				
Are there designated smoking areas.				
Adequate first aid kits supplied.				

GENERAL COMMENTS OR OTHER OBSERVATIONS

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PORTABLE LADDER INSPECTION CHECKLIST

Date of Inspection: _____ **Ladder ID No.:** _____

Inspector Name: _____ **Signature:** _____

Type of Ladder: ☐ Extension ☐ Step **Const. of Ladder:** ☐ Wood ☐ Metal ☐ Fiberglass

GENERAL	**Condition OK**	**Needs Repair**	**Not Applicable**
Loose steps or rungs (loose if can be moved by hand)			
Loose nails, screws, bolts or other materials			
Cracked, split or broken uprights, braces, steps or rungs			
Slivers on uprights, rungs or steps			
Rungs/steps missing			
Rungs/steps on metal ladders corrugated or knurled			
Free from grease, oil or slippery materials			
Wooden parts free from splinters, cracks and decay			
Joints between rungs and side rails tight (loose if can be moved by hand)			
Movable parts operate freely			
Damaged or worn non-slip bases			
Rails free from cracks/splitting			
Loose nails/screws			
STEP LADDERS			
Wobbly			
Do not exceed 20 feet in length			
Loose or bent hinge spreaders			
Broken stop on hinge spreaders			
Sharp edges on spreaders			
Loose hinges			
EXTENSION LADDERS			
Loose, broken or missing extension locks			
Defective locks that do not seat properly when ladder is extended			
Frayed or worn rope			
Single section ladders do not exceed 30 feet in length			
Two-section extension ladders do not exceed 48 feet in length for metal ladders and 60 feet in length for wood ladders			
Ladders with more than two sections do not exceed 60 feet in length			
COMMENTS			

If repaired, provide date repaired and date returned to service: _____

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SAFETY HARNESS INSPECTION REPORT

Inspected By: *(Foreman's Name)*	**Date:**
Area:	**Crew Number:**

Instructions:

1. All parts of safety belt & attachments are to be inspected for excessive wear and damage
2. This (✓) symbol is for YES or OK
   This (x) symbol is for NO or REPLACE
3. To be inspected weekly and report turned into Safety Department

Employee Name	Badge No.	Mfg.'s Serial No.										

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ENERGY CONTROL INSPECTION FORM

Date: _____ Authorized Person: _____

Work Location: Name of Company: _____

Address: _____

Location of Machine/Equipment: _____

_____

Make/Model/Serial No.: _____

_____

Additional Equipment & Locations Involved: _____

_____

Affected Employees: _____

_____

Types and Magnitude of Energy and Hazards: _____

_____

Types and Location of Energy Isolating Means: _____

_____

Method of Isolation: _____

Types of Stored Energy: _____

Methods or Means of Dissipation or Restraint: _____

Sources of Hazardous Energy Re-Accumulation: _____

Verification Procedures: _____

Group Lockout Procedures: _____

Shift Changing Procedures: _____

Special Information: _____

_____

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VEHICLE CHECKLIST

Week Ending: _____ Vehicle Plate No.: _____

Driver's Name: _____ Date: _____ thru _____

Driver's Name: _____ Date: _____ thru _____

	MON	TUES	WED	THUR	FRI
UNDERHOOD					
Oil					
Radiator					
Windshield					
Steering					
Brake					
Transmission					
Belts					
Hoses					
Battery/Cables					
INSIDE					
Brakes					
Steering					
Transmission					
Lift Fluid					
Adjust mirrors					
Radio					
Horn					
Gauges					
Controls					
Blower Fan					
Cleanliness					
Interior Lts					
SAFETY					
First Aid Kit					
Seat Belts					
Insurance Card					
Registration Card					
Up to date Inspection Sticker					
OUTSIDE					
Head Lamps					
Taillights					
Backup Lights					
Alarm Lights					
Signals					
Flashers					
Plate Light					
Tires-Pressure					
Tires-Tread Depth					
ACCESSIBILITY					
Wheelchair Lift					
Manual Pump					
Belts- Correct #					
Belts - Condition					

Note any maintenance needs, damaged items or safety issues: _____

_____

_____

_____

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Mobile Elevating Work Platform (MEWP) Pre-Use Inspection

Project:					**Location:**	
Inspected By:					**Date of Inspection:**	
MEWP Type:	Scissor Lift	☐	Personnel Lift	☐	**MEWP Make/Model:**	
	Aerial Lift	☐	Telescoping Lift	☐	**Hour Meter Reading:**	
	Boom Lift	☐	Articulating Lift	☐		

	Power Off Checks	**OK**	**NO**	**N/A**		**Power On Checks**	**OK**	**No**	**N/A**
1	Wheels & Tires				22	Unit starts and runs properly			
2	Lights/Strobes				23	Instruments/gauges			
3	Mirrors/Visibility Aids				24	Warning Lights/audible alarms			
4	Engine/Compartments				25	Fuel/charge level			
4a	Belts/Hoses				26	Horn/audible warning devices			
4b	Cables/Wires				27	Function controls			
4c	Debris				27a	Boom/lift arms-raise/lower/extend/retract			
5	Batteries				27b	Turret rotate			
5a	Terminals tight				27c	Drive-forward/reverse			
5b	Clean/Dry/Secure				27d	Steer-left/right			
6	Hydraulics				27e	Platform-tilt/rotate/extend			
6a	Cylinders/Rods				27f	Stability enhancing devices			
6b	Hoses/Lines/Fittings				27g	Function-enable (deadman) devices			
7	Fluids				28	Emergency/auxiliary controls			
7a	Engine oil Level Leaks				29	Safety interlocks			
7b	Engine coolant Level Leaks				30	Braking-stops & holds			
7c	Hydraulic oil Level Leaks				31	Other:			
7d	Fuel/Battery Level Leaks				**General**				
8	Data/Capacity Plate				32	Mfr. Operating manual stored on MEWP			
9	Counterweight/Counterweight Bolt(s)				33	Safety decals/warnings			
10	Cover panels				34	Misc. parts-loose/missing/broken			
11	Boom Valley/Under Platform – leaks/debris				**Work Area Inspection**				
12	Accessory Plugs and Cables				35	Droop –offs or holes			
13	Boom/Lift Arms – General Condition/Wear				36	Bumps and floor/ground obstructions			
14	Power Track – lines/hoses				37	Debris			
15	Safety Prop functional?				38	Overhead obstructions			
16	Platform – guardrails/toeboard/anchorage/gate				39	Energized power lines			
17	Weather-resistant storage compartment/manuals				40	Hazard locations			
18	Control markings visible				41	Ground Surface and support conditions			
19	Other:				42	Pedestrian/vehicle traffic			
20	Other:				43	Wind and weather conditions			
21	Other:				44	Other possible hazards:			

Report any problems found to site super immediately. ALWAYS lockout/tagout unsafe equipment!

1	
2	
3	
4	
5	

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APPENDIX H

GUIDE TO SELECTION OF RESPIRATORS

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GUIDE TO SELECTION OF RESPIRATORS

HAZARD	RESPIRATOR
Oxygen Deficiency	
A. Immediately dangerous to life or health	A. Any positive pressure SCBA (Self Contained Breathing Apparatus)
B. Not immediately dangerous to life or health	B. Any positive pressure SCBA or supplied air respirator.
Gas and Vapor Contaminants	
A. Immediately dangerous to life or health	A. Positive pressure SCBA Combination positive pressure SAR (Supplied Air Respirator) with auxiliary self contained air supply
B. Not immediately dangerous to life or health	B. Any positive pressure SAR, gas mask or chemical cartridge respirator
Particulate Contaminants	Any positive pressure SAR, including abrasive blasting respirator, powered air purifying respirator equipped with high efficiency filters, any air purifying respirator with a specific particulate filter.
Gaseous and Particulate Contaminants	
A. Immediately dangerous to life or health	A. Positive pressure SCBA or combination of positive pressure SAR with auxiliary self contained air supply
B. Not immediately dangerous to life or health	B. Any positive pressure SAR, gas mask or chemical cartridge respirator
Escape from contaminated atmosphere that may be immediately dangerous to life or health	Any positive pressure SCBA, gas mask or combination positive pressure SAR with escape SCBA.
Firefighting	Any positive pressure SCBA

******Additional information on Respiratory Protection may be found in OSHA 3079******

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APPENDIX I

OSHA FACT SHEETS

OSHA FactSheet

Using Aerial Lifts

The major causes of injuries and fatalities involving aerial lifts are falls, electrocutions, and collapses or tip-overs. Aerial devices include boom-supported aerial platforms, such as cherry pickers or bucket trucks, aerial ladders and vertical towers (OSHA regulates scissor lifts as mobile scaffolds, not as aerial devices). Safe work practices for aerial lifts include:

- Ensure that workers who operate aerial lifts are properly trained in the safe use of the equipment. Test the controls and inspect the aerial lift before use each day. Make sure that all controls are clearly marked as to their function.

- Never override hydraulic, mechanical or electrical safety devices. Maintain and operate aerial lifts according to the manufacturer's instructions. Always stand firmly on the basket floor. Do not sit or climb on the edge or rails of the basket. Never use planks, boxes or other items inside the basket to extend your reach.

- Ensure that all wheels of an elevated lift are on a solid base. Use outriggers, if provided. Set the brakes and use wheel chocks when on an incline. Do not exceed the load limits of the equipment. Allow for the combined weight of the worker(s), tools and materials.

- De-energize and lockout/tagout aerial lifts before performing any maintenance or repairs.

Working near Power Lines

Maintain a minimum clearance of at least 10 feet away from the nearest overhead line. In addition, any conductive object that can be contacted must be maintained at least 10 feet from overhead lines. Conductive objects could be wires, transformers, ducts, pipes or other equipment. Always treat overhead lines as energized, even if they are down or appear to be insulated. (Qualified power line and communications workers and qualified line-clearance tree trimmers are trained to work closer than 10 feet to a power line. See OSHA's Tree Trimming Fact Sheet and Quick Card.) Never lose awareness of the overhead hazard.

Struck-by, Crushed-by, or Caught-in Hazards

Establish and clearly mark a danger zone around the aerial lift support vehicle. Never move the equipment with workers in the elevated platform unless the equipment has been specifically designed for this type of operation. Do not allow workers to position themselves between overhead hazards, such as joists and beams, and the rails of the basket. If the basket moves, the worker(s) could become trapped and crushed between the rails and the overhead object.

Fall Protection

Do not allow workers to belt off to an adjacent pole, structure or equipment while working from an aerial lift. Use a body harness or positioning device with a lanyard attached to the boom or basket to prevent the worker from being ejected or pulled from the basket.

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For more complete information:

OSHA Occupational Safety and Health Administration

U.S. Department of Labor

www.osha.gov

(800) 321-OSHA

DSG 10/2005

OSHA® FactSheet

Asbestos

Asbestos is a naturally occurring mineral fiber. It was used in numerous building materials and vehicle products for its strength and ability to resist heat and corrosion before its dangerous health effects were discovered. Individual asbestos fibers cannot be seen by the naked eye, which puts workers at an increased risk. The Occupational Safety and Health Administration (OSHA) has regulations to protect workers from the hazards of asbestos.

What is the hazard?

Asbestos fibers are released into the air during activities that disturb asbestos-containing materials.

The asbestos fibers can then be inhaled without knowing and trapped in the lungs. If swallowed, they can become embedded into the digestive tract as well.

Asbestos is a known human carcinogen and can cause chronic lung disease as well as lung and other cancers. Symptoms and/or cancer may take many years to develop following exposure.

Where is the hazard?

The hazard may occur during manufacturing of asbestos-containing products; performing brake or clutch repairs; renovating or demolishing buildings or ships; or cleanup from those activities; contact with deteriorating asbestos-containing materials and during cleanup after natural disasters.

Some materials are presumed to contain asbestos if installed before 1981. Examples of these materials, as well as other presumed asbestos-containing materials are:

- Thermal system insulation
- Roofing and siding shingles
- Vinyl floor tiles
- Plaster, cement, putties and caulk
- Ceiling tiles and spray-on coatings
- Industrial pipe wrapping
- Heat-resistant textiles
- Automobile brake linings and clutch pads

OSHA Standards

OSHA has three standards to protect workers from the hazards of asbestos depending on the type of workplace. For complete information on all of the requirements, see the standard specific to your type of workplace:

General Industry: 29 CFR 1910.1001 covers work in general industry, such as exposure during brake and clutch repair, maintenance work, and manufacture of asbestos-containing products.

Shipyards: 29 CFR 1915.1001 covers construction, alteration, repair, maintenance, renovation and demolition of structures containing asbestos during work in shipyards.

Construction: 29 CFR 1926.1101 covers construction, alteration, repair, maintenance, or renovation and demolition of structures containing asbestos.

What protections exist in the Standards?

- **Permissible Exposure Limit (PEL)** for asbestos is 0.1 fiber per cubic centimeter of air as an eight-hour time-weighted average (TWA), with an excursion limit (EL) of 1.0 asbestos fibers per cubic centimeter over a 30-minute period. The employer must ensure that no one is exposed above these limits.
- **Assessment** of workplaces covered by the standards must be completed to determine if asbestos is present and if the work will generate airborne fibers by a specific method under each standard.
- **Monitoring** necessary to detect if asbestos exposure is at or above the PEL or EL for workers who are, or may be expected to be exposed to asbestos. Frequency depends on work classification and exposure. The construction and shipyard standards require assessment and monitoring by a competent person.

- If the exposure has the potential to be above the PEL or EL, employers must use proper **engineering controls and work practices** to the extent feasible to keep it at or below the PEL and EL. Where feasible engineering controls and work practices do not ensure worker protection at the exposure limits, employers must reduce the exposures to the lowest level achievable and then supplement with proper **respiratory protection** to meet the PEL. The construction and shipyard standards contain specific control methods depending on work classification, and the general industry standard has specific controls for brake and clutch repair work.
- **Proper hazard communication and demarcation** with warning signs containing specified language in areas that have exposures above the PEL or EL is necessary. No smoking, eating, or drinking should occur in these areas and proper PPE must be provided and used to prevent exposure.
- **Separate decontamination and lunch areas** with proper hygiene practices must be provided to workers exposed above the PEL to avoid contamination.
- **Training** requirements depend on the workplace exposure and classification. Training must be provided to all workers exposed at or above the PEL before work begins and yearly thereafter. All training must be conducted in a manner and language in which the worker is able to understand. Workers who perform housekeeping operations in buildings with presumed asbestos-containing materials but not at the PEL must also be provided asbestos awareness training.
- **Medical surveillance** requirements are different depending on the industry. Medical surveillance must be provided for workers who engage in certain classifications of work, or experience exposures at or above the PEL in construction and shipyards. In general industry, medical examinations must be provided for workers who experience exposure at or above the PEL.
- **Records** must be kept on exposure monitoring for asbestos for at least 30 years, and worker medical surveillance records retained for the duration of employment plus 30 years. Training records must be kept for at least 1 year beyond the last date of employment.

Contact OSHA

For more information on this and other health-related issues impacting workers, to report an emergency, fatality or catastrophe, to order publications, to file a confidential complaint, or to request OSHA's free on-site consultation service, contact your nearest OSHA office, visit www.osha.gov, or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.

Worker Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- Get copies of test results that find and measure hazards.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules.
- OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation or discrimination.

For more information, see OSHA's workers page.

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For assistance, contact us. We can help. It's confidential.

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U.S. Department of Labor
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DEP FS-3507 01/2014

OSHA® FactSheet

Bloodborne Pathogen Exposure Incidents

OSHA's Bloodborne Pathogens standard (29 CFR 1910.1030) requires employers to make immediate confidential medical evaluation and follow-up available for workers who have an exposure incident, such as a needlestick. An exposure incident is a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials (OPIM), as defined in the standard that results from the performance of a worker's duties.

Reporting an Exposure Incident

Exposure incidents should be reported immediately to the employer since they can lead to infection with hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV), or other bloodborne pathogens. When a worker reports an exposure incident right away, the report permits the employer to arrange for immediate medical evaluation of the worker. Early reporting is crucial for beginning immediate intervention to address possible infection of the worker and can also help the worker avoid spreading bloodborne infections to others. Furthermore, the employer is required to perform a timely evaluation of the circumstances surrounding the exposure incident to find ways of preventing such a situation from occurring again.

Reporting is also important because part of the follow-up includes identifying the source individual, unless the employer can establish that identification is infeasible or prohibited by state or local law, and determining the source's HBV and HIV infectivity status. If the status of the source individual is not already known, the employer is required to test the source's blood as soon as feasible, provided the source individual consents. If the individual does not consent, the employer must establish that legally required consent cannot be obtained. If state or local law allows testing without the source individual's consent, the employer must test the individual's blood, if it is available. The results of these tests must be made available to the exposed worker and the worker must be informed of the laws and regulations about disclosing the source's identity and infectious status.

Medical Evaluation and Follow-up

When a worker experiences an exposure incident, the employer must make immediate confidential medical evaluation and follow-up available to the worker. This evaluation and follow-up must be: made available at no cost to the worker and at a reasonable time and place; performed by or under the supervision of a licensed physician or other licensed healthcare professional; and provided according to the recommendations of the U.S. Public Health Service (USPHS) current at the time the procedures take place. In addition, laboratory tests must be conducted by an accredited laboratory and also must be at no cost to the worker. A worker who participates in post-exposure evaluation and follow-up may consent to have his or her blood drawn for determination of a baseline infection status, but has the option to withhold consent for HIV testing at that time. In this instance, the employer must ensure that the worker's blood sample is preserved for at least 90 days in case the worker changes his or her mind about HIV testing.

Post-exposure prophylaxis for HIV, HBV, and HCV, when medically indicated, must be offered to the exposed worker according to the current recommendations of the U.S. Public Health Service. The post-exposure follow-up must include counseling the worker about the possible implications of the exposure and his or her infection status, including the results and interpretation of all tests and how to protect personal contacts. The follow-up must also include evaluation of reported illnesses that may be related to the exposure.

Written Opinion

The employer must obtain and provide the worker with a copy of the evaluating healthcare professional's written opinion within 15 days of completion of the evaluation. According to OSHA's standard, the **written opinion** should only include: whether hepatitis B vaccination was recommended for the exposed worker; whether or not the worker received the vaccination, and that the healthcare provider informed the worker of the results of the evaluation and any medical conditions resulting from exposure to blood or OPIM which require further evaluation or treatment. Any findings other than these are not to be included in the written report.

Additional Information

For more information, go to OSHA's Bloodborne Pathogens and Needlestick Prevention Safety and Health Topics web page at: https://www.osha.gov/SLTC/bloodbornepathogens/index.html.

To file a complaint by phone, report an emergency, or get OSHA advice, assistance, or products, contact your nearest OSHA office under the "U.S. Department of Labor" listing in your phone book, or call us toll-free at **(800) 321-OSHA (6742)**.

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www.osha.gov 1-800-321-6742

DSG 1/2011

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Hepatitis B Vaccination Protection

Hepatitis B virus (HBV) is a pathogenic microorganism that can cause potentially life-threatening disease in humans. HBV infection is transmitted through exposure to blood and other potentially infectious materials (OPIM), as defined in the OSHA Bloodborne Pathogens standard, 29 CFR 1910.1030.

Any workers who have reasonably anticipated contact with blood or OPIM during performance of their jobs are considered to have occupational exposure and to be at risk of being infected. Workers infected with HBV face a risk for liver ailments which can be fatal, including cirrhosis of the liver and primary liver cancer. A small percentage of adults who get hepatitis B never fully recover and remain chronically infected. In addition, infected individuals can spread the virus to others through contact with their blood and other body fluids.

An employer must develop an exposure control plan and implement use of universal precautions and control measures, such as engineering controls, work practice controls, and personal protective equipment to protect all workers with occupational exposure. In addition, employers must make hepatitis B vaccination available to these workers. Hepatitis B vaccination is recognized as an effective defense against HBV infection.

HBV Vaccination

The standard requires employers to offer the vaccination series to all workers who have occupational exposure. Examples of workers who may have occupational exposure include, but are not limited to, healthcare workers, emergency responders, morticians, first-aid personnel, correctional officers and laundry workers in hospitals and commercial laundries that service healthcare or public safety institutions. The vaccine and vaccination must be offered at no cost to the worker and at a reasonable time and place.

The hepatitis B vaccination is a non-infectious, vaccine prepared from recombinant yeast cultures, rather than human blood or plasma. There is no risk of contamination from other bloodborne pathogens nor is there any chance of developing HBV from the vaccine.

The vaccine must be administered according to the recommendations of the U.S. Public Health Service (USPHS) current at the time the procedure takes place. To ensure immunity, it is important for individuals to complete the entire course of vaccination contained in the USPHS recommendations.

The great majority of those vaccinated will develop immunity to the hepatitis B virus. The vaccine causes no harm to those who are already immune or to those who may be HBV carriers. Although workers may desire to have their blood tested for antibodies to see if vaccination is needed, employers cannot make such screening a condition of receiving vaccination and employers are not required to provide prescreening.

Employers must ensure that all occupationally exposed workers are trained about the vaccine and vaccination, including efficacy, safety, method of administration, and the benefits of vaccination. They also must be informed that the vaccine and vaccination are offered at no cost to the worker. The vaccination must be offered after the worker is trained and within 10 days of initial assignment to a job where there is occupational exposure, unless the worker has previously received the vaccine series, antibody testing has revealed that the worker is immune, or the vaccine is contraindicated for medical reasons. The employer must obtain a written opinion from the licensed healthcare professional within 15 days of the completion of the evaluation for vaccination. This written opinion is limited to whether hepatitis B vaccination is indicated for the worker and if the worker has received the vaccination.

Declining the Vaccination

Employers must ensure that workers who decline vaccination sign a declination form. The purpose of this is to encourage greater participation in the vaccination program by stating that a worker declining the vaccination remains at risk of acquiring hepatitis B. The form also states that if a worker initially declines to receive the vaccine, but at a later date decides to accept it, the employer is required to make it available, at no cost, provided the worker is still occupationally exposed.

Additional Information

For more information, go to OSHA's Bloodborne Pathogens and Needlestick Prevention Safety and Health Topics web page at: https://www.osha.gov/SLTC/bloodbornepathogens/index.html.

To file a complaint by phone, report an emergency, or get OSHA advice, assistance, or products, contact your nearest OSHA office under the "U.S. Department of Labor" listing in your phone book, or call us toll-free at (800) 321-OSHA (6742).

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DSG 1/2011

OSHA® FactSheet

OSHA's Bloodborne Pathogens Standard

Bloodborne pathogens are infectious microorganisms present in blood that can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV), the virus that causes AIDS. Workers exposed to bloodborne pathogens are at risk for serious or life-threatening illnesses.

Protections Provided by OSHA's Bloodborne Pathogens Standard

All of the requirements of OSHA's Bloodborne Pathogens standard can be found in Title 29 of the Code of Federal Regulations at 29 CFR 1910.1030. The standard's requirements state what employers must do to protect workers who are occupationally exposed to blood or other potentially infectious materials (OPIM), as defined in the standard. That is, the standard protects workers who can reasonably be anticipated to come into contact with blood or OPIM as a result of doing their job duties.

In general, the standard requires employers to:

- **Establish an exposure control plan.** This is a written plan to eliminate or minimize occupational exposures. The employer must prepare an exposure determination that contains a list of job classifications in which all workers have occupational exposure and a list of job classifications in which some workers have occupational exposure, along with a list of the tasks and procedures performed by those workers that result in their exposure.
- **Employers must update the plan annually** to reflect changes in tasks, procedures, and positions that affect occupational exposure, and also technological changes that eliminate or reduce occupational exposure. In addition, employers must annually document in the plan that they have considered and begun using appropriate, commercially-available effective safer medical devices designed to eliminate or minimize occupational exposure. Employers must also document that they have solicited input from frontline workers in identifying, evaluating, and selecting effective engineering and work practice controls.
- **Implement the use of universal precautions** (treating all human blood and OPIM as if known to be infectious for bloodborne pathogens).
- **Identify and use engineering controls.** These are devices that isolate or remove the bloodborne pathogens hazard from the workplace. They include sharps disposal containers, self-sheathing needles, and safer medical devices, such as sharps with engineered sharps-injury protection and needleless systems.
- **Identify and ensure the use of work practice controls**. These are practices that reduce the possibility of exposure by changing the way a task is performed, such as appropriate practices for handling and disposing of contaminated sharps, handling specimens, handling laundry, and cleaning contaminated surfaces and items.
- **Provide personal protective equipment (PPE), such as gloves, gowns, eye protection, and masks.** Employers must clean, repair, and replace this equipment as needed. Provision, maintenance, repair and replacement are at no cost to the worker.
- **Make available hepatitis B vaccinations to all workers with occupational exposure.** This vaccination must be offered after the worker has received the required bloodborne pathogens training and within 10 days of initial assignment to a job with occupational exposure.
- **Make available post-exposure evaluation and follow-up to any occupationally exposed worker who experiences an exposure incident.** An exposure incident is a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or OPIM. This evaluation and follow-up must be at no cost to the worker and includes documenting the route(s) of exposure and the circumstances

under which the exposure incident occurred; identifying and testing the source individual for HBV and HIV infectivity, if the source individual consents or the law does not require consent; collecting and testing the exposed worker's blood, if the worker consents; offering post-exposure prophylaxis; offering counseling; and evaluating reported illnesses. The healthcare professional will provide a limited written opinion to the employer and all diagnoses must remain confidential.

- **Use labels and signs to communicate hazards.** Warning labels must be affixed to containers of regulated waste; containers of contaminated reusable sharps; refrigerators and freezers containing blood or OPIM; other containers used to store, transport, or ship blood or OPIM; contaminated equipment that is being shipped or serviced; and bags or containers of contaminated laundry, except as provided in the standard. Facilities may use red bags or red containers instead of labels. In HIV and HBV research laboratories and production facilities, signs must be posted at all access doors when OPIM or infected animals are present in the work area or containment module.
- **Provide information and training to workers.** Employers must ensure that their workers receive regular training that covers all elements of the standard including, but not limited to: information on bloodborne pathogens and diseases, methods used to control occupational exposure, hepatitis B vaccine, and medical evaluation and post-exposure follow-up procedures. Employers must offer this training on initial assignment, at least annually thereafter, and when new or modified tasks or procedures affect a worker's occupational exposure. Also, HIV and HBV laboratory and production facility workers must receive specialized initial training, in addition to the training provided to all workers with occupational exposure. Workers must have the opportunity to ask the trainer questions. Also, training must be presented at an educational level and in a language that workers understand.
- **Maintain worker medical and training records.** The employer also must maintain a sharps injury log, unless it is exempt under Part 1904 -- Recording and Reporting Occupational Injuries and Illnesses, in Title 29 of the Code of Federal Regulations.

Additional Information

For more information, go to OSHA's Bloodborne Pathogens and Needlestick Prevention Safety and Health Topics web page at: https://www.osha.gov/SLTC/bloodbornepathogens/index.html.

To file a complaint by phone, report an emergency, or get OSHA advice, assistance, or products, contact your nearest OSHA office under the "U.S. Department of Labor" listing in your phone book, or call us toll-free at **(800) 321-OSHA (6742)**.

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OSHA® FactSheet

Cleanup Hazards

Cleanup work of any kind is hazardous, but flood conditions make it even more so. Following the procedures listed below will help to keep you safe and healthy while cleaning up after natural disasters that involve flooding.

Health Tips

- Take frequent rest breaks when lifting heavy, water-laden objects. Avoid overexertion and practice good lifting techniques. To help prevent injury, use teams of two or more to move bulky objects; avoid lifting any materials that weigh more than 50 pounds per person, and use proper automated lifting assistance devices if practical.
- When working in hot environments, have plenty of drinking water available, use sunscreen, and take frequent rest breaks. Wear light-colored, loose-fitting clothing.
- Be sure that a first-aid kit is available to disinfect any cuts or abrasions. Protect open cuts and abrasions with waterproof gloves or dressings.
- Wash your hands often during the day, especially before eating, drinking, or applying cosmetics.

General Precautions

- Use a wooden stick or pole to check flooded areas for pits, holes, and protruding objects before entering.
- Ensure that all ladders and scaffolds are properly secured prior to use.
- Conduct a preliminary worksite inspection to verify stability before entering a flooded or formerly flooded building or before operating vehicles over roadways or surfaces. Do not work in or around any flood-damaged building until it has been examined and certified as safe for work by a registered professional engineer or architect.
- Washouts, trenches, excavations, and gullies must be supported or their stability verified prior to entry. All trenches should be supported (e.g., with a trench box); if no support is available, the trench must be sloped at no less than a 1:1 (45°) angle for cohesive soil and angular gravel and a 1½:1 (34°) angle for granular soils including gravel, sand, and loamy sand or submerged soil or soil from which water is freely seeping.
- Establish a plan for contacting medical personnel in the event of an emergency.
- Report any obvious hazards (downed power lines, frayed electric wires, gas leaks or snakes) to appropriate authorities.
- Use fuel-powered generators outdoors. Do not bring them indoors, as they may pose a carbon monoxide (CO) hazard.
- Use life vests when engaged in activities that could result in deep water exposure.
- Use extreme caution when handling containers holding unknown substances or known toxic substances (for example, floating containers of household or industrial chemicals). Contact the EPA (Environmental Protection Agency) for information on disposal at the National Response Center (800) 424-8802.
- Do NOT use improvised surfaces (e.g., refrigerator racks) for cooking food or for boiling water to avoid exposure to heavy metals.

Clothing and Personal Protective Equipment

- Always wear watertight boots with a steel toe and insole, gloves, long pants, and safety glasses during cleanup operations; sneakers should NOT be worn because they will not prevent punctures, bites or crush injuries. Wear a hardhat if there is any danger of falling debris.
- Wear a NIOSH-approved dust respirator if working with moldy building materials or

vegetable matter (hay, stored grain, or compost).
- When handling bleach or other chemicals, follow the directions on the package; wear eye, hand, and face protection as appropriate; and have plenty of clean water available for eyewash and other first-aid treatments.

Electrical Hazards

- Do NOT touch downed power lines or any object or water that is in contact with such lines.
- Treat all power lines as energized until you are certain that the lines have been de-energized.
- Beware of overhead and underground power lines when clearing debris. Extreme caution is necessary when moving ladders and other equipment near overhead power lines to avoid inadvertent contact.
- If damage to an electrical system is suspected (for example, if the wiring has been under water, you can smell burning insulation, wires are visibly frayed, or you see sparks), turn off the electrical system in the building and follow lockout/tagout procedures before beginning work. Do not turn the power back on until electrical equipment has been inspected by a qualified electrician.
- When using a generator, be sure that the main circuit breaker is OFF and locked out prior to starting the generator. This will prevent inadvertent energization of power lines from backfeed electrical energy from generators and help protect utility line employees from possible electrocution.
- Be aware that de-energized power lines may become energized by a secondary power source such as a portable backup generator.
- Any electrical equipment, including extension cords, used in wet environments must be marked, as appropriate, for use in wet locations and must be undamaged. Be sure that all connections are out of water.
- All cord-connected, electrically operated tools and equipment must be grounded or be double insulated.
- Ground-fault circuit interrupters (GFCIs) must be used in all wet locations. Portable GFCIs can be purchased at hardware stores.

Fire Protection

- Immediately evacuate any building that has a gas leak until the leak is controlled and the area ventilated.
- Be sure that an adequate number of fire extinguishers are available and re-evaluate the fire evacuation plan.
- Be sure that all fire exits are clear of debris and sandbags.

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For more complete information:

OSHA® Occupational Safety and Health Administration

U.S. Department of Labor

www.osha.gov

(800) 321-OSHA

DSTM 10/2005

OSHA® FactSheet

CONTROL SILICA DUST
Breathe Easier

CONTROL OF SILICA DUST IN CONSTRUCTION

Crushing Machines

Using crushing machines at construction sites to reduce the size of large rocks, concrete, or construction rubble can generate *respirable crystalline silica* dust. When inhaled, the small particles of silica can irreversibly damage the lungs. This fact sheet describes dust controls that can be used to minimize the amount of airborne dust when using crushing machines as listed in Table 1 of the Respirable Crystalline Silica Standard for Construction 29 CFR 1926.1153.

Engineering Control Method: Wet Methods ***AND*** Operator Isolation

The use of water sprays or mists for dust suppression at the points where dust is generated (e.g., hoppers, conveyers, sieves/sizing or vibrating components, and discharge points) can control dust exposures when operating crushers. In addition, operator isolation through the use of a remote control station or ventilated booth that provides fresh, climate-controlled air to the operator must also be used to control exposure when operating crushers at construction sites.



Photo courtesy of Screen Machine Industries

Crushing machine being loaded with construction debris by an excavator.

Wet Methods

Wet spray methods can greatly reduce the silica exposure levels of operators and laborers who work near crushers, tending the equipment, removing jammed material from hoppers, picking debris out of the material stream, and performing other tasks.

The crusher must be operated and maintained in accordance with the manufacturer's instructions to minimize dust emissions. Make sure to:

- **Locate** nozzles upstream of dust generation points.
- **Position** nozzles to thoroughly wet the material.
- **Ensure** the volume and size of droplets is adequate to sufficiently wet the material (optimal droplet size is between 10 and 150 µm).
- **Ensure** nozzles provide complete water coverage but are not so far that the water is carried away by wind.

Operator Isolation

Operator isolation for crushing machines includes using either an enclosed booth or a remote control station. Operators using crushing machines with enclosed cabs can limit their silica exposure by staying inside the cab during crushing operations. The enclosed cab must:

- Be well-sealed and well-ventilated using positive pressure.
- Have door jambs, window grooves, power-line entries and other joints that work properly and are tightly sealed.
- Have heating and air conditioning so that operators can keep windows and doors closed.
- Use an intake air filter with a minimum MERV-16 rating (at least 95 percent in the 0.3-10.0 µm range).

- Be kept free from settled dust by regular cleaning and maintenance to prevent dust from become airborne inside the enclosed booth.

An alternative method for operator isolation is to use a remote control station located a sufficient distance upwind to limit exposure to silica containing dust.

Respiratory Protection

When properly used, water sprays with either ventilated booths or remote control stations can in most cases effectively limit exposure to airborne dust. Therefore, Table 1 in the silica standard for construction does not require use of respiratory protection when using crushers at construction sites when the machines are equipped with water sprays along with either control booths or remote controls stations.

Additional Information

For more information, visit www.osha.gov/silica and see the OSHA Fact Sheet on the Crystalline Silica Rule for Construction, and the Small Entity Compliance Guide for the Respirable Crystalline Silica Standard for Construction.

OSHA can provide compliance assistance through a variety of programs, including technical assistance about effective safety and health programs, workplace consultations, and training and education. OSHA's On-Site Consultation Program offers free, confidential occupational safety and health services to small and medium-sized businesses in all states and several territories across the country, with priority given to high-hazard worksites. On-Site consultation services are separate from enforcement and do not result in penalties or citations. To locate the OSHA On-Site Consultation Program nearest you, visit www.osha.gov/consultation.

Workers' Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

For additional information, see OSHA's Workers page.

How to Contact OSHA

Under the Occupational Safety and Health Act of 1970, employers are responsible for providing safe and healthful workplaces for their employees. OSHA's role is to ensure these conditions for America's working men and women by setting and enforcing standards, and providing training, education and assistance. For more information, visit www.osha.gov or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.

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DSG FS-3935 12/2017

OSHA® FactSheet

CONTROL SILICA DUST
Breathe Easier

CONTROL OF SILICA DUST IN CONSTRUCTION
Drivable Saws

Using a drivable saw to cut masonry, concrete, stone, or other silica-containing materials can generate *respirable crystalline silica* dust. When inhaled, the small particles of silica can irreversibly damage the lungs. This fact sheet describes dust controls that can be used to minimize the amount of airborne dust when using drivable saws as listed in Table 1 of the Respirable Crystalline Silica Standard for Construction, 29 CFR 1926.1153.

Engineering Control Method: Water continuously fed to saw blade

Wet Cutting

Wet cutting is an effective method to reduce exposure to silica dust when outdoors using drivable saws equipped with an integrated water delivery system. This system directs a continuous stream of water onto the blade where it wets the materials being cut and reduces the amount of dust generated. These saws have built-in water tanks, or water is supplied to the saw from a source such as a hose connected to a faucet or portable tank. Water flow rates must be sufficient to minimize the release of visible dust.



Photo courtesy of Husqvarna

A construction worker cutting pavement using a drivable saw with an integrated water delivery system.

The saw must be operated and maintained in accordance with manufacturers' instructions to minimize dust emissions. Focus on the following areas:

- **Check** that hoses are securely connected and are not cracked or broken.
- **Adjust** nozzles so that water goes to the blade and wets the cutting area.
- **Inspect** the saw blade before use to be sure it is in good condition and does not show excessive wear.

Clean up any slurry produced during wet cutting to prevent the slurry from drying and releasing silica dust into the air. Wet slurry can be cleaned up using shovels or a wet vacuum equipped with a HEPA filter.

If employers operate drivable saws indoors or in an enclosed area, they must conduct an exposure assessment and may need to take additional action.

Electrical Safety. Where water is used to control dust, electrical safety is a particular concern. Use ground-fault circuit interrupters (GFCIs) and watertight, sealable electrical connectors for electric tools and equipment on construction sites.

Respiratory Protection

When properly used outdoors, wet methods can effectively control silica dust. Therefore, Table 1 in the silica standard does not require use of respiratory protection when using wet methods

for outdoor operation of drivable saws. Table 1 does not apply to drivable saws used indoors or in enclosed areas. Therefore, if drivable saws are operated indoors or in an enclosed area, employers must conduct an exposure assessment and may need to take additional action including the use of respiratory protection.

When respirators are required, employers must put in place a written respiratory protection program in accordance with OSHA's Respiratory Protection standard 29 CFR 1910.134.

Additional Information

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- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

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OSHA® FactSheet

CONTROL SILICA DUST
Breathe Easier

CONTROL OF SILICA DUST IN CONSTRUCTION
Handheld and Stand-Mounted Drills

The use of handheld and stand-mounted drills, impact and rotary hammer drills, and similar tools used to drill holes in concrete, masonry, or other silica-containing materials can generate *respirable crystalline silica* dust. When inhaled over time, the small particles of silica can irreversibly damage the lungs. This fact sheet describes dust controls that can be used to minimize the amount of airborne dust when using handheld and stand-mounted drills as listed in Table 1 of the Respirable Crystalline Silica Standard for Construction, 29 CFR 1926.1153.

Engineering Control Method: Vacuum Dust Collection System

Vacuum Dust Collection System (VDCS)

When using handheld or stand mounted drills to drill into concrete or other materials that contain crystalline silica, reduce exposure to silica dust by enclosing the drill in a commercially available shroud or cowling with a vacuum attached to capture the silica dust as it is generated around the drill bit.

A VDCS is commercially available in a variety of designs that include a dust collection device (shroud or cowling), vacuum, hose, filter, and filter-cleaning mechanism. These systems are typically available integrated into the tools or as add-on systems.

The VDCS must be equipped with a:

- Shroud or cowling sized to fit around the drill bit that is compatible with the manufacturer's vacuum system;
- Vacuum that is rated to provide the airflow recommended by the tool manufacturer or greater to remove dust at the drilling point; and
- Air filter with a 99 percent or greater efficiency and a filter cleaning mechanism.

The drill and VDCS must be operated and maintained in accordance with the manufacturer's instructions to minimize dust emissions. Focus on the following areas:

- **Keep** the vacuum hose clear and free of debris, kinks and tight bends.
- **Activate** any non-automatic filter-cleaning mechanism as needed to reduce dust buildup on the filter.
- **Change** vacuum-collection bags as needed.
- **Set** a schedule for filter cleaning and maintenance.
- **Avoid** exposure to dust when changing vacuum bags and cleaning or replacing air filters.

When necessary to clean the dust and debris from the drilled holes, a HEPA-filtered vacuum system must be used to capture the dust.



Photo courtesy of OSHA

Worker drilling into concrete with a rotary hammer equipped with a shroud and dust collection system.

Indoors or in Enclosed Areas

Using a VDCS indoors or in enclosed areas may not reliably keep silica exposures low, so extra ventilation may be needed to reduce visible airborne dust. Extra ventilation can be supplied by using:

- Exhaust trunks
- Portable exhaust fans
- Air ducts
- Other means of mechanical ventilation

Ensure air flow is not impeded by the movements of employees during work, or by the opening or closing of doors and windows. Position the ventilation to move contaminated air away from the workers' breathing zones.

Compressed Air. Unless there is a ventilation system that effectively captures the dust cloud, do not use compressed air or blowers to clean surfaces, clothing or filters because it can increase exposure to silica. Instead, clean with a HEPA-filter equipped vacuum or by wet methods.

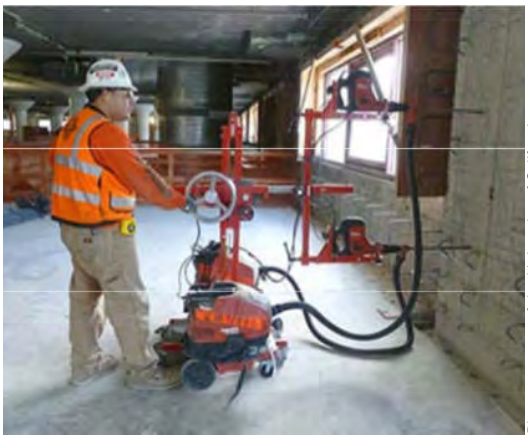


Photo courtesy of the University of California, Berkeley (D. Rempel)

Worker drilling horizontal holes in a concrete wall using two stand-mounted drills equipped with two dust collectors. Note that the shrouds around drill bits, black hose, and dust collector are attached conveniently to the stand.

Respiratory Protection

When properly used, a VDCS can reduce airborne dust levels to below the permissible exposure limit (PEL) of 50 µg/m^3, calculated as an 8-hour time-weighted average. Therefore, respiratory protection is not required when using drills equipped with a VDCS and a filter cleaning mechanism as specified earlier.

Additional Information

For more information, visit www.osha.gov/silica and see the OSHA Fact Sheet on the Crystalline Silica Rule for Construction, and the Small Entity Compliance Guide for the Respirable Crystalline Silica Standard for Construction.

OSHA can provide compliance assistance through a variety of programs, including technical assistance about effective safety and health programs, workplace consultations, and training and education. OSHA's On-Site Consultation Program offers free, confidential occupational safety and health services to small and medium-sized businesses in all states and several territories across the country, with priority given to high-hazard worksites. On-Site consultation services are separate from enforcement and do not result in penalties or citations. To locate the OSHA On-Site Consultation Program nearest you, visit www.osha.gov/consultation.

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DSG FS-3630 12/2017

OSHA® FactSheet

CONTROL SILICA DUST
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CONTROL OF SILICA DUST IN CONSTRUCTION
Handheld Power Saws

Using a handheld power saw (also called a cut-off saw) to cut masonry, concrete, stone, or other silica-containing materials can generate *respirable crystalline silica* dust. When inhaled, the small particles of silica can irreversibly damage the lungs. This fact sheet describes dust controls that can be used to minimize the amount of dust that gets into the air when using handheld power saws with an integrated water delivery system as listed in Table 1 of the Respirable Crystalline Silica Standard for Construction, 29 CFR 1926.1153. This fact sheet does not apply to handheld saws used to cut fiber-cement board.

Engineering Control Method: Water applied continuously to the saw blade

Wet Cutting

Many handheld power saws come equipped with an integrated water delivery system designed to cool the blade by directing a continuous stream of water onto the blade where it wets the material being cut and reduces the amount of dust generated when cutting. Water can be supplied to the saw by either a pressurized container or by a constant water supply such as a hose connected to a faucet or construction site water supply. Water flow rates must be sufficient to minimize release of visible dust.



Photo courtesy of OSHA

A construction worker using a handheld power saw with an integrated water delivery system.

The saw must be operated and maintained in accordance with manufacturer's instructions to minimize dust emissions. Focus on the following areas:

- **Check** that hoses are securely connected and are not cracked or broken.
- **Adjust** nozzles so that water goes to the blade and wets the cutting area.
- **Inspect** the saw blade before use to be sure it is in good condition and does not show excessive wear.
- **Maintain** and operating the saw's dust-control equipment based on the manufacturer's instructions.

Clean up any slurry produced to prevent the slurry from drying and releasing silica dust into the air. Wet slurry can be cleaned up using, for example, shovels or a wet vacuum equipped with a HEPA filter.

Wet Cutting Indoors or in Enclosed Areas

Wet cutting indoors or in enclosed areas may not reliably keep silica exposures low, so extra ventilation or a means of exhaust may be needed to reduce visible airborne dust. Extra ventilation can be supplied by using:

- Exhaust trunks
- Portable exhaust fans
- Air ducts
- Other means of mechanical ventilation

Ensure air flow is not impeded by the movements of employees during work, or by the opening or closing of doors and windows. Position the ventilation to move contaminated air away from the workers' breathing zones.

Electrical Safety. Where water is used to control dust, electrical safety is a particular concern. Use ground-fault circuit interrupters (GFCIs) and watertight, sealable electrical connectors for electric tools and equipment on construction sites.

Respiratory Protection

In addition to using wet cutting methods, respiratory protection with a minimum Assigned Protection Factor **(APF) of 10** is required on Table 1 when wet cutting with handheld masonry saws **indoors or in an enclosed** area, or used outdoors for **more than four hours** per shift.

When respirators are required, employers must put in place a written respiratory protection program in accordance with OSHA's Respiratory Protection standard 29 CFR 1910.134.

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- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

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How to Contact OSHA

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U.S. Department of Labor

OSHA® Occupational Safety and Health Administration

DSG FS-3627 12/2017

OSHA® FactSheet

Electric Power Generation, Transmission and Distribution: Fall Protection Requirements

This fact sheet discusses specific fall protection requirements in OSHA's revised §1910.269 and §1926, Subpart V. Employers doing work covered by these revised Electric Power Generation, Transmission and Distribution standards must assess the worksite where fall protection is needed to protect workers.

Employers must provide workers with the required fall personal protective equipment (PPE), train workers on its proper use, and on how to abate related hazards. Key PPE requirements for fall protection include:

- Employers generally must ensure that workers use personal fall arrest systems, fall restraint systems, or work-positioning equipment, as appropriate, when they work in elevated locations more than 4 feet (1.2 meters) above the ground on poles, towers, or similar structures. A personal fall arrest system must be rigged so that a worker cannot contact a lower level or free fall more than 6 feet.
- Employers must ensure that their workers using aerial lifts use either a fall restraint system or a personal fall arrest system. A *body belt is never acceptable* as part of a personal fall arrest system, but it is acceptable as part of a fall restraint system. A fall restraint system must be designed to prevent a worker from falling *any* distance.
- Work-positioning equipment typically consists of a body belt or body harness, rigged to allow a worker to be supported on an elevated vertical surface, such as a utility pole or tower leg, and to work with both hands free while leaning. Work-positioning systems must be rigged to *prevent a free fall of more than 2 feet (0.6 meters).*
- If workers are exposed to hazards from flames or electric arcs, personal fall arrest systems must be capable of passing a drop test after exposure to an electric arc with heat energy of 40 ±5 cal/cm^2. In addition, use of fall protection must also comply with the requirements in either Subpart D for maintenance, or in Subpart M for construction.
- Like all PPE, fall protection equipment must be inspected before use to ensure that the equipment is in safe working condition, and workers must be trained on its proper use. Fall protection equipment that is not in safe working condition may not be used.
- The personal protective equipment required by these standards must be provided by the employer at no cost to employees (see 29 CFR 1910.132 and 29 CFR 1926.95).

For additional information, see www.osha.gov/dsg/power_generation.

Workers' Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

For more information, see OSHA's Workers page.

How to Contact OSHA

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U.S. Department of Labor

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OSHA® FactSheet

Electric Power Generation, Transmission and Distribution: Electrical Protective Equipment Requirements

This fact sheet discusses electrical protective equipment requirements for work covered by OSHA's revised Electric Power Generation, Transmission and Distribution standards. Where these requirements apply, employers must provide the appropriate protective equipment at no cost to workers, train workers on its proper use, and ensure that their workers use it.

Key requirements include:

- The use of rubber insulating equipment requires the following *(specific requirements found in §1910.137 and §1926.97).*
    - Outer protector gloves must generally be worn over Class 00 to 4 insulating gloves. *(Insulating gloves may be used without outer protector gloves, but only under limited use conditions).*
    - Electrical protective equipment must be periodically tested in accord with the test tables found in the standard(s).
    - Insulating equipment must be inspected for damage before each day's use. Equipment found defective must be taken out-of-service until repaired and retested.
    - The employer must certify that this equipment has been tested. The certification must identify the equipment which passed the test, and the date tested. The only two acceptable ways of meeting this certification requirement are marking the information directly on the equipment, or entering the information in logs.
    - The employer must provide paid time for workers to conduct required testing and inspection of equipment.
- The use of arc-rated protective clothing requires the following *[specific requirements are in §1910.269(l) and §1926.960(g)]*:
    - The employer must assess the workplace to identify which workers could be exposed to flames or electric arc hazards, and then make estimates (based on acceptable methods) of the incident heat energy to which the worker could be exposed.
    - When the estimated incident heat energy exceeds 2.0 cal/cm^2 the employer must ensure that exposed workers wear appropriate arc-rated protective clothing and other protective equipment.
    - The arc-rated protective clothing and other protective equipment generally must cover the worker's entire body, except for hands, feet, head and face, which may be protected by other PPE.
- Appendix E in both §1910.269 and §1926 Subpart V, provides guidance on estimating available heat energy, and contains additional information on the selection of appropriate protection.

For additional information, see www.osha.gov/dsg/power_generation.

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U.S. Department of Labor

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OSHA® FactSheet

Working Safely Around Downed Electrical Wires

Electrical hazards multiply for workers involved in cleanup and recovery efforts following major disasters and weather emergencies. Life-threatening danger exists around downed and low-hanging electrical wires which can still be energized following a storm.

Safety First

Always consider all electrical equipment, lines and conductors to be energized. If you notice downed wires or damaged electrical equipment, contact appropriate utility personnel if you can. Circuits do not always turn off when a power line falls into a tree or onto the ground. Reloaders automatically try to reset circuits and restore power when it is interrupted. Even if electric lines are not sparking or humming, fallen electric lines can electrocute you if you touch them or the ground nearby.

Energy

Downed wires can energize other nearby objects, such as fences, water pipes, bushes and trees, buildings, and telephone/CATV/ fiber optic cables. Even manhole castings and reinforcement bars (rebar) in pavement can become energized by downed wires. During storms, wind-blown objects such as canopies, aluminum roofs, siding, and sheds can also be energized by downed wires.

Backfeed

The improper connection of portable generators to a building's electrical system is one way hazardous backfeed conditions are created! Backfeed is a hazardous condition created when temporary sources of electricity (such as a generator) are connected to the damaged permanent system causing electricity to flow inside and outside a structure through connected lines and equipment. In emergency conditions, portable generators should only be used as standalone sources of power, and (except for properly wired by-pass or isolation connections) not connected to a building's electrical system. If a generator is connected to a building's electrical system, it must be done with a properly installed main breaker bypass to prevent electricity from flowing out of the building and into downed power lines.

Some other sources of backfeed include:

- Circuit ties/switch points
- Lightning
- Downstream events

Always ensure that proper lockout/tagout procedures are followed to avoid connecting two electrical sources to the same circuit.

Rules to Live By

- Do **not** assume that a downed power line is safe simply because it is on the ground or it is not sparking.
- Do **not** assume that any wire is a harmless telephone, television, or fiber-optic cable, and does not carry lethal current.
- Treat everything electrical as energized until tested and proven to be de-energized.
- Never go near a downed or fallen electric power line.
- Electricity can spread outward through the ground in a circular shape from the point of contact. As you move away from the center, large differences in voltages can be created.
- Never drive over downed power lines. Assume that they are energized.
- If contact is made with an energized power line while you are in a vehicle, remain calm and do not get out unless the vehicle is on fire. If possible, call for help.
- If you must exit any equipment because of fire or other safety reasons, try to jump completely clear, making sure that you do not

touch the equipment and the ground at the same time. Land with both feet together and shuffle away in small steps to minimize the path of electric current and avoid electrical shock. Be careful to maintain your balance.

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U.S. Department of Labor

OSHA® Occupational Safety and Health Administration

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OSHA FactSheet

Electrical Safety Hazards of Overloading Cable Trays

According to the 2005 National Electrical Code® (NEC), a cable tray system is "[a] unit or assembly of units or sections and associated fittings forming a structural system used to securely fasten or support cables and raceways." Cable trays support cable across open spans in the same manner that roadway bridges support traffic. Cable trays are not raceways, and are treated as a structural component of a facility's electrical system. Cable trays are a part of a planned cable management system to support, route, protect and provide a pathway for cable systems.

Cable trays feature flexibility unmatched by conduit, as cables are easier to mark, remove and find in cable trays. Cable trays are available in a number of different configurations, including ladder, ventilated trough, ventilated channel, solid bottom, wire mesh, single rail, and other similar structures. They are manufactured in steel, aluminum, and fiber reinforced plastic (FRP), although aluminum accounts for about 70% of the cable trays used in industry today.

Overloading cable trays

Cable trays come in a wide variety of sizes. The appropriate size and number of cable trays depends directly on the number and size of conductors intended and the allowable fill area as specified in the NEC. Also, since cable trays offer flexibility for modification and expansion, engineers and designers should plan cable tray systems to be sized and designed to anticipate both current and future needs.

Cable tray fill is addressed in the 2005 edition of NEC Sections 392.8, 392.9, 392.10, and 392.12. The type of cable tray (e.g., solid, ventilated), ampacity requirements, and the type and voltage rating of cable used determines the allowable fill for each cable tray — ventilated cable trays provide for the greatest allowable fill due to increased airflow. A generic guideline provided by The Cable Tray Institute indicates that cable trays should not be filled in excess of 40-50% of the inside area of the tray or of the maximum weight based on the cable tray specifications. The NEC provides specific and more detailed requirements for cable tray fill. In any case, the best strategy is to review and follow the rules set out in the NEC and the manufacturer's installation guides when installing cables in cable trays.

Hazards associated with overloaded cable trays

Overfilling and improperly securing wires in cable trays can lead to a number of serious hazards. Weight is one issue; all cable trays and their associated supports are rated for a specific maximum weight, based partly on the allowable fill area and the spacing of the cable tray supports. Overloading cable trays can lead to a breakdown of the tray, its connecting points, and/or supports, causing hazards to persons underneath the cable tray and even leading to possible electric shock and arc-flash/blast events from component failure when the cables are suddenly no longer supported. Additionally, cables in trays can be damaged by improperly securing and installing other cables and wires in the same cable tray.

The NEC requirements for cable tray fill also consider the heat buildup in conductors while current flows. When cable trays are overloaded, excessive heat buildup in and around live conductors can cause the insulation to break down, leading to potential shock hazards or fires. Fires can occur either in the cable tray (which may provide a fire path) or in combustible materials near the cable tray. Furthermore, the improper use of flexible cord could lead to the spread of toxic fumes if a fire were to occur.

Grounding of cable tray systems is essential for personal safety and protection against arc-

ing that can occur anywhere in the wiring system. Proper grounding must be done before cables are installed and tested before cables are energized. In addition to these general requirements, metallic cable tray systems supporting electrical conductors must be electrically continuous and effectively bonded as per the requirements of the 2005 edition of NEC Section 392.7.

Recognizing overloaded cable trays

Recognizing overloaded cable trays is not difficult. The fill values for cable trays specified in the 2005 NEC range from a single layer to roughly a 50% fill of the cross-sectional area of the cable tray. If visual observation reveals a cable tray that is completely full and/or overflowing with cables, chances are that the cable tray is in violation of both the National Electrical Code and OSHA requirements. One of the major culprits associated with overloaded cable trays are abandoned cables within the tray. These abandoned cables should be removed; and in fact, section 590.3(D) and various sections in Chapter 8 of the 2005 NEC specifically require removal of abandoned temporary wiring and communication cable installed within a cable tray.

Wiring methods permitted in cable trays

Any wiring methods used in cable trays must be listed by a Nationally Recognized Testing Laboratory as suitable for use in cable trays and in the environment in which it is installed. Table 392.3(A) of the NEC and OSHA's 1910.305(a)(3)(i) provide corresponding lists of conductors and raceways permitted in cable tray systems. Additionally, NEC Section 392.3(B) and OSHA's 1910.305(a)(3)(i)(B) allow other specific conductors in industrial establishments where maintenance and supervision assure that only qualified persons will service the cable tray systems. Flexible cords are not currently listed for use in cable trays (NEC Article 400, OSHA, 1910.305(g)) as they are prohibited as a replacement for the fixed wiring of a structure. The insulation on flexible cords can break down and become brittle over the years, which can lead to shorts and fires containing toxic fumes.

Standards and regulations that apply to cable trays

Cable trays were first covered in the 1965 edition of the NEC, under Continuous Rigid Cable Supports. Today, the use and installation of cable trays is covered by Article 392 of the NEC, and by OSHA regulations in 29 CFR 1910.305(a)(3) and 1910.399, or comparable standards promulgated by States operating OSHA-approved State plans. Specific permitted uses of cable trays are covered by the 2005 edition of NEC Section 392.3 and OSHA's 1910.305(a)(3)(i); uses not permitted are addressed in NEC 392.4 and OSHA's 1910.305(a)(3)(ii). Other sections and articles of the NEC are referenced throughout Article 392 for specific installation and use issues. The National Electrical Manufacturers Association (NEMA) also publishes three standards that apply to the proper manufacture and installation of cable trays: ANSI/NEMA-VE 1-1998, Metal Cable Tray Systems; NEMA-VE 2-1996, Metal Cable Tray Installation Guidelines; and NEMA-FG-1998, Nonmetallic Cable Tray Systems.

For more information

National Electrical Code®, (2005 Edition) Article 392 (See also NEC Handbook).

OSHA 29 CFR 1910.305(a)(3) and 1910.399.

Cable Tray Institute (http://www.cabletrays.com).

The Cable Tray Manufacturer's Installation and Use Instructions.

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For more complete information:

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(800) 321-OSHA

DSTM 03/2006

OSHA® FactSheet

Emergency Exit Routes

How would you escape from your workplace in an emergency? Do you know where all the exits are in case your first choice is too crowded? Are you sure the doors will be unlocked and that the exit access, such as a hallway, will not be blocked during a fire, explosion, or other crisis? Knowing the answers to these questions could keep you safe during an emergency.

What is an *exit route*?

An *exit route* is a continuous and unobstructed path of exit travel from any point within a workplace to a place of safety. An *exit route* consists of three parts:

- **Exit access** – portion of an *exit route* that leads to an exit.
- **Exit** – portion of an *exit route* that is generally separated from other areas to provide a protected way of travel to the *exit discharge*.
- **Exit discharge** – part of the *exit route* that leads directly outside or to a street, walkway, refuge area, public way, or open space with access to the outside.

How many *exit routes* must a workplace have?

Normally, a workplace must have at least two exit routes to permit prompt evacuation of employees and other building occupants during an emergency. More than two exits are required, however, if the number of employees, size of the building, or arrangement of the workplace will not allow employees to evacuate safely. *Exit routes* must be located as far away as practical from each other in case one is blocked by fire or smoke.

Exception: If the number of employees, the size of the building, its occupancy, or the arrangement of the workplace allows all employees to evacuate safely during an emergency, one *exit route* is permitted.

What are some other design and construction requirements for exit routes?

- *Exit routes* must be permanent parts of the workplace.
- *Exit discharges* must lead directly outside or to a street, walkway, refuge area, public way, or open space with access to the outside. These *exit discharge* areas must be large enough to accommodate the building occupants likely to use the *exit route*.
- *Exit stairs* that continue beyond the level on which the *exit discharge* is located must be interrupted at that level by doors, partitions, or other effective means that clearly indicate the direction of travel leading to the *exit discharge*.
- *Exit route* doors must be unlocked from the inside. They must be free of devices or alarms that could restrict use of the *exit route* if the device or alarm fails.
- Side-hinged exit doors must be used to connect rooms to *exit routes*. These doors must swing out in the direction of exit travel if the room is to be occupied by more than 50 people or if the room is a high-hazard area.
- *Exit routes* must support the maximum permitted occupant load for each floor served, and the capacity of an *exit route* may not decrease in the direction of *exit route* travel to the *exit discharge*.
- Ceilings of *exit routes* must be at least 7 feet, 6 inches high.
- An exit access must be at least 28 inches wide at all points. Where there is only one exit access leading to an exit or exit discharge, the width of the exit and exit discharge must be at least equal to the width of the exit access. Objects that project into the exit must not reduce its width.
- Outdoor *exit routes* are permitted but must meet the minimum height and width requirement for indoor *exit routes* and must
  - have guardrails to protect unenclosed sides if a fall hazard exists;
  - be covered if snow or ice is likely to accumulate, unless the employer can demonstrate accumulations will be removed before a slipping hazard exists;
  - be reasonably straight and have smooth, solid, substantially level walkways;and
  - not have a dead-end longer than 20 feet.

What are the requirements for exits?

- *Exits* must be separated by fire resistant materials—that is, one-hour fire-resistance rating if the exit connects three or fewer stories and two-hour fire-resistance rating if the exit connects more than three floors.
- *Exits* are permitted to have only those openings necessary to allow access to the *exit* from occupied areas of the workplace or to the *exit discharge*. Openings must be protected by a self-closing, approved *fire door* that remains closed or automatically closes in an emergency.

What are the maintenance, safeguarding, and operational features for exit routes?

OSHA standards require employers to do the following:

- Keep e*xit routes* free of explosive or highly flammable furnishings and other decorations.
- Arrange *exit routes* so employees will not have to travel toward a high-hazard area unless the path of travel is effectively shielded from the high-hazard area.
- Ensure that e*xit routes* are unobstructed such as by materials, equipment, locked doors, or dead-end corridors.
- Ensure that safeguards designed to protect employees during an emergency remain in good working order.
- Provide lighting for *exit routes* adequate for employees with normal vision.
- Keep *exit route* doors free of decorations or signs that obscure the visibility of *exit route doors*.
- Post signs along the *exit access* indicating the direction of travel to the nearest *exit* and *exit discharge* if that direction is not immediately apparent. Also, the line-of-sight to an exit sign must be clearly visible at all times.
- Mark doors or passages along an *exit access* that could be mistaken for an *exit* "Not an Exit" or with a sign identifying its use (such as "Closet").
- Install "EXIT" signs in plainly legible letters.
- Renew fire-retardant paints or solutions often enough to maintain their fire-retardant properties.
- Maintain e*xit routes* during construction, repairs, or alterations.
- Provide an emergency alarm system to alert employees, unless employees can promptly see or smell a fire or other hazard in time to provide adequate warning to them.

Are employers required to have emergency action plans?

If you have *10 or fewer employees*, you may communicate your plan orally. If you have *more than 10 employees*, however, your plan must be written, kept in the workplace, and available for employee review. Although employers are required to have an emergency action plan (EAP) only when the applicable OSHA standard requires it, OSHA strongly recommends that all employers have an EAP. Here are the OSHA standards that require EAPs:

- Process Safety Management of Highly Hazardous Chemicals - 1910.119
- Fixed Extinguishing Systems, General - 1910.160
- Fire Detection Systems, 1910.164
- Grain Handling - 1910.272
- Ethylene Oxide - 1910.1047
- Methylenedianiline - 1910.1050
- 1,3-Butadiene - 1910.1051

What are the minimum elements of an emergency action plan?

- Procedures for reporting fires and other emergencies.
- Procedures for emergency evacuation, including the type of evacuation and *exit route* assignments.
- Procedures for employees who stay behind to continue critical plant operations.
- Procedures to account for all employees after evacuation.
- Procedures for employees performing rescue or medical duties.
- Name or job title of employees to contact for detailed plan information.
- Alarm system to alert workers.

In addition, you must designate and train employees to assist in a safe and orderly evacuation of other employees. You must also review the emergency action plan with each employee covered when the following occur:

- Plan is developed or an employee is assigned initially to a job.
- Employee's responsibilities under the plan changes.
- Plan is changed.

Must all employers have fire prevention plans?

If you have *10 or fewer employees*, you may communicate your plan orally. If you have *more than 10 employees*, however, your plan must be written, kept in the workplace, and available for employee review. Although employers are only required to have a fire prevention plan (FPP) when the applicable OSHA standard requires it, OSHA strongly recommends that all employers have a FPP. The following OSHA standards require fire prevention plans:

- Ethylene Oxide - 1910.1047
- Methylenedianiline - 1910.1050
- 1,3-Butadiene - 1910.1051

Here are the minimum provisions of a fire prevention plan:

- List of all major fire hazards, proper handling and storage procedures for hazardous materials, potential ignition sources and their control, and the type of fire protection equipment necessary to control each major hazard.
- Procedures to control accumulations of flammable and combustible waste materials.
- Procedures for regular maintenance of safeguards installed on heat-producing equipment to prevent the accidental ignition of combustible materials.
- Name or job title of employees responsible for maintaining equipment to prevent or control sources of ignition or fires.
- Name or job title of employees responsible for the control of fuel source hazards.

In addition, when you assign employees to a job, you must inform them of any fire hazards they may be exposed to. You must also review with each employee those parts of the fire prevention plan necessary for self-protection.

How can I get more information on *exit route* safety?

For more detail on exit routes and related standards see *Exit Routes, Emergency Action Plans, and Fire Prevention Plans* in *Title 29 of the Code of Federal Regulations* (*CFR*) 1910.33-39; and OSHA Directive CPL 2-1.037, *Compliance Policy for Emergency Action Plans and Fire Prevention Plans*. In addition, employers who comply with the exit route provisions of the National Fire Protection Association's 101-2009, *Life Safety Code*, or the exit provisions of the International Fire Code, 2009, will be considered in compliance with the OSHA requirements for exit routes.

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U.S. Department of Labor

OSHA® Occupational Safety and Health Administration

DSG FS-3943 03/2018

OSHA INFOSHEET

Health Effects from Contaminated Water in Eyewash Stations

Eyewash stations used in workplaces must be maintained to prevent injury and illness to workers. This InfoSheet provides updated information on eyewash station hazards.

Eyewash stations are critical emergency safety equipment intended to mitigate eye injuries when control methods do not prevent exposure to a physical or chemical irritant or a biological agent. The ANSI standard for eyewashes specifies that eyewashes must be capable of delivering tepid flushing fluid to the eyes not less than 1.5 liters per minute (0.4 gpm) for 15 minutes after a single movement and subsequent hands-free operation. Whether the eyewash station is permanently connected to a source of potable water (i.e., plumbed) or has self-contained flushing fluid, improper maintenance may present health hazards that can worsen or cause additional damage to a worker's eye.

Where are eyewash stations used?

Eyewash facilities are required in workplaces where corrosive chemicals are used (29 CFR 1910.151(c)), as well as in HIV and HBV research laboratories and production facilities (1910.1030(e)(3)(i)), and where there is any possibility that an employee's eyes may be splashed with solutions containing 0.1 percent or greater formaldehyde (1910.1048(i)(3)). They may also be found in research and production laboratories, in medical facilities and other workplaces with materials that may cause injury to or infection of the eyes.

How can improperly maintained eyewash stations cause infections?

Water found in improperly maintained eyewash stations is more likely to contain organisms (*e.g., Acanthamoeba*, *Pseudomonas*, *Legionella*) that thrive in stagnant or untreated water and are known to cause infections. When a worker uses an eyewash station that is not maintained, organisms in the water may come into contact with the eye, skin, or may be inhaled. Workers using eyewash stations after exposure to a hazardous chemical or material may have eye injuries that make the eye more susceptible to infection. Also, workers with skin damage or compromised immune systems (*e.g.,* transplant recovery, cancer, lupus) are at increased risk for developing illnesses from contaminated water. Early diagnosis is important to prevent infections from causing serious health effects, including permanent vision loss and severe lung diseases (*e.g.*, pneumonia).

The following are a few organisms that thrive in eyewash stations when not maintained properly and the health hazards they present. This list is not all inclusive. There are many other micro-organisms that live in stagnant water that are not listed below.

Acanthamoeba is a microscopic single cell organism (amoeba) that may cause eye infections (see Figure 1). This organism can live in treated water and is commonly found in mucous membranes (*e.g.*, nose, throat, eyes) and in neurological tissues (*e.g.*, brain) without causing harm to the person. On rare occasions, exposure to *Acanthamoeba results in harmful eye infections known as Acanthamoeba keratitis.* Along with keratitis, workers with compromised immune systems face a significantly higher risk for developing neurological infections (Granulomatous Amoebic Encephalitis) or whole body infections. Workers may also experience eye redness, pain, tearing, blurred vision, light sensitivity, and eye inflammation several days after the use of a contaminated eyewash station. Diagnosing *Acanthamoeba* keratitis is difficult because more common eye infections have similar symptoms.



Photo courtesy of Dan B. Jones, M.D.

Figure 1. *Left, broad illumination; right, slit beam illumination. Early epithelial stage. Multifocal intraepithelial Acanthamoeba organisms.*

Pseudomonas infections are typically caused by a common bacteria species. *Pseudomonas aeruginosa* may cause infections to eyes, skin, muscle, lung, and other tissues. One symptom specific to *Pseudomonas aeruginosa* infection is green-blue pus in or around the infected area. If a pseudomonas infection spreads through the bloodstream (*i.e.*, septicemia), workers may become very sick with fevers, chills, confusion, shock, and even death. This bacterium has developed resistance to many antibiotics, which may make it harder to treat.



Figure 2. *Eyewash with protective covers.*

Legionella is a group of bacteria that are found in nature living with amoeba and may cause a serious lung infection. For example, since *Acanthamoeba* are effective hosts for *Legionella*, they may both be present in contaminated water. Although *Legionella* does not cause eye infections, inhaling water droplets containing the bacteria can cause Legionnaires' disease, a severe and fatal form of pneumonia. Workers with compromised immune systems, workers over the age of 55 or those with pre-existing lung diseases, such as Chronic Obstructive Pulmonary Diseases (COPD) are more at risk for infection. Legionnaires' disease symptoms occur 2 to 14 days after exposure, including coughing, breathlessness, high fever, muscle aches, and headaches, often requiring hospitalization.

For more information on Legionnaires' disease visit the OSHA Safety and Health Topics Page (www.osha.gov/SLTC/legionnairesdisease).

How can eyewash stations be maintained to prevent infections?

Eyewash station manufacturer instructions provide direction on how often and how long to activate specific plumbed systems to reduce microbial contamination and generally reference the American National Standards Institute (ANSI) standard Z358.1-2014. Self-contained eyewash units must be maintained and employers should consult the manufacturer's instructions for maintenance procedures. This includes flushing the system and using only solutions appropriate for flushing eyes.

Workers' Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

For additional information on Workers' Rights, Employer Responsibilities, and other services OSHA offers, visit www.osha.gov.

Contact OSHA

For questions or to get information or advice, to report an emergency, fatality, inpatient hospitalization, amputation, or loss of an eye, or to file a confidential complaint, contact your nearest OSHA office, visit www.osha.gov, or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.

OSHA's On-site Consultation Program offers free and confidential advice to small and medium-sized businesses in all states across the country, with priority given to high-hazard worksites. On-site consultation services are separate from enforcement and do not result in penalties or citations.

For more information, to find the local On-site Consultation office in your state, or to request a brochure on Consultation Services, visit www.osha.gov/consultation, or call 1-800-321- OSHA (6742).

Many states operate their own OSHA-approved safety and health program. For further information, please visit www.osha.gov/dcsp/osp.

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Estimated rates of AK:

Estimated Burden of Keratitis — United States, 2010 November 14, 2014 / 63(45);1027-1030 http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6345a3.htm

National Outbreak of Acanthamoeba Keratitis Associated with Use of a Contact Lens Solution, United States. [PDF, 663 KB, 7 pages] (Vol. 15, No. 8 / August 15, 2009)

Amebic Keratitis article (updated 7/23/2015) http://emedicine.medscape.com/article/211214-overview#a0199

Outbreaks of AK:

CDC. *Acanthamoeba* keratitis (AK) outbreak investigation http://www.cdc.gov/parasites/acanthamoeba/outbreaks/2011/outbreak_qa_ak.html

Outbreak following flooding in Iowa. http://archopht.jamanetwork.com/article.aspx?articleid=263287

This InfoSheet is not a standard or regulation, and it creates no new legal obligations. It contains recommendations as well as descriptions of mandatory safety and health standards. The recommendations are advisory in nature, informational in content, and are intended to assist employers in providing a safe and healthful workplace. The *Occupational Safety and Health Act* requires employers to comply with safety and health standards and regulations promulgated by OSHA or by a state with an OSHA-approved state plan. In addition, the Act's General Duty Clause, Section 5(a)(1), requires employers to provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm.

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DTSEM OSHA 3818-07 2015

OSHA FactSheet

Grounding Requirements for Portable Generators

Portable generators are internal combustion engines used to generate electricity. They are useful when temporary or remote power is needed, and are commonly used during cleanup and recovery efforts following disasters.

Major Causes of Injuries and Fatalities

- Shocks and electrocution to users from improper use.
- **Shocks and electrocution to utility workers from improper connection to structures, such as residences, offices, shops and trailers.**

Safe Work Practices

- Maintain and operate portable generators in accordance with the manufacturer's use and safety instructions.
- Never attach a portable generator directly to the electrical system of a structure (home, office or trailer) unless the generator has a properly installed open-transition transfer switch.
- Always plug electrical appliances and tools directly into the generator, using the appliance manufacturer's supplied cords. Use heavy-duty extension cords that contain a grounding conductor (3-wire flexible cord and 3-pronged cord connectors).
- Proper grounding and bonding are a means to prevent shocks and electrocutions.
- Use ground-fault circuit interrupters (GFCIs) as per the manufacturer's instructions.
- **Do not connect a generator to a structure unless the generator has a properly installed transfer switch.**
- Visually inspect the equipment before use; remove defective equipment from service; mark or tag it as unsafe for use.

Grounding Requirements for Portable and Vehicle-mounted Generators

Under the following conditions, OSHA directs (29 CFR 1926.404(f)(3)(i)) that the frame of a portable generator need not be grounded (connected to earth) and that the frame may serve as the ground (in place of the earth):

- The generator supplies only equipment mounted on the generator and/or cord- and plug-connected equipment through receptacles mounted on the generator, § 1926.404(f)(3)(i)(A), and
- The noncurrent-carrying metal parts of equipment (such as the fuel tank, the internal combustion engine, and the generator's housing) are bonded to the generator frame, and the equipment grounding conductor terminals (of the power receptacles that are a part of [mounted on] the generator) are bonded to the generator frame, § 1926.404(f)(3)(i)(B).

Thus, rather than connect to a grounding electrode system, such as a driven ground rod, the generator's frame replaces the grounding electrode.

If these conditions do not exist, then a grounding electrode, such as a ground rod, is required.

If the portable generator is providing electric power to a structure by connection via a transfer switch to a structure (home, office, shop, trailer, or similar) it must be connected to a grounding electrode system, such as a driven ground rod. The transfer switch must be approved for the use and installed in accordance with the manufacturer's installation instructions by a qualified electrician.

Grounding requirements for generators connected via transfer switches are covered by Article 250 of the National Electrical Code (NEC).

Safe Work Practices for Portable Tools include:

- Do not use underrated cords—replace them with appropriately rated cords that use heavier gauge wires.
- Never use electrical tools or appliances with frayed cords, missing grounding prongs, or damaged or cracked housings.
- Use double-insulated tools and equipment distinctively marked as such, where possible.
- Use battery-operated tools, where possible.

Verification by Testing

The integrity of the connection between the generator's frame and the equipment grounding terminals of power receptacles is important to the safe use of the equipment. The connection may be confirmed via testing by a competent electrician with the correct equipment. The ohmic resistance should measure near zero and must not be intermittent, which indicates a loose connection.

Bonding Versus Grounding

Bonding and grounding are separate requirements for generators and other electrical distribution systems. Grounding means the connection, or the establishment of a connection, of an electric circuit or equipment to reference ground, which includes the generator's frame. Bonding is the intentional connection between the grounded circuit conductor (neutral) and the grounding means for the generator, which includes the generator's frame. Thus, effective bonding of the neutral conductor to the generator's frame is also a concern for the safe use of the equipment. As with grounding terminal connections, proper bonding of the neutral terminal of a power receptacle may be confirmed via testing by a competent electrician with the correct equipment, and the ohmic resistance should measure near zero and must not be intermittent, which indicates a loose connection.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

For more complete information:

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DSTM 10/2005

OSHA® FactSheet

Protecting Workers from the Hazards of Abrasive Blasting Materials

Abrasive blasting uses compressed air or water to direct a high velocity stream of an abrasive material to clean an object or surface, remove burrs, apply a texture, or prepare a surface for the application of paint or other type of coating. Employers must protect workers from hazardous dust levels and toxic metals that may be generated from both the blasting material and the underlying substrate and coatings being blasted. This fact sheet provides information on abrasive blasting material, health hazards, and methods to protect workers.

Abrasive Blasting Materials

The decision to use a certain type of abrasive material can depend on factors such as cost, job specifications, environment, and worker health.

Commonly used abrasive materials:

- Silica sand (crystalline)
- Coal slag
- Garnet sand
- Nickel slag
- Copper slag
- Glass (beads or crushed)
- Steel shot
- Steel grit
- Specular hematite (iron ore)

Alternative, less toxic blasting materials include:

- Ice cubes
- Dry ice
- Plastic bead media
- Sponge
- Sodium bicarbonate (baking soda)



Abrasive blasting creates high levels of dust. Photo courtesy of NIOSH.

- Ground walnut shells, ground corn cob and other biodegradable materials
- High pressure water

****** CAUTION ******

Abrasive blasting creates high levels of noise that can cause substantial hearing loss. Always wear hearing protection. Employers must administer a hearing conservation program as required by the OSHA Occupational Noise standard.

Health Hazards

Abrasive blasting operations can create high levels of dust and noise. Abrasive material and the surface being blasted may contain toxic materials (e.g., lead paint, silica) that are hazardous to workers.

- Silica sand (crystalline) can cause silicosis, lung cancer, and breathing problems in exposed workers.
- Coal slag and garnet sand may cause lung damage similar to silica sand (based on preliminary animal testing).
- Copper slag, nickel slag, and glass (crushed or beads) also have the potential to cause lung damage.
- Steel grit and shot have less potential to cause lung damage.
- Slags can contain trace amounts of toxic metals such as arsenic, beryllium, and cadmium.

How to Protect Workers from Exposure to Abrasive Blasting Materials

Each abrasive blasting operation is unique, involving different surfaces, coatings, blast material, and working conditions. Before beginning work, employers should identify the hazards and assign a knowledgeable person trained to recognize hazards and with the authority to quickly take corrective action to eliminate them. Use engineering and administrative controls, personal protective equipment (PPE), including respiratory protection, and training to protect workers involved in abrasive blasting activities. Engineering controls, such as substitution, isolation, containment, and ventilation are the primary means of preventing or reducing exposures to airborne hazards during abrasive blasting operations. Administrative controls, including the use of good work and personal hygiene practices, can also reduce exposure. When engineering and administrative controls cannot keep exposures to hazardous materials below OSHA permissible exposure limits, respiratory protection must be used.



Abrasive blasting using a dust collection system with multiple exhaust ducts. (Photo courtesy of Flexaust, Inc. This equipment is shown for illustrative purposes only and is not intended as an endorsement by OSHA of this company, its products or services.)

Engineering Controls

1. Substitution

- Use a less toxic abrasive blasting material.
- Use abrasives that can be delivered with water (slurry) to reduce dust.

2. Isolation and Containment

- Use barriers and curtain walls to isolate the blasting operation from other workers.
- Use blast rooms or blast cabinets for smaller operations.
- Use restricted areas for non-enclosed blasting operations.
- Keep coworkers away from the blaster.

3. Ventilation

- Use exhaust ventilation systems in containment structures to capture dust.

Employers can use OSHA's free On-site Consultation Program for advice on safety and health issues.

Administrative Controls

Perform routine cleanup using wet methods or HEPA filtered vacuuming to minimize the accumulation of toxic dusts.

- Do not use compressed air to clean as this will create dust in the air.
- Clean and decontaminate tarps and other equipment on the worksite.
- Schedule blasting when the least number of workers are at the site.
- Avoid blasting in windy conditions to prevent the spread of any hazardous materials.

Personal Hygiene Practices

- Prohibit eating, drinking, or using tobacco products in blasting areas.
- Provide wash stations so workers can wash their hands and face routinely and before eating, drinking, or smoking.
- Vacuum or remove contaminated work clothes before eating, drinking or smoking.

- Provide accommodations for end-of-shift showers and change areas with separate storage facilities for street clothes, protective clothing and equipment.
- Keep contaminated clothing and equipment out of the clean change area.

Respiratory Protection

An abrasive-blasting respirator must cover the wearer's head, neck, and shoulders to protect the wearer from rebounding abrasive. Workers must use only respirators approved by NIOSH to provide protection from dusts produced during abrasive-blasting operations.

- Type CE NIOSH-certified blasting airline respirator with positive pressure blasting helmet.

Support personnel involved in cleanup and other related activities may also need respiratory protection.

When respirators are used, employers must establish a comprehensive respiratory protection program as required by the OSHA Respiratory Protection standard (29 CFR 1910.134).

Personal Protective Equipment

- Hearing protection
- Eye and face protection
- Helmet
- Leather gloves that protect to full forearm and aprons (or coveralls)
- Safety shoes or boots

Worker Training and Hazard Communication

- Provide training to abrasive blasters and support personnel on blasting health and safety hazards, how to use controls, personal hygiene practices, safe work practices and the use of PPE and respirators.
- Manufacturers are required to include appropriate health hazard information on the blasting materials on safety data sheets (SDS) as required under OSHA's Hazard Communication standard (29 CFR 1910.1200).
- Obtain and read the manufacturer's SDS for health hazard information on the abrasive blasting material you are using.

For more information on abrasive blasting and control measures see: OSHA's guidance document: "Abrasive Blasting Hazards in Shipyard Employment" (2006); and eTool: Mechanical Removers (Ship Repair).

Disclaimer: This OSHA Fact Sheet provides a general overview of the requirements in OSHA standards related to abrasive blasting. It does not alter or determine compliance responsibilities in these standards or the Occupational Safety and Health Act of 1970. *Since interpretations and enforcement policy may change over time, the reader should consult current OSHA interpretations and decisions by the Occupational Safety and Health Review Commission and the courts for additional guidance on OSHA compliance requirements.*

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Applicable OSHA Standards and Safety and Health Topic Pages

The following table provides links to several OSHA standards (not all-inclusive) that may contain requirements that apply to abrasive blasting operations. For example, the removal of lead paint by abrasive blasting will likely require employers to follow provisions of the OSHA Lead standard. Safety and health topic pages listed here provide employers and workers with information that may be useful for safely conducting abrasive blasting.

General Industry	Shipyard Industry	Construction Industry	OSHA Topics Page(s)
1910.94, Ventilation	1915.33 & 1915.34, Chemical & Mechanical paint removers Ventilation (as it applies to shipyard employment, 1910.94) 1915.13, Cleaning and other cold work	1926.57, Ventilation	Ventilation
1910.95, Occupational noise exposure	1910.95, Occupational noise exposure (as per Shipyard "Tool Bag" Directive, CPL 02-00-182)	1926.52, Occupational noise exposure 1926.101, Hearing Protection	Noise
1910.132, Personal Protective Equipment	1915 Subpart I, Personal Protective Equipment	1926 Subpart E, Personal Protective Equipment	Personal Protective Equipment
Respiratory Protection (1910.134)	1915.154, Respiratory Protection refers to (1910.134)	1926.103, Respiratory Protection (refers to 1910.134)	Respiratory Protection
1910.141, Sanitation	1915.88, Sanitation	1926.51, Sanitation	
1910.1000, Air contaminants Table Z-1, Limits for air contaminants Table Z-2, Toxic and Hazardous Substances Table Z-3, Mineral dusts	1915.1000, Air contaminants Table Z – Shipyards	1926.55, Gases,vapors, fumes, dusts, and mists Appendix A, Threshold limit values of airborne contaminants for construction	Permissible Exposure Limits (PELs) & Hazardous and Toxic Substances
Beryllium See 1910.1000, Table Z-1 for air contaminants	Beryllium See 1915.1000, Table Z	Beryllium See Table 1926.55, Appendix A	Beryllium
Silica See 1910.1000, Table Z-3	Silica See 1915.1000, Table Z	Silica See 1926.55, Appendix A	Silica
1910.1018, Inorganic Arsenic	1915.1018, Inorganic Arsenic	1926.1118, Inorganic Arsenic	Arsenic
1910.1025, Lead	1915.1025, Lead	1926.62, Lead	Lead (General Industry) Lead (Construction)
1910.1026, Chromium(VI)	1915.1026, Chromium(VI)	1926.1126, Chromium(VI)	Hexavalent Chromium
1910.1027, Cadmium	1915.1027, Cadmium	1926.1127, Cadmium	Cadmium
1910.1200, Hazard Communication	1915.1200, Hazard Communication (refers to 1910.1200)	1926.59, Hazard Communication (refers to 1910.1200)	Hazard Communication

OSHA® FactSheet

December 1st, 2013 Training Requirements for the Revised Hazard Communication Standard

OSHA revised its Hazard Communication Standard (HCS) to align with the United Nations' Globally Harmonized System of Classification and Labeling of Chemicals (GHS) and published it in the Federal Register in March 2012 (77 FR 17574). Two significant changes contained in the revised standard require the use of new labeling elements and a standardized format for Safety Data Sheets (SDSs), formerly known as, Material Safety Data Sheets (MSDSs). The new label elements and SDS requirements will improve worker understanding of the hazards associated with the chemicals in their workplace. To help companies comply with the revised standard, OSHA is phasing in the specific requirements over several years (December 1, 2013 to June 1, 2016).

The first compliance date of the revised HCS is December 1, 2013. By that time employers must have trained their workers on the new label elements and the SDS format. This training is needed early in the transition process since workers are already beginning to see the new labels and SDSs on the chemicals in their workplace. To ensure employees have the information they need to better protect themselves from chemical hazards in the workplace during the transition period, it is critical that employees understand the new label and SDS formats.

The list below contains the minimum required topics for the training that must be completed by December 1, 2013.

➢ Training on label elements must include information on:

- Type of information the employee would expect to see on the new labels, including the
  - ✓ **Product identifier:** how the hazardous chemical is identified. This can be (but is not limited to) the chemical name, code number or batch number. The manufacturer, importer or distributor can decide the appropriate product identifier. The same product identifier must be both on the label and in Section 1 of the SDS (Identification).
  - ✓ **Signal word:** used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label. There are only two signal words, "Danger" and "Warning." Within a specific hazard class, "Danger" is used for the more severe hazards and "Warning" is used for the less severe hazards. There will only be one signal word on the label no matter how many hazards a chemical may have. If one of the hazards warrants a "Danger" signal word and another warrants the signal word "Warning," then only "Danger" should appear on the label.
  - ✓ **Pictogram:** OSHA's required pictograms must be in the shape of a square set at a point and include a black hazard symbol on a white background with a red frame sufficiently wide enough to be clearly visible. A square red frame set at a point without a hazard symbol is not a pictogram and is not permitted on the label. OSHA has designated eight pictograms under this standard for application to a hazard category.
  - ✓ **Hazard statement(s):** describe the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard. For example: "Causes damage to kidneys through prolonged or repeated exposure when absorbed through the skin." All of the applicable hazard statements must appear on the label. Hazard statements may be combined where appropriate to reduce redundancies and improve readability. The hazard statements are specific to the hazard

classification categories, and chemical users should always see the same statement for the same hazards, no matter what the chemical is or who produces it.

✓ **Precautionary statement(s):** means a phrase that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical or improper storage or handling.

✓ **Name, address and phone number of the chemical manufacturer, distributor, or importer**

- How an employee might use the labels in the workplace. For example,
  - ✓ Explain how information on the label can be used to ensure proper storage of hazardous chemicals.
  - ✓ Explain how the information on the label might be used to quickly locate information on first aid when needed by employees or emergency personnel.
- General understanding of how the elements work together on a label. For example,
  - ✓ Explain that where a chemical has multiple hazards, different pictograms are used to identify the various hazards. The employee should expect to see the appropriate pictogram for the corresponding hazard class.
  - ✓ Explain that when there are similar precautionary statements, the one providing the most protective information will be included on the label.

➢ Training on the format of the SDS must include information on:

- Standardized 16-section format, including the type of information found in the various sections
  - ✓ For example, the employee should be instructed that with the new format, Section 8 (Exposure Controls/Personal Protection) will always contain information about exposure limits, engineering controls and ways to protect yourself, including personal protective equipment.
- How the information on the label is related to the SDS
  - ✓ For example, explain that the precautionary statements would be the same on the label and on the SDS.

As referenced in Dr. Michaels' OSHA Training Standards Policy Statement (April 28, 2010) – with all training, OSHA requires employers to present information in a manner and language that their employees can understand. If employers customarily need to communicate work instructions or other workplace information to employees in a language other than English, they will also need to provide safety and health training to employees in the same manner. Similarly, if the employee's vocabulary is limited, the training must account for that limitation. By the same token, if employees are not literate, telling them to read training materials will not satisfy the employer's training obligation.

OSHA's Hazard Communication website (http://www.osha.gov/dsg/hazcom/index.html) has the following QuickCards and OSHA Briefs to assist employers with the required training.

- Label QuickCard (English/Spanish)
- Pictogram QuickCard (English/Spanish)
- Safety Data Sheet QuickCard (English) (Spanish)
- Safety Data Sheet OSHA Brief
- Label/Pictogram OSHA Brief (to come)

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OSHA® BRIEF

Hazard Communication Standard: Safety Data Sheets

The Hazard Communication Standard (HCS) (29 CFR 1910.1200(g)), revised in 2012, requires that the chemical manufacturer, distributor, or importer provide Safety Data Sheets (SDSs) (formerly MSDSs or Material Safety Data Sheets) for each hazardous chemical to downstream users to communicate information on these hazards. The information contained in the SDS is largely the same as the MSDS, except now the SDSs are required to be presented in a consistent user-friendly, 16-section format. This brief provides guidance to help workers who handle hazardous chemicals to become familiar with the format and understand the contents of the SDSs.

The SDS includes information such as the properties of each chemical; the physical, health, and environmental health hazards; protective measures; and safety precautions for handling, storing, and transporting the chemical. The information contained in the SDS must be in English (although it may be in other languages as well). In addition, OSHA requires that SDS preparers provide specific minimum information as detailed in Appendix D of 29 CFR 1910.1200. The SDS preparers may also include additional information in various section(s).

Sections 1 through 8 contain general information about the chemical, identification, hazards, composition, safe handling practices, and emergency control measures (e.g., fire fighting). This information should be helpful to those that need to get the information quickly. Sections 9 through 11 and 16 contain other technical and scientific information, such as physical and chemical properties, stability and reactivity information, toxicological information, exposure control information, and other information including the date of preparation or last revision. The SDS must also state that no applicable information was found when the preparer does not find relevant information for any required element.

The SDS must also contain Sections 12 through 15, to be consistent with the UN Globally Harmonized System of Classification and Labeling of Chemicals (GHS), but OSHA will not enforce the content of these sections because they concern matters handled by other agencies.

A description of all 16 sections of the SDS, along with their contents, is presented below:

Section 1: Identification

This section identifies the chemical on the SDS as well as the recommended uses. It also provides the essential contact information of the supplier. The required information consists of:

- Product identifier used on the label and any other common names or synonyms by which the substance is known.
- Name, address, phone number of the manufacturer, importer, or other responsible party, and emergency phone number.
- Recommended use of the chemical (e.g., a brief description of what it actually does, such as flame retardant) and any restrictions on use (including recommendations given by the supplier).

Section 2: Hazard(s) Identification

This section identifies the hazards of the chemical presented on the SDS and the appropriate warning information associated with those hazards. The required information consists of:

- The hazard classification of the chemical (e.g., flammable liquid, category[1]).
- Signal word.
- Hazard statement(s).
- Pictograms (the pictograms or hazard symbols may be presented as graphical reproductions of the symbols in black and white or be a description of the name of the symbol (e.g., skull and crossbones, flame).
- Precautionary statement(s).
- Description of any hazards not otherwise classified.
- For a mixture that contains an ingredient(s) with unknown toxicity, a statement describing how much (percentage) of the mixture consists of ingredient(s) with unknown acute toxicity. Please note that this is a total percentage of the mixture and not tied to the individual ingredient(s).

Section 3: Composition/Information on Ingredients

This section identifies the ingredient(s) contained in the product indicated on the SDS, including impurities and stabilizing additives. This section includes information on substances, mixtures, and all chemicals where a trade secret is claimed. The required information consists of:

Substances

- Chemical name.
- Common name and synonyms.
- Chemical Abstracts Service (CAS) number and other unique identifiers.
- Impurities and stabilizing additives, which are themselves classified and which contribute to the classification of the chemical.

Mixtures

- Same information required for substances.
- The chemical name and concentration (i.e., exact percentage) of all ingredients which are classified as health hazards and are:
  - Present above their cut-off/concentration limits or
  - Present a health risk below the cut-off/concentration limits.
- The concentration (exact percentages) of each ingredient must be specified except concentration ranges may be used in the following situations:
  - A trade secret claim is made,
  - There is batch-to-batch variation, or
  - The SDS is used for a group of substantially similar mixtures.

Chemicals where a trade secret is claimed

- A statement that the specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret is required.

[1] Chemical, as defined in the HCS, is any substance, or mixture of substances.

Section 4: First-Aid Measures

This section describes the initial care that should be given by untrained responders to an individual who has been exposed to the chemical. The required information consists of:

- Necessary first-aid instructions by relevant routes of exposure (inhalation, skin and eye contact, and ingestion).
- Description of the most important symptoms or effects, and any symptoms that are acute or delayed.
- Recommendations for immediate medical care and special treatment needed, when necessary.

Section 5: Fire-Fighting Measures

This section provides recommendations for fighting a fire caused by the chemical. The required information consists of:

- Recommendations of suitable extinguishing equipment, and information about extinguishing equipment that is not appropriate for a particular situation.
- Advice on specific hazards that develop from the chemical during the fire, such as any hazardous combustion products created when the chemical burns.
- Recommendations on special protective equipment or precautions for firefighters.

Section 6: Accidental Release Measures

This section provides recommendations on the appropriate response to spills, leaks, or releases, including containment and cleanup practices to prevent or minimize exposure to people, properties, or the environment. It may also include recommendations distinguishing between responses for large and small spills where the spill volume has a significant impact on the hazard. The required information may consist of recommendations for:

- Use of personal precautions (such as removal of ignition sources or providing sufficient ventilation) and protective equipment to prevent the contamination of skin, eyes, and clothing.
- Emergency procedures, including instructions for evacuations, consulting experts when needed, and appropriate protective clothing.
- Methods and materials used for containment (e.g., covering the drains and capping procedures).
- Cleanup procedures (e.g., appropriate techniques for neutralization, decontamination, cleaning or vacuuming; adsorbent materials; and/or equipment required for containment/clean up).

Section 7: Handling and Storage

This section provides guidance on the safe handling practices and conditions for safe storage of chemicals. The required information consists of:

- Precautions for safe handling, including recommendations for handling incompatible chemicals, minimizing the release of the chemical into the environment, and providing advice on general hygiene practices (e.g., eating, drinking, and smoking in work areas is prohibited).
- Recommendations on the conditions for safe storage, including any incompatibilities. Provide advice on specific storage requirements (e.g., ventilation requirements).

Section 8: Exposure Controls/Personal Protection

This section indicates the exposure limits, engineering controls, and personal protective measures that can be used to minimize worker exposure. The required information consists of:

- OSHA Permissible Exposure Limits (PELs), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the safety data sheet, where available.
- Appropriate engineering controls (e.g., use local exhaust ventilation, or use only in an enclosed system).
- Recommendations for personal protective measures to prevent illness or injury from exposure to chemicals, such as personal protective equipment (PPE) (e.g., appropriate types of eye, face, skin or respiratory protection needed based on hazards and potential exposure).
- Any special requirements for PPE, protective clothing or respirators (e.g., type of glove material, such as PVC or nitrile rubber gloves; and breakthrough time of the glove material).

Section 9: Physical and Chemical Properties

This section identifies physical and chemical properties associated with the substance or mixture. The minimum required information consists of:

- Appearance (physical state, color, etc.);
- Odor;
- Odor threshold;
- pH;
- Melting point/freezing point;
- Initial boiling point and boiling range;
- Flash point;
- Evaporation rate;
- Flammability (solid, gas);
- Upper/lower flammability or explosive limits;
- Vapor pressure;
- Vapor density;
- Relative density;
- Solubility(ies);
- Partition coefficient: n-octanol/water;
- Auto-ignition temperature;
- Decomposition temperature; and
- Viscosity.

The SDS may not contain every item on the above list because information may not be relevant or is not available. When this occurs, a notation to that effect must be made for that chemical property. Manufacturers may also add other relevant properties, such as the dust deflagration index (Kst) for combustible dust, used to evaluate a dust's explosive potential.

Section 10: Stability and Reactivity

This section describes the reactivity hazards of the chemical and the chemical stability information. This section is broken into three parts: reactivity, chemical stability, and other. The required information consists of:

Reactivity

- Description of the specific test data for the chemical(s). This data can be for a class or family of the chemical if such data adequately represent the anticipated hazard of the chemical(s), where available.

Chemical stability

- Indication of whether the chemical is stable or unstable under normal ambient temperature and conditions while in storage and being handled.
- Description of any stabilizers that may be needed to maintain chemical stability.
- Indication of any safety issues that may arise should the product change in physical appearance.

Other

- Indication of the possibility of hazardous reactions, including a statement whether the chemical will react or polymerize, which could release excess pressure or heat, or create other hazardous conditions. Also, a description of the conditions under which hazardous reactions may occur.
- List of all conditions that should be avoided (e.g., static discharge, shock, vibrations, or environmental conditions that may lead to hazardous conditions).
- List of all classes of incompatible materials (e.g., classes of chemicals or specific substances) with which the chemical could react to produce a hazardous situation.
- List of any known or anticipated hazardous decomposition products that could be produced because of use, storage, or heating. (Hazardous combustion products should also be included in Section 5 (Fire-Fighting Measures) of the SDS.)

Section 11: Toxicological Information

This section identifies toxicological and health effects information or indicates that such data are not available. The required information consists of:

- Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact). The SDS should indicate if the information is unknown.
- Description of the delayed, immediate, or chronic effects from short- and long-term exposure.
- The numerical measures of toxicity (e.g., acute toxicity estimates such as the LD50 (median lethal dose)) - the estimated amount [of a substance] expected to kill 50% of test animals in a single dose.
- Description of the symptoms. This description includes the symptoms associated with exposure to the chemical including symptoms from the lowest to the most severe exposure.
- Indication of whether the chemical is listed in the National Toxicology Program (NTP) Report on Carcinogens (latest edition) or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest editions) or found to be a potential carcinogen by OSHA.

Section 12: Ecological Information (non-mandatory)

This section provides information to evaluate the environmental impact of the chemical(s) if it were released to the environment. The information may include:

- Data from toxicity tests performed on aquatic and/or terrestrial organisms, where available (e.g., acute or chronic aquatic toxicity data for fish, algae, crustaceans, and other plants; toxicity data on birds, bees, plants).
- Whether there is a potential for the chemical to persist and degrade in the environment either through biodegradation or other processes, such as oxidation or hydrolysis.
- Results of tests of bioaccumulation potential, making reference to the octanol-water partition coefficient (K_{ow}) and the bioconcentration factor (BCF), where available.
- The potential for a substance to move from the soil to the groundwater (indicate results from adsorption studies or leaching studies).
- Other adverse effects (e.g., environmental fate, ozone layer depletion potential, photochemical ozone creation potential, endocrine disrupting potential, and/or global warming potential).

Section 13: Disposal Considerations (non-mandatory)

This section provides guidance on proper disposal practices, recycling or reclamation of the chemical(s) or its container, and safe handling practices. To minimize exposure, this section should also refer the reader to Section 8 (Exposure Controls/Personal Protection) of the SDS. The information may include:

- Description of appropriate disposal containers to use.
- Recommendations of appropriate disposal methods to employ.
- Description of the physical and chemical properties that may affect disposal activities.
- Language discouraging sewage disposal.
- Any special precautions for landfills or incineration activities.

Section 14: Transport Information (non-mandatory)

This section provides guidance on classification information for shipping and transporting of hazardous chemical(s) by road, air, rail, or sea. The information may include:

- UN number (i.e., four-figure identification number of the substance)[2].
- UN proper shipping name[2].
- Transport hazard class(es)[2].
- Packing group number, if applicable, based on the degree of hazard[2].
- Environmental hazards (e.g., identify if it is a marine pollutant according to the International Maritime Dangerous Goods Code (IMDG Code)).
- Guidance on transport in bulk (according to Annex II of MARPOL 73/78[3] and the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (International Bulk Chemical Code (IBC Code)).
- Any special precautions which an employee should be aware of or needs to comply with, in connection with transport or conveyance either within or outside their premises (indicate when information is not available).

[2] Found in the most recent edition of the United Nations Recommendations on the Transport of Dangerous Goods.

[3] MARPOL 73/78 means the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, as amended.

Section 15: Regulatory Information (non-mandatory)

This section identifies the safety, health, and environmental regulations specific for the product that is not indicated anywhere else on the SDS. The information may include:

- Any national and/or regional regulatory information of the chemical or mixtures (including any OSHA, Department of Transportation, Environmental Protection Agency, or Consumer Product Safety Commission regulations).

Section 16: Other Information

This section indicates when the SDS was prepared or when the last known revision was made. The SDS may also state where the changes have been made to the previous version. You may wish to contact the supplier for an explanation of the changes. Other useful information also may be included here.

Employer Responsibilities

Employers must ensure that the SDSs are readily accessible to employees for all hazardous chemicals in their workplace. This may be done in many ways. For example, employers may keep the SDSs in a binder or on computers as long as the employees have immediate access to the information without leaving their work area when needed and a back-up is available for rapid access to the SDS in the case of a power outage or other emergency. Furthermore, employers may want to designate a person(s) responsible for obtaining and maintaining the SDSs. If the employer does not have an SDS, the employer or designated person(s) should contact the manufacturer to obtain one.

References

OSHA, 29 CFR 1910.1200(g) and Appendix D.

United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS), third revised edition, United Nations, 2009.

These references and other information related to the revised Hazard Communication Standard can be found on OSHA's Hazard Communication Safety and Health Topics page, located at: http://www.osha.gov/dsg/hazcom/index.html.

Disclaimer: This brief provides a general overview of the safety data sheet requirements in the Hazard Communication Standard (see 29 CFR 1910.1200(g) and Appendix D of 29 CFR 1910.1200). It does not alter or determine compliance responsibilities in the standard or the Occupational Safety and Health Act of 1970. Since interpretations and enforcement policy may change over time, the reader should consult current OSHA interpretations and decisions by the Occupational Safety and Health Review Commission and the courts for additional guidance on OSHA compliance requirements. Please note that states with OSHA-approved state plans may have additional requirements for chemical safety data sheets, outside of those outlined above. For more information on those standards, please visit: http://www.osha.gov/dcsp/osp/statestandards.html.

This is one in a series of informational briefs highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

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DSG BR-3514 2/2012

OSHA® BRIEF

Hazard Communication Standard: Labels and Pictograms

OSHA has adopted new hazardous chemical labeling requirements as a part of its recent revision of the Hazard Communication Standard, 29 CFR 1910.1200 (HCS), bringing it into alignment with the United Nations' Globally Harmonized System of Classification and Labelling of Chemicals (GHS). These changes will help ensure improved quality and consistency in the classification and labeling of all chemicals, and will also enhance worker comprehension. As a result, workers will have better information available on the safe handling and use of hazardous chemicals, thereby allowing them to avoid injuries and illnesses related to exposures to hazardous chemicals.

The revised HCS changes the existing Hazard Communication Standard (HCS/HazCom 1994[1]) from a performance-based standard to one that has more structured requirements for the labeling of chemicals. The revised standard requires that information about chemical hazards be conveyed on labels using quick visual notations to alert the user, providing immediate recognition of the hazards. Labels must also provide instructions on how to handle the chemical so that chemical users are informed about how to protect themselves.

The label provides information to the workers on the specific hazardous chemical. While labels provide important information for anyone who handles, uses, stores, and transports hazardous chemicals, they are limited by design in the amount of information they can provide. Safety Data Sheets (SDSs), which must accompany hazardous chemicals, are the more complete resource for details regarding hazardous chemicals. The revised standard also requires the use of a 16-section safety data sheet format, which provides detailed information regarding the chemical. There is a separate OSHA Brief on SDSs that provides information on the new SDS requirements.

All hazardous chemicals shipped after June 1, 2015, must be labeled with specified elements including pictograms, signal words and hazard and precautionary statements. However, manufacturers, importers, and distributors may start using the new labeling system in the revised HCS before the June 1, 2015 effective date if they so choose. Until the June 1, 2015 effective date, manufacturers, importers and distributors may maintain compliance with the requirements of HazCom 1994 or the revised standard. Distributors may continue to ship containers labeled by manufacturers or importers (but not by the distributor themselves) in compliance with the HazCom 1994 until December 1, 2015.

This document is designed to inform chemical receivers, chemical purchasers, and trainers about the label requirements. It explains the new labeling elements, identifies what goes on a label, and describes what pictograms are and how to use them.

Label Requirements

Labels, as defined in the HCS, are an appropriate group of written, printed or graphic informational elements concerning a hazardous chemical that are affixed to, printed on, or attached to the immediate container of a hazardous chemical, or to the outside packaging.

The HCS requires chemical manufacturers, importers, or distributors to ensure that each container of hazardous chemicals leaving the workplace is labeled, tagged or marked with the following information: product identifier; signal word; hazard statement(s); precautionary

[1] Prior to the 2012 update, the Hazard Communication Standard had last been amended in 1994. 'HazCom 1994' refers to the version of the Hazard Communication Standard in effect directly prior to the 2012 revision, printed in the 1995 through 2011 versions of the Code of Federal Regulations. It is also available on OSHA's webpage.

statement(s); and pictogram(s); and name, address and telephone number of the chemical manufacturer, importer, or other responsible party.

Labels for a hazardous chemical must contain:

- Name, Address and Telephone Number
- Product Identifier
- Signal Word
- Hazard Statement(s)
- Precautionary Statement(s)
- Pictogram(s)

To develop labels under the revised HCS, manufacturers, importers and distributors must first identify and classify the chemical hazard(s). Appendices A, B, and C are all mandatory. The classification criteria for health hazards are in Appendix A and the criteria for physical hazards are presented in Appendix B of the revised Hazard Communication Standard. After classifying the hazardous chemicals, the manufacturer, importer or distributor then consults Appendix C to determine the appropriate pictograms, signal words, and hazard and precautionary statement(s), for the chemical label. Once this information has been identified and gathered, then a label may be created.

Label Elements
The HCS now requires the following elements on labels of hazardous chemicals:

- **Name, Address and Telephone Number** of the chemical manufacturer, importer or other responsible party.

- **Product Identifier** is how the hazardous chemical is identified. This can be (but is not limited to) the chemical name, code number or batch number. The manufacturer, importer or distributor can decide the appropriate product identifier. The same product identifier must be both on the label and in section 1 of the SDS.

- **Signal Words** are used to indicate the relative level of severity of the hazard and alert the reader to a potential hazard on the label. There are only two words used as signal words, "Danger" and "Warning." Within a specific hazard class, "Danger" is used for the more severe hazards and "Warning" is used for the less severe hazards. There will only be one signal word on the label no matter how many hazards a chemical may have. If one of the hazards warrants a "Danger" signal word and another warrants the signal word "Warning," then only "Danger" should appear on the label.

- **Hazard Statements** describe the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard. For example: "Causes damage to kidneys through prolonged or repeated exposure when absorbed through the skin." All of the applicable hazard statements must appear on the label. Hazard statements may be combined where appropriate to reduce redundancies and improve readability. The hazard statements are specific to the hazard classification categories, and chemical users should always see the same statement for the same hazards no matter what the chemical is or who produces it.

- **Precautionary Statements** describe recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to the hazardous chemical or improper storage or handling. There are four types of precautionary statements: prevention (to minimize exposure); response (in case of accidental spillage or exposure emergency response, and first-aid); storage; and disposal. For example, a chemical presenting a specific target organ toxicity (repeated exposure) hazard would include the following on the label: "Do not breathe dust/fume/gas/mist/vapors/spray. Get medical advice/attention if you feel unwell. Dispose of contents/container in accordance with local/regional/national and international regulations."

  A forward slash (/) designates that the classifier can choose one of the precautionary statements. In the example

above, the label could state, "Do not breathe vapors or spray. Get medical attention if you feel unwell. Dispose of contents in accordance with local/regional/national/international regulations." See Examples 1 and 2A of this document as an example.

In most cases, the precautionary statements are independent. However, OSHA does allow flexibility for applying precautionary statements to the label, such as combining statements, using an order of precedence or eliminating an inappropriate statement.

Precautionary statements may be combined on the label to save on space and improve readability. For example, "Keep away from heat, spark and open flames," "Store in a well-ventilated place," and "Keep cool" may be combined to read: "Keep away from heat, sparks and open flames and store in a cool, well-ventilated place." Where a chemical is classified for a number of hazards and the precautionary statements are similar, the most stringent statements must be included on the label. In this case, the chemical manufacturer, importer, or distributor may impose an order of precedence where phrases concerning response require rapid action to ensure the health and safety of the exposed person. In the self-reactive hazard category Types C, D, E or F, three of the four precautionary statements for prevention are:

- "Keep away from heat/sparks/open flame/hot surfaces. - No Smoking.";
- "Keep/Store away from clothing/…/ combustible materials";
- "Keep only in original container."

These three precautionary statements could be combined to read: "Keep in original container and away from heat, open flames, combustible materials and hot surfaces. - No Smoking."

Finally, a manufacturer or importer may eliminate a precautionary statement if it can demonstrate that the statement is inappropriate.

- **Supplementary Information.** The label producer may provide additional instructions or information that it deems helpful. It may also list any hazards not otherwise classified under this portion of the label. This section must also identify the percentage of ingredient(s) of unknown acute toxicity when it is present in a concentration of ≥1% (and the classification is not based on testing the mixture as a whole). If an employer decides to include additional information regarding the chemical that is above and beyond what the standard requires, it may list this information under what is considered "supplementary information." There is also no required format for how a workplace label must look and no particular format an employer has to use; however, it cannot contradict or detract from the required information.

  An example of an item that may be considered supplementary is the personal protective equipment (PPE) pictogram indicating what workers handling the chemical may need to wear to protect themselves. For example, the Hazardous Materials Identification System (HMIS) pictogram of a person wearing goggles may be listed. Other supplementary information may include directions of use, expiration date, or fill date, all of which may provide additional information specific to the process in which the chemical is used.

- Pictograms are graphic symbols used to communicate specific information about the hazards of a chemical. On hazardous chemicals being shipped or transported from a manufacturer, importer or distributor, the required pictograms consist of a red square frame set at a point with a black hazard symbol on a white background, sufficiently wide to be clearly visible. A square red frame set at a point without a hazard symbol is not a pictogram and is not permitted on the label.

  The pictograms OSHA has adopted improve worker safety and health, conform with the GHS, and are used worldwide.

While the GHS uses a total of nine pictograms, OSHA will only enforce the use of eight. The environmental pictogram is not mandatory but may be used to provide additional information. Workers may see the ninth symbol on a label because label preparers may choose to add the environment pictogram as supplementary information. Figure 1 shows the symbol for each pictogram, the written name for each pictogram, and the hazards associated with each of the pictograms. Most of the symbols are already used for transportation and many chemical users may be familiar with them.

Figure 1: Pictograms and Hazards



It is important to note that the OSHA pictograms do not replace the diamond-shaped labels that the U.S. Department of Transportation (DOT) requires for the transport of chemicals, including chemical drums, chemical totes, tanks or other containers. Those labels must be on the external part of a shipped container and must meet the DOT requirements set forth in 49 CFR 172, Subpart E. If a label has a DOT transport pictogram, Appendix C.2.3.3 states that the corresponding HCS pictogram shall not appear. However, DOT does not view the HCS pictogram as a conflict and for some international trade both pictograms may need to be present on the label. Therefore, OSHA intends to revise C.2.3.3. In the meantime, the agency will allow both DOT and HCS pictograms for the same hazard on a label. While the DOT diamond label is required for all hazardous chemicals on the outside shipping containers, chemicals in smaller containers inside the larger shipped container do not require the DOT diamond but do require the OSHA pictograms. (See Example 2.)

Labels must be legible, in English, and prominently displayed. Other languages may be displayed in addition to English. Chemical manufacturers, importers, and distributors who become newly aware of any significant information regarding the hazards of a chemical must revise the label within six months.

Employer Responsibilities

Employers are responsible for maintaining the labels on the containers, including, but not limited to, tanks, totes, and drums. This means that labels must be maintained on chemicals in a manner which continues to be legible and the pertinent information (such as the hazards and directions for use) does not get defaced (i.e., fade, get washed off) or removed in any way.

The employer is not responsible for updating labels on shipped containers, even if the shipped containers are labeled under HazCom 1994. The employer must relabel items if the labels are removed or defaced. However, if the employer is aware of newly-identified hazards that are not disclosed on the label, the employer must ensure that the workers are aware of the hazards as discussed below under workplace labels.

Workplace Labels

OSHA has not changed the general requirements for workplace labeling. Employers have the option to create their own workplace labels. They can either provide all of the required information that is on the

label from the chemical manufacturer or, the product identifier and words, pictures, symbols or a combination thereof, which in combination with other information immediately available to employees, provide specific information regarding the hazards of the chemicals.

If an employer has an in-plant or workplace system of labeling that meets the requirements of HazCom 1994, the employer may continue to use this system in the workplace as long as this system, in conjunction with other information immediately available to the employees, provides the employees with the information on all of the health and physical hazards of the hazardous chemical. This workplace labeling system may include signs, placards, process sheets, batch tickets, operating procedures, or other such written materials to identify hazardous chemicals. Any of these labeling methods or a combination thereof may be used instead of a label from the manufacturer, importer or distributer as long as the employees have immediate access to all of the information about the hazards of the chemical. Workplace labels must be in English. Other languages may be added to the label if applicable.

If the employer chooses to use the pictograms that appear in Appendix C on the workplace (or in-plant) labels, these pictograms may have a black border, rather than a red border.

Employers may use additional instructional symbols that are not included in OSHA's HCS pictograms on the workplace labels. An example of an instructional pictogram is a person with goggles, denoting that goggles must be worn while handling the given chemical. Including both types of pictograms on workplace labels is acceptable. The same is true if the employer wants to list environmental pictograms or PPE pictograms from the HMIS to identify protective measures for those handling the chemical.

Employers may continue to use rating systems such as National Fire Protection Association (NFPA) diamonds or HMIS requirements for workplace labels as long as they are consistent with the requirements of the Hazard Communication Standard and the employees have immediate access to the specific hazard information as discussed above. An employer using NFPA or HMIS labeling must, through training, ensure that its employees are fully aware of the hazards of the chemicals used.

If an employer transfers hazardous chemicals from a labeled container to a portable container that is only intended for immediate use by the employee who performs the transfer, no labels are required for the portable container.

Sample Labels

The following examples demonstrate how a manufacturer or importer may display the appropriate information on the label. As mentioned above, once the manufacturer determines the classification of the chemical (class and category of each hazard) using Appendices A and B, it would determine the required pictograms, signal words, hazard statements, and precautionary statements using Appendix C. The final step is to put the information on the label.

The examples below show what a sample label might look like under the revised HCS requirements. The examples break the labeling out into "steps" to show the order of information gathering and how label creation occurs. Step 1 is performing classification; step 2 is gathering full label information; and step 3 is creating the label.

These examples are for informational purposes only and are not meant to represent the only labels manufacturers, importers and distributors may create for these hazards.

Example 1: This example demonstrates a simple label.

The Substance:
HS85
Batch Number: 85L6543

Step 1: Perform Classification
Class: Acute Oral Toxicity; Category 4

Step 2: Gather Labeling Information
Pictograms:



Signal Word:
WARNING

Hazard Statements:
Harmful if Swallowed

Precautionary Statements:
Prevention:
- Wash hands and face thoroughly after handling.
- Do not eat, drink or smoke when using this product.

Response:
- If swallowed: Call a doctor if you feel unwell.[2]
- Rinse mouth

Storage:
None specified

Disposal:
- Dispose of contents/container in accordance with local/regional/national/international regulations.[3]

Step 3: Create the Label
Putting together the above information on HS85, a label might list the following information:

Example 1: HS85 Label

HS85
Batch number: 85L6543



Warning
Harmful if swallowed

Wash hands and face thoroughly after handling. Do not eat, drink or smoke when using this product. Dispose of contents/container in accordance with local, state and federal regulations.

First aid:
If swallowed: Call a doctor if you feel unwell. Rinse mouth.

GHS Example Company, 123 Global Circle, Anyville, NY 130XX Telephone (888) 888-8888

[2] The manufacturer of this chemical determined that calling a doctor was the most appropriate emergency medical advice; therefore, it is listed as part of the first-aid procedures.
[3] The downstream users must familiarize themselves with the proper disposal methods in accordance with local, regional, state and federal regulations. It is impractical to expect the label preparer to list all potential regulations that exist.

Example 2: This example demonstrates a more complex label.

Example 2 is for a substance that is a severe physical and health hazard. For shipping packages of chemicals that will be transported in the United States (i.e., drums, totes, tanks, etc.), the U.S. DOT requires a DOT label(s) on the outside container(s) for hazardous chemicals. Two versions of this label are presented below to demonstrate the difference between an OSHA label with pictograms from the HCS and a DOT label required for transport of a shipping container.

The Substance:
OXI252 (disodiumflammy)
CAS number: 111-11-11xx

Step 1: Perform Classification

Class: Oxidizing Solid, Category 1
Class: Skin Corrosive, Category 1A

Step 2: Gather Labeling Information

Pictograms:



Signal Word:
DANGER

Hazard Statements:

- May cause fire or explosion; strong oxidizer
- Causes severe skin burns and eye damage

Precautionary Statements:
Prevention:

- Keep away from heat.
- Keep away from clothing and other combustible materials.
- Take any precaution to avoid mixing with combustibles.
- Wear protective neoprene gloves, safety goggles and face shield with chin guard.
- Wear fire/flame resistant clothing.
- Do not breathe dust or mists.
- Wash arms, hands and face thoroughly after handling.

Response:

- IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
- IF ON CLOTHING: Rinse immediately contaminated clothing and skin with plenty of water before removing clothes. Wash contaminated clothing before reuse.
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
- Immediately call poison center.[4]

Specific Treatment:
Treat with doctor-prescribed burn cream.[5]

In case of fire:
Use water spray. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.

Storage:
Store locked up.

Disposal:

- Dispose of contents/container in accordance with local/regional/national/international regulations.[3]

Step 3: Create the Label

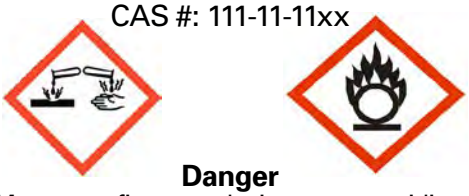
Putting together the above information on OXI252, a label might list the following information:

[4] In this example, the manufacturer determined that calling a poison control center is the most appropriate emergency medical advice.

[5] Not all SDSs will have direction for "specific treatment" on the label. This is only if the manufacturer specifically notes a certain treatment that needs to be used to treat a worker who has been exposed to this chemical.

Example 2A: OXI252 Label inner package label with OSHA pictograms

OXI252
(disodiumflammy)
CAS #: 111-11-11xx



Danger
May cause fire or explosion; strong oxidizer
Causes severe skin burns and eye damage

Keep away from heat. Keep away from clothing and other combustible materials. Take any precaution to avoid mixing with combustibles. Wear protective neoprene gloves, safety goggles and face shield with chin guard. Wear fire/flame resistant clothing. Do not breathe dust or mists. Wash arms, hands and face thoroughly after handling. Store locked up. Dispose of contents and container in accordance with local, state and federal regulations.

First aid:
IF ON SKIN (or hair) or clothing[6]: Rinse immediately contaminated clothing and skin with plenty of water before removing clothes. Wash contaminated clothing before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
Immediately call poison center.
Specific Treatment: Treat with doctor-prescribed burn cream.

Fire:
In case of fire: Use water spray. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.

Great Chemical Company, 55 Main Street, Anywhere, CT 064XX Telephone (888) 777-8888

Example 2B: OXI252 Label meeting DOT requirements for shipping[7]

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[6] There are occasions where label preparers may combine statements on the label. In this case the similar statements were combined and the most stringent were listed. For example, the first-aid pre-cautionary statements were combined for exposure to skin, hair and clothing.

[7] DOT Labels must comply with the size require-ments presented in 49 CFR 172.

For more detailed information about labels and Safety Data Sheets (SDSs) under the revised Hazard Communication Standard, please refer to refer to 29 CFR 1910.1200 - paragraphs (f) and (g), and Appendix C.

The revised Hazard Communication Standard and additional guidance materials are available on OSHA's Hazard Communication page, located at: www.osha.gov/dsg/hazcom/index.html.

Disclaimer: This OSHA Brief provides a general overview of the label requirements in the Hazard Communication Standard (see 29 CFR 1910.1200(f) and Appendix C of 29 CFR 1910.1200). It does not alter or determine compliance responsibilities in the standard or the Occupational Safety and Health Act of 1970. Since interpretations and enforcement policy may change over time, the reader should consult current OSHA interpretations and decisions by the Occupational Safety and Health Review Commission and the courts for additional guidance on OSHA compliance requirements.

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For assistance, contact us. We can help. It's confidential.

OSHA® Occupational Safety and Health Administration

U.S. Department of Labor
www.osha.gov (800) 321-OSHA (6742)

DSG BR-3636 2/2013

OSHA FactSheet

Health Effects of Hexavalent Chromium

Hexavalent chromium is a toxic form of the element chromium. Hexavalent chromium compounds are man-made and widely used in many different industries.

Some major industrial sources of hexavalent chromium are:

- chromate pigments in dyes, paints, inks, and plastics
- chromates added as anti-corrosive agents to paints, primers and other surface coatings
- chrome plating by depositing chromium metal onto an item's surface using a solution of chromic acid
- particles released during smelting of ferro-chromium ore
- fume from welding stainless steel or nonferrous chromium alloys
- impurity present in portland cement.

How hexavalent chromium can harm employees

Workplace exposure to hexavalent chromium may cause the following health effects:

- lung cancer in workers who breathe airborne hexavalent chromium
- irritation or damage to the nose, throat, and lung (respiratory tract) if hexavalent chromium is breathed at high levels
- irritation or damage to the eyes and skin if hexavalent chromium contacts these organs in high concentrations.

How hexavalent chromium affects the nose, throat and lungs

Breathing in high levels of hexavalent chromium can cause irritation to the nose and throat. Symptoms may include runny nose, sneezing, coughing, itching and a burning sensation.

Repeated or prolonged exposure can cause sores to develop in the nose and result in nosebleeds. If the damage is severe, the nasal septum (wall separating the nasal passages) develops a hole in it (perforation).

Breathing small amounts of hexavalent chromium even for long periods does not cause respiratory tract irritation in most people.

Some employees become allergic to hexavalent chromium so that inhaling chromate compounds can cause asthma symptoms such as wheezing and shortness of breath.

How hexavalent chromium affects the skin

Some employees can also develop an allergic skin reaction, called allergic contact dermatitis. This occurs from handling liquids or solids containing hexavalent chromium. Once an employee becomes allergic, brief skin contact causes swelling and a red, itchy rash that becomes crusty and thickened with prolonged exposure. Allergic contact dermatitis is long-lasting and more severe with repeated skin contact.

Direct skin contact with hexavalent chromium can cause a non-allergic skin irritation. Contact with non-intact skin can also lead to chrome ulcers. These are small crusted skin sores with a rounded border. They heal slowly and leave scars.

How employees can be exposed to hexavalent chromium

Employees can inhale airborne hexavalent chromium as a dust, fume or mist while:

- producing chromate pigments and powders; chromic acid; chromium catalysts, dyes, and coatings
- working near chrome electoplating
- welding and hotworking stainless steel, high chrome alloys and chrome-coated metal
- applying and removing chromate-containing paints and other surface coatings.

Skin exposure can occur during direct handling of hexavalent chromium-containing solutions, coatings, and cements.

Steps OSHA has taken to protect employees from health hazards caused by hexavalent chromium

The new OSHA workplace standard requires employers to:

- limit eight-hour time-weighted average hexavalent chromium exposure in the workplace to 5 micrograms or less per cubic meter of air.
- perform periodic monitoring at least every 6 months if initial monitoring shows employee exposure at or above the action level (2.5 micrograms per cubic meter of air calculated as an 8-hour time-weighted average).
- provide appropriate personal protective clothing and equipment when there is likely to be a hazard present from skin or eye contact.
- implement good personal hygiene and housekeeping practices to prevent hexavalent chromium exposure.
- prohibit employee rotation as a method to achieve compliance with the exposure limit (PEL).
- provide respiratory protection as specified in the standard.
- make available medical examinations to employees within 30 days of initial assignment, annually, to those exposed in an emergency situation, to those who experience signs or symptoms of adverse health effects associated with hexavalent chromium exposure, to those who are or may be exposed at or above the action level for 30 or more days a year, and at termination of employment.

For more complete information:

OSHA Occupational Safety and Health Administration

U.S. Department of Labor

www.osha.gov

(800) 321-OSHA

DSG 7/2006

RISKIEST Work Schedules

38% of the U.S. workforce reports being sleep deprived.

NIGHT SHIFTS

Safety incidents are 30% higher during night shifts



EARLY MORNING START

Before 7:00am, body is still in sleep mode



LONG HOURS

The longer the shift, the higher the risk



IRREGULAR SHIFTS & ROTATING SCHEDULES

Schedules changing daily or weekly upsets your body clock



For more information, visit www.nsc.org/fatigue

NATIONAL SAFETY COUNCIL | 1121 SPRING LAKE DRIVE | ITASCA, IL 60143-3201
(800) 723-3643 | nsc.org

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HAZARD ALERT

Incorrectly Refurbished Circuit Breakers

Introduction

The Occupational Safety and Health Administration (OSHA) recently learned of a hazardous condition that may exist in certain molded-case circuit breakers . The breakers may have an actual rating of 600 volts AC (alternating current) (VAC) or less, but are labeled as 1,000 VAC and may contain incorrect parts that can cause the breaker to malfunction.

The third-party rebuilder has apparently refurbished the breakers incorrectly. These breakers were originally manufactured by Eaton/Cutler-Hammer, as part of its E^2 mining series breakers. All model numbers of this series begin with "E^2". Only the E^2KM model (see Figure 1) and E^2K model of this series are known to be affected. The rating of these original breakers was 600 VAC (for the E^2K model) and 1,000 VAC (for the E^2KM model). Under certain conditions, the E^2KM model may be rated at 250 volts DC (direct current) (VDC).

OSHA bases the details of this alert on an alert issued by the Mine Safety and Health Administration (MSHA)

Breakers." (See http://www.msha.gov/Alerts/Equipment/3rdPartyCircuitBreakers042011.pdf.)

How would I identify the affected circuit breakers?

The hazardous condition may affect circuit breakers of any frame size. The circuit breakers may appear to be new or properly rebuilt, but a third-party rebuilder changed them from the manufacturer's original design. The breakers were then sold for use in mining operations, which are regulated by MSHA. OSHA

workplaces under OSHA's jurisdiction. However, it is

have been purchased for use in tunneling operations, because such operations require machinery similar to that used in coal or other mining operations. It

have been sold improperly for use as replacement components in *any* electrical cabinet where stand-



Figure 1 (Note: The arrow in Figure 1 points to an area on the alert notes is smooth. Originally, the E^2K model had a grey cover and the E^2KM model a red cover. Also, the breaker's label or

Recognized Testing Laboratory (NRTL). OSHA knows of no other e

alone type (in general, surface-mounted) circuit breakers are used. Such uses are regulated by OSHA.

What are the hazards?

Defective circuit breakers present hazards that may

explosions.

The third-party rebuilder sold these breakers either directly to users or indirectly through a mining supply company. Evidence suggests that these circuit breakers have incorrect 600 VAC or 1,000 VAC covers. These covers are of unknown construction and were not manufactured by Eaton. The third-party rebuilder

the breakers in an effort to make the circuit breakers look new and legitimate.

Because these covers do not meet manufacturer

protection or proper grounding. In addition, the frames used for the covers that are labeled 1,000 VAC may only have a 600 VAC or less rating, and a 250 VDC rating, such as shown in Figure 1, may be invalid.

Also, the frames used for covers that are labeled 600 VAC or 1,000 VAC have been rebuilt and may contain parts, such as tips and springs, of unknown origin and

injury and equipment damage from the failure of these circuit breakers, employers must remove them from service and replace them with proper circuit breakers.

What do I do if I have an Eaton E²K or E²KM mining series breaker?

At this time, OSHA does not know the number of affected breakers or their locations. If your location uses an Eaton E²K or E²KM mining series breaker,

f power to the breaker and follow proper lockout/tagout procedures.
person must ensure there is no voltage in the area where any work on the breaker may be performed and must examine the breaker and determine if it works properly. All other personnel should avoid going

determines that it works properly.

A
from service. After removing a defective breaker from

supply system or have questions about these breakers, please notify OSHA by e-mailing nrtlprogram@dol.gov, or calling 202-693-2300 and ask to speak to the staff of the NRTL Program. In addition, please contact Mr. Tom Grace of Eaton/Cutler-Hammer for instructions on how to dispose of the breaker. You may contact Mr. Grace at 412-418-2169 or by e-mail at tomagrace@eaton.com. If you cannot reach him, Eaton's Customer Support phone number is 877-386-2273.

What approval does OSHA require for circuit breakers used in the workplace?

A workplace under OSHA's jurisdiction generally must

a Nationally Recognized Testing Laboratory (NRTL) that OSHA recognizes to test the particular type of breaker. The NRTL's mark that appears on a breaker indicates that the NRTL properly approved the breaker. OSHA can cite employers if they use breakers not properly approved by an NRTL.

Eaton's mining series breakers have a molded-case construction, and the breakers are for use in locations where combustible gases are present. OSHA currently recognizes only four NRTLs that can approve such breakers: Canadian Standards Association, FM Approvals, Intertek Testing Services NA, and Underwriters Laboratories. Go to OSHA's informational page at http://www.osha.gov/dts/otpca/nrtl/index.html to see the type of breakers each NRTL can approve. From this page, you also can access OSHA's web page for the marks that these NRTLs use. An NRTL' ,
typically on the label of the breaker. In the case of Intertek, it uses only its "ETL" mark when approving breakers. If the mark of any other NRTL or organiza- , it is a violation of OSHA's requirements, and you must remove the breaker from service.

How can OSHA help?

If you have any questions about this alert or about OSHA's requirements for NRTL approval of breakers, e-mail nrtlprogram@dol.gov, or call 202-693-2300 and ask to speak to the staff of the NRTL Program. Contact your local OSHA
questions about circuit breakers that you are using. Call 1-800-321-OSHA (6742) or visit OSHA's website at http://www.osha.gov/html/RAmap.html to reach

can contact OSHA' -
tion service to help determine if there are hazards at their workplace. On-site consultations do not result in penalties or citations. To contact OSHA's consultation service, visit http://www.osha.gov/dcsp/smallbusiness/consult.html or call 1-800-321-OSHA (6742).

What rights do workers have?

Workers have a right to a safe workplace. The purpose of the *Occupational Safety and Health Act of 1970* (OSH Act) is to prevent death or injury in the workplace. The *OSH Act* requires employers to provide their workers with a workplace that is free of serious hazards. The *OSH Act* established OSHA, which sets and enforces protective workplace safety and health standards. OSHA also provides information, training, and assistance to workers and employers. W
OSHA inspect their workplace if they believe that their employer is not following OSHA standards, or that there are serious hazards in the workplace.

complaint. W
We are here to help you.

For other valuable worker protection information and other services OSHA offers, visit www.osha.gov.

Disclaimer

This Hazard Alert is not a standard or regulation, and it creates no new legal obligations. It contains recommendations as well as descriptions of mandatory safety and health standards. The recommendations are advisory in nature, informational in content, and are intended to assist employers in providing a safe and healthful workplace. The Occupational Safety and Health Act requires employers to comply with safety and health standards and regulations promulgated by OSHA or by a state with an OSHA-approved state plan. In addition, the Act's General Duty Clause, Section 5(a)(1), requires employers to provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm.

U.S. Department of Labor
Hilda L. Solis, Secretary of Labor

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OSHA® FactSheet

Ladder Jack Scaffolds

Supported Scaffolds

A ladder jack scaffold is a system designed to perform activities, such as: installing building exteriors, trim, and finishes. Contractors widely use ladder jack scaffolds because of their cost effectiveness, portability, and quick erection and dismantling procedures, as well as their adaptability for use in narrow spaces at construction worksites.

What is a Ladder Jack Scaffold?

Triangle-shaped brackets called "ladder jacks" are attached to portable ladders, which are used on each side of a ladder jack scaffold to form a means of support for a platform.



Photo courtesy of National Association of Home Builders.

Ladder Jack Scaffold

Types of Ladder Jack Bracket Devices

There are different types of Ladder Jack bracket devices. These include:

1. **Side Rail Ladder Jack –**
   (Over the rail and rung)

   This style of jack is installed onto the railing and rungs of a pair of extension, or single, ladders. The planking is then slid into position along the side of the bracket to create a work platform.



Photo courtesy of ACRO Building Systems, Inc.

Side Rail Ladder Jack

2. **Two or Three Rung Bracket Ladder Jacks –**
   (Over the rung only)

   This style of jack hooks directly onto two or three ladder rungs. With these types of ladder jacks, planking may be placed on top of the bracket jacks to create a working platform.



2-Rung Bracket Jack



3-Rung Bracket Jack

Photos courtesy of Werner Co Services, Inc.

Setting-Up Ladder Jack Scaffolds

Before each use:

- Inspect all scaffold components for damage.
- Verify that all parts are working and ensure that all nuts are tightened.
- Do not use bent, cracked, damaged or substitute parts.
- If using a two- or three-rung bracket jack, ensure that the rectangular brackets are fitted securely onto the ladder rungs in accordance with manufacturer's specifications.
- If using the side rail ladder jack, secure the upper round hooks and the lower brackets of the device onto the ladder's side rails, then rest the brackets onto the rungs, and secure the platform gusset plate onto the adjustable notches at center. **(See Figure #1).**
- The ladder jack must be designed and constructed so that it will bear on the side rails and ladder rungs or on the ladder rungs alone. If bearing on rungs only, the bearing area must include a length of at least 10 inches (25.4 cm) on each rung [29 CFR 1926.452(k)(3)].

- Ensure that the bracket jack is adjusted so that it is parallel to the ground to create a level platform.
- Securely tighten the ladder jack's wing nuts to prevent slippage during use.
- If the scaffold system is defective, tag and promptly remove it from service.

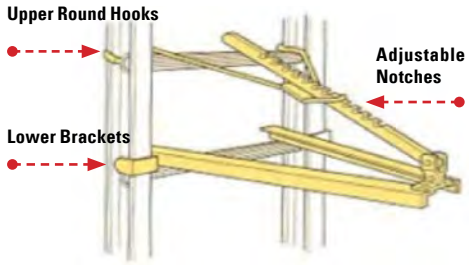


Illustration courtesy of ACRO Building Systems, Inc.

Figure #1

Using Ladder Jack Scaffolds

- Extension ladders must not be separated to create two ladders.
- Keep the areas around the base of all ladders clear to prevent trip-and-fall hazards.
- Avoid setting ladders up in high traffic areas or barricade areas near the base of the ladder.
- Keep ladders on stable and level surfaces, unless secured, to prevent accidental displacement.
- Ladders must be secured or provided with slip-resistant feet when used on slippery surfaces.
- Workers should avoid electrical hazards and look for overhead power lines before handling ladders.
- Workers should not use metal ladders near power lines or exposed energized electrical equipment.
- Keep platforms clear for working activities.

Platform Requirements

- Two workers are recommended when installing planking onto jack bracket supports for scaffolding.
- Do not paint or plaster scaffold planks, and if paint or plaster is observed, promptly remove the plank from service.
- Do not use ladder jack scaffolding to support a platform higher than 20 feet (6.1m) [§1926.452(k)(1)].
- Do not bridge scaffold platforms together [§1926.452(k)(5)]. (This practice often causes the center of the platform to overload.)
- Each ladder jack scaffold platform must be at least 12 inches (30 cm) wide [§1926.451(b)(2)(i)].



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When choosing a straight or extension ladder, make sure that its length allows you to set it up at the required angle, using the 4-to-1 Rule.

Suggested Guidelines

[29 CFR 1926 Subpart L, Appendix A(2)(k)]

- The maximum intended load for a ladder jack scaffold is 25 lb/ft².
- No more than two workers may occupy a platform at any one time.
- The maximum span between supports is 8 feet.

Training

- The training requirements of 29 CFR 1926 Subparts L – Scaffolds (§1926.454) and X – Stairways and Ladders (§1926.1060) apply to ladder jack scaffolding.
- Employers must provide training for workers in hazard recognition, and procedures for controlling or minimizing hazards, when working on ladders and scaffolding.
- Employers must ensure that workers use ladders are trained by a person competent in fall hazards, fall protection systems, the maximum intended load-carrying capacity of ladders, and the proper construction, use, placement and care required when handling ladders.
- Employers must ensure that workers involved in erecting, disassembling, moving, operating,

repairing, maintaining, or inspecting scaffolding are trained by a person competent in hazard recognition.

Which OSHA standards apply to Ladder Jack Scaffolds?

Several OSHA standards apply to construction operations involving the use of ladder jack scaffolding, including:

- *Ladder Jack Scaffold*: A platform resting on brackets attached to ladders [§1926.450(b)];
- *Supported Scaffold*: One or more platforms supported by outrigger beams, brackets, poles, legs, uprights, posts, frames, or similar rigid support [§1926.450(b)];
- *Ladder Jack Scaffolds*: requirements applicable to specific types of scaffolds (29 CFR 1926 Subpart L – Scaffolds), including requirement that all ladders used to support ladder jack scaffolds meet the requirements of Subpart X – Stairways and Ladders) [§1926.452(k)];
- *Non-Mandatory Guidelines*: 29 CFR 1926 Subpart L, Appendix A – Scaffold Specifications.

Ladder Requirements

- All ladders used to support ladder jack scaffolds must comply with 29 CFR 1926 Subpart X – Stairways and Ladders [§1926.452(k)(2)].
- **Exception:** Job-made ladders must not be used to support ladder jack scaffolds.

Fall Protection Requirements

- Employees working above 10 feet (3.1 m) on a ladder jack scaffold must be protected from fall hazards by a personal fall arrest system (PFAS) [§§1926.451(g)(1) & (g)(1)(i)].
- Personal fall arrest systems for scaffolds must meet the requirements of §1926.502(d) & §1926.451(g)(3).
- The maximum distance from the face for plastering and lathing operations must be 18 inches (46 cm) [§1926.451(b)(3)(ii)].
- The front edge of all platforms must not be more than 14 inches (36 cm) from the face of the work, unless guardrail systems are erected along the front edge and/or personal fall arrest systems are used [§1926.451(b)(3)].

OSHA's Scaffolding e-Tool

- OSHA's Scaffolding e-Tool provides information on the requirements that apply to specific types of scaffolding and ways to recognize potential hazards and identify controls, at: www.osha.gov/SLTC/etools/scaffolding/supported.

Workers' Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

For more information, see OSHA's Workers page.

How to Contact OSHA

For questions or to get information or advice, to report an emergency, fatality, inpatient hospitalization, amputation, or loss of an eye, or to file a confidential complaint, contact your nearest OSHA office, visit www.osha.gov or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.

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OSHA® Occupational Safety and Health Administration

www.osha.gov (800) 321-OSHA (6742)

U.S. Department of Labor

DOC FS-3857 04/2016



OSHA FACT Sheet

Lockout/Tagout

What is the OSHA standard for control of hazardous energy sources?

The OSHA standard for *The Control of Hazardous Energy (Lockout/Tagout), Title 29 Code of Federal Regulations* (*CFR*) Part 1910.147, addresses the practices and procedures necessary to disable machinery or equipment, thereby preventing the release of hazardous energy while employees perform servicing and maintenance activities. The standard outlines measures for controlling hazardous energies—electrical, mechanical, hydraulic, pneumatic, chemical, thermal, and other energy sources.

In addition, *29 CFR* 1910.333 sets forth requirements to protect employees working on electric circuits and equipment. This section requires workers to use safe work practices, including lockout and tagging procedures. These provisions apply when employees are exposed to electrical hazards while working on, near, or with conductors or systems that use electric energy.

Why is controlling hazardous energy sources important?

Employees servicing or maintaining machines or equipment may be exposed to serious physical harm or death if hazardous energy is not properly controlled. Craft workers, machine operators, and laborers are among the 3 million workers who service equipment and face the greatest risk. Compliance with the lockout/tagout standard prevents an estimated 120 fatalities and 50,000 injuries each year. Workers injured on the job from exposure to hazardous energy lose an average of 24 workdays for recuperation.

How can you protect workers?

The lockout/tagout standard establishes the employer's responsibility to protect employees from hazardous energy sources on machines and equipment during service and maintenance.

The standard gives each employer the flexibility to develop an energy control program suited to the needs of the particular workplace and the types of machines and equipment being maintained or serviced. This is generally done by affixing the appropriate lockout or tagout devices to energy-isolating devices and by deenergizing machines and equipment. The standard outlines the steps required to do this.

What do employees need to know?

Employees need to be trained to ensure that they know, understand, and follow the applicable provisions of the hazardous energy control procedures. The training must cover at least three areas: aspects of the employer's energy control program; elements of the energy control procedure relevant to the employee's duties or assignment; and the various requirements of the OSHA standards related to lockout/tagout.

What must employers do to protect employees?

The standards establish requirements that employers must follow when employees are exposed to hazardous energy while servicing and maintaining equipment and machinery. Some of the most critical requirements from these standards are outlined below:

- Develop, implement, and enforce an energy control program.
- Use lockout devices for equipment that can be locked out. Tagout devices may be used in lieu of lockout devices only if the tagout program provides employee protection equivalent to that provided through a lockout program.
- Ensure that new or overhauled equipment is capable of being locked out.
- Develop, implement, and enforce an effective tagout program if machines or equipment are not capable of being locked out.

Lockout/Tagout

- Develop, document, implement, and enforce energy control procedures. [See the note to *29 CFR* 1910.147(c)(4)(i) for an exception to the documentation requirements.]
- Use only lockout/tagout devices authorized for the particular equipment or machinery and ensure that they are durable, standardized, and substantial.
- Ensure that lockout/tagout devices identify the individual users.
- Establish a policy that permits only the employee who applied a lockout/tagout device to remove it. [See *29 CFR* 1910.147(e)(3) for exception.]
- Inspect energy control procedures at least annually.
- Provide effective training as mandated for all employees covered by the standard.
- Comply with the additional energy control provisions in OSHA standards when machines or equipment must be tested or repositioned, when outside contractors work at the site, in group lockout situations, and during shift or personnel changes.

How can you get more information?

OSHA has various publications, standards, technical assistance, and compliance tools to help you, and offers extensive assistance through its many safety and health programs: workplace consultation, voluntary protection programs, grants, strategic partnerships, state plans, training, and education. Guidance such as OSHA's *Safety and Health Management Program Guidelines* identify elements that are critical to the development of a successful safety and health management system. This and other information are available on OSHA's website at **www.osha.gov**.

- For a free copy of OSHA publications, send a self-addressed mailing label to this address: OSHA Publications Office, P.O. Box 37535, Washington, DC 20013-7535; or send a request to our fax at (202) 693-2498, or call us at (202) 693-1888.
- To file a complaint by phone, report an emergency, or get OSHA advice, assistance, or products, contact your nearest OSHA office under the "U.S. Department of Labor" listing in your phone book, or call us toll-free at **(800) 321-OSHA (6742)**. The teletypewriter (TTY) number is (877) 889-5627.
- To file a complaint online or obtain more information on OSHA federal and state programs, visit OSHA's website.

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U.S. Department of Labor
Occupational Safety and Health Administration
2002

OSHA FactSheet

Motor Vehicle Safety Facts

The U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) in partnership with the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) launched a promotional campaign, "Every Belt - Every Ride" at the National Safety Congress, September 14, 2004 in New Orleans to encourage federal workers to wear seat belts every time they ride in a vehicle on public business.

Costs of Traffic Crashes

- Traffic crashes are the leading cause of on-the-job fatalities in America.[1]
- From 1992 to 2001, half the federal workers who died on the job lost their lives in transportation incidents.[2]
- In Fiscal Year 2003, at least 28 federal workers were killed in job-related traffic crashes and about 8,000 more were injured.[3]
- Over the past five years, the U.S. government has paid out nearly $75 million in medical and compensation costs linked to federal employee injuries and deaths related to motor vehicle crashes.[4]

Seat Belts Save Lives

- Using seat belts cuts the risk of death by 45% for people riding in cars and by as much as 60% for those traveling in trucks or SUVs.[5]
- Seat belts save 14,000 lives each year and every state in the nation has a law mandating seat belt use. But 20% of Americans still fail to buckle up.[6]
- Federal employees are required to wear seat belts—every time they travel on public business as passengers or drivers—by Executive Order 13043.
- **Every Belt – Every Ride** seeks to remind federal employees of the life-saving value of seat belts and their obligation to use the safety devices in government vehicles, private cars and taxies, whenever and wherever they go on public business.

References

[1] Pegula, Paul S., Fatal Occupational Injuries to Government Workers, 1992-2001, U.S. Department of Labor, Bureau of Labor Statistics, 2004.

[2] Pegula, Paul S., Fatal Occupational Injuries to Government Workers, 1992-2001, U.S. Department of Labor, Bureau of Labor Statistics.

[3] U.S. Department of Labor, Office of Workers' Compensation Programs. Data prepared by OWCP for OSHA.

[4] U.S. Department of Labor, Office of Workers' Compensation Programs. Data prepared by OWCP for OSHA.

[5] U.S. Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis, Safety Belt Use in 2003-Use Rates in the States and Territories.

[6] U.S. Department of Transportation, National Highway Traffic Safety Administration, National Occupant Protection Use Survey, June 2003.

NHTSA People Saving People www.nhtsa.dot.gov

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OSHA® FactSheet

Narrow Frame Scaffolds

Narrow frame scaffolds, also known as Baker/Perry style scaffolds, are among the most popular pieces of construction equipment. Due to their versatility many contractors use them instead of ladders because they allow workers to maintain their balance and work more easily from the platform.

What is a narrow frame scaffold?

A narrow frame scaffold has wheels and is often used as a mobile scaffold with the end frame measuring 3 feet or less in width. (See Fig. 1.) Designed to be easily moved, they are used for operations such as painting, drywall installation, plastering, and other jobs where workers must frequently change position. Scaffolds can be adapted to stairs, ramps, and other uneven surfaces.

In some instances scaffolds may be a better and safer choice than ladders.

Minimizing hazards

Some of the hazards associated with narrow frame scaffolds, ***can*** *lead to personal injury or death; they include*:

- Falls from an elevated level
- Tip-overs
- Electric shocks
- Structural failures (collapse)

Training workers in scaffold safety

Under the *Occupational Safety and Health Act* employers are responsible for providing a safe workplace.

All training must be conducted in a manner and language which the worker is able to understand.

- Only trained and authorized persons should be allowed to use a scaffold. This training must be provided by a qualified person who recognizes the hazards associated with the type of scaffold being used and who understands the procedures to control or minimize those hazards. Training must include how to safely:
  - Use the scaffold and determine the maximum load limits when handling materials.
  - Recognize and avoid scaffolding hazards such as electric shock, falls from heights, and being hit by falling objects.
  - Erect, inspect, move, operate, maintain, and repair scaffolds.



Figure 1

For more information on scaffolding, see OSHA's Safety and Health Topics page at www.osha.gov/SLTC/scaffolding.

Scaffold Safety

Employers must ensure the following:

- Follow the manufacturer's allowable load for the casters, scaffold components and platforms, along with recommended bracing to ensure a rigid and structurally sound scaffold.
- Assess the work area, site conditions, and work to be performed.
- Conduct a pre-operation inspection to verify that all scaffold components are functioning properly and/or are correctly assembled.
- Keep the platform free from tripping hazards such as hand tools, equipment, or materials.
- Lock scaffold wheels with positive wheel and/or wheel and swivel locks to prevent movement while in use.
- Use guardrails which include top rails, mid-rails, and toe boards, or fall protection at working platform heights of 10 feet or higher.
- Stay at least 10 feet away from energized power lines.
- If outriggers are installed, deploy installed outriggers on both sides of the scaffold. All locking pins must be engaged before using the scaffold.

Employers must ensure that workers have been effectively trained in the following:

- Not to stand on the guardrail or use any components of the scaffold or other items (e.g., stepladders, buckets, boxes, barrels, etc.) inside the scaffold to gain additional standing height.
- Not to try to pull yourself from one location to another while standing on the platform.
- Not to use a scaffold if it is incomplete, broken or has missing or ill-fitting parts which need replacement. Contact your employer immediately.
- Not to move the scaffold with worker(s) on the scaffold when:
  - The worker(s) on the scaffold is unaware of the move and/or the surface under the scaffold is not within 3 degrees of level and free of pits, holes or obstructions.
  - The worker is on any part of the scaffold which extends outward beyond the wheels, casters, or other supports.
  - Manual force is not being applied as close to the base as practicable. Manual force must be applied not more than 5 feet above the supporting surface (1926.452(w)(3)).
  - The height to base width ratio of the scaffold during movement is greater than 2 to 1, unless the scaffold is designed and constructed to meet or exceed nationally recognized stability test requirements (such as ANSI/SIA A92.5 and A92.6) (1926.452(w)(6)(ii)).

Retraining

Employers must retrain employees when inadequacies are observed, changes in worksite conditions occur or when it is believed that an employee lacks the skill or understanding needed for safe work involving the erection, use or dismantling of the scaffold.

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For assistance, contact us. We can help. It's confidential.

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OSHA® FactSheet

Occupational Safety and Health Administration (OSHA) Inspections

OSHA is committed to strong, fair, and effective enforcement of safety and health requirements in the workplace. OSHA inspectors, called compliance safety and health officers, are experienced, well-trained industrial hygienists and safety professionals whose goal is to assure compliance with OSHA requirements and help employers and workers reduce on-the-job hazards and prevent injuries, illnesses, and deaths in the workplace. Normally, OSHA conducts inspections without advance notice. Employers have the right to require compliance officers to obtain an inspection warrant before entering the worksite.

Inspection Priorities

OSHA has jurisdiction over approximately 7 million worksites. The agency seeks to focus its inspection resources on the most hazardous workplaces in the following order of priority:

1. Imminent danger situations—hazards that could cause death or serious physical harm receive top priority. Compliance officers will ask employers to correct these hazards immediately or remove endangered employees.

2. Severe injuries and illnesses—employers must report:

- All work-related fatalities within 8 hours.
- All work-related inpatient hospitalizations, amputations, or losses of an eye within 24 hours.

3. Worker Complaints—allegations of hazards or violations also receive a high priority. Employees may request anonymity when they file complaints.

4. Referrals of hazards from other federal, state or local agencies, individuals, organizations or the media receive consideration for inspection.

5. Targeted inspections—inspections aimed at specific high-hazard industries or individual workplaces that have experienced high rates of injuries and illnesses also receive priority.

6. Follow-up inspections—checks for abatement of violations cited during previous inspections are also conducted by the agency in certain circumstances.

Phone/Fax Investigations

OSHA carefully prioritizes all complaints it receives based on their severity. For lower-priority hazards, with permission of a complainant, OSHA may telephone the employer to describe safety and health concerns, following up with a fax providing details on alleged safety and health hazards. The employer must respond in writing within five working days, identifying any problems found and noting corrective actions taken or planned. If the response is adequate and the complainant is satisfied with the response, OSHA generally will not conduct an on-site inspection.

On-Site Inspections

Preparation—Before conducting an inspection, OSHA compliance officers research the inspection history of a worksite using various data sources, review the operations and processes in use and the standards most likely to apply. They gather appropriate personal protective equipment and testing instruments to measure potential hazards.

Presentation of credentials—The on-site inspection begins with the presentation of the compliance officer's credentials, which include both a photograph and a serial number.

Opening Conference—The compliance officer will explain why OSHA selected the workplace for inspection and describe the scope of the inspection, walkaround procedures, employee representation and employee interviews. The employer then selects a representative to accompany the compliance officer during the inspection. An authorized representative of the employees, if any, also has the right to accompany an inspector. The compliance officer will consult privately with a reasonable number of employees during the inspection.

Walkaround—Following the opening conference, the compliance officer and the representatives will walk through the portions of the workplace covered by the inspection, inspecting for hazards that could lead to employee injury or illness. The compliance officer will also review worksite injury and illness records and the posting of the official OSHA poster.

During the walkaround, compliance officers may point out some apparent violations that can be corrected immediately. While the law requires that these hazards must still be cited, prompt correction is a sign of good faith on the part of the employer. Compliance officers try to minimize work interruptions during the inspection and will keep confidential any trade secrets observed.

Closing Conference—After the walkaround, the compliance officer holds a closing conference with the employer and the employee representatives to discuss the findings. The compliance officer discusses possible courses of action an employer may take following an inspection, which could include an informal conference with OSHA or contesting citations and proposed penalties. The compliance officer also discusses consultation services and employee rights.

Results

When an inspector finds violations of OSHA standards or serious hazards, OSHA may issue citations and fines. OSHA must issue a citation and proposed penalty within six months of the violation's occurrence. Citations describe OSHA requirements allegedly violated, list any proposed penalties, and give a deadline for correcting the alleged hazards. Violations are categorized as willful, serious, other-than-serious, *de minimis*, failure to abate, and repeated. In settling a penalty, OSHA has a policy of reducing penalties for small employers and those acting in good faith. For serious violations, OSHA may also reduce the proposed penalty based on the gravity of the alleged violation. No good faith adjustment will be made for alleged willful violations. For information on penalty ranges, see www.osha.gov/penalties.

Appeals

When OSHA issues a citation to an employer, it also offers the employer an opportunity for an informal conference with the OSHA Area Director to discuss citations, penalties, abatement dates, or any other information pertinent to the inspection. The agency and the employer may work out a settlement agreement to resolve the matter and to eliminate the hazard. OSHA's primary goal is correcting hazards and maintaining compliance rather than issuing citations or collecting penalties.

Alternatively, employers have 15 working days after receipt of citations and proposed penalties to formally contest the alleged violations and/or penalties by sending a written notice to the Area Director. OSHA forwards the contest to the Occupational Safety and Health Review Commission for independent review. Alternatively, citations, penalties, and abatement dates that are not challenged by the employer or settled become a final order of the Occupational Safety and Health Review Commission.

Workers' Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

For additional information, see OSHA's Workers' page (www.osha.gov/workers).

How to Contact OSHA

Under the Occupational Safety and Health Act of 1970, employers are responsible for providing safe and healthful workplaces for their employees. OSHA's role is to help ensure these conditions for America's working men and women by setting and enforcing standards, and providing training, education and assistance. For more information, visit www.osha.gov or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

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OSHA FactSheet

Planning and Responding to Workplace Emergencies

Nobody expects an emergency or disaster. Yet emergencies and disasters can strike anyone, anytime, anywhere. Employers should establish effective safety and health management systems and prepare their workers to handle emergencies before they arise.

Planning

Where required by some Occupational Safety and Health Administration standards, firms with more than 10 employees must have a written emergency action plan; smaller companies may communicate their plans orally. Top management support and the commitment and involvement of all employees are essential to an effective emergency action plan.

Employers should review plans with employees when initially put in place and re-evaluate and amend the plan periodically whenever the plan itself, or employee responsibilities, change. Emergency procedures, including the handling of any toxic chemicals, should include:

- Escape procedures and escape route assignments.
- Special procedures for employees who perform or shut down critical plant operations.
- Systems to account for all employees after evacuation and for information about the plan.
- Rescue and medical duties for employees who perform them.
- Means for reporting fires and other emergencies.

Chain of Command

The employer should designate an emergency response coordinator and a backup coordinator. The coordinator may be responsible for plant-wide operations, public information and ensuring that outside aid is called. Having a backup coordinator ensures that a trained person is always available. Employees should know who the designated coordinator is. Duties of the coordinator and employer include:

- Determining what emergencies may occur and seeing that emergency procedures are developed to address each situation.
- Directing all emergency activities including evacuation of personnel.
- Ensuring that outside emergency services are notified when necessary.
- Directing the shutdown of plant operations when necessary.

Emergency Response Teams

Emergency response team members should be thoroughly trained for potential crises and physically capable of carrying out their duties. Team members need to know about toxic hazards in the workplace and be able to judge when to evacuate personnel or when to rely on outside help (e.g., when a fire is too large to handle). One or more teams must be trained in:

- Use of various types of fire extinguishers.
- First aid, including cardiopulmonary resuscitation (CPR) and self-contained breathing apparatus (SCBA).
- Requirements of the OSHA bloodborne pathogens standard.
- Shutdown procedures.
- Chemical spill control procedures.
- Search and emergency rescue procedures.
- Hazardous materials emergency response.

Response Activities

Effective emergency communication is vital. An alternate area for a communications center other than management offices should be established in the plans, and the emergency response coordinator should operate from this center. Management should provide emergency alarms and ensure that employees know how to report emergencies. An updated list of key personnel and off-duty telephone numbers should be maintained.

Accounting for personnel following evacuation is critical. A person in the control center should notify police or emergency response team members of persons believed missing.

Effective security procedures can prevent unauthorized access and protect vital records and equipment. Duplicate records of essential accounting files, legal documents and lists of employee relatives – to be notified in case of emergency – can be kept at off-site locations.

Training

Every employee needs to know details of the emergency action plan, including evacuation plans, alarm systems, reporting procedures for personnel, shutdown procedures, and types of potential emergencies. Any special hazards, such as flammable materials, toxic chemicals, radioactive sources or water-reactive substances, should be discussed with employees. Drills should be held at random intervals, at least annually, and should include outside police and fire authorities.

Training must be conducted at least annually and when employees are hired or when their job changes. Additional training is needed when new equipment, materials or processes are introduced, when the layout or design of the facility changes, when procedures have been updated or revised, or when exercises show that employee performance is inadequate.

Personal Protection

Employees exposed to or near accidental chemical splashes, falling objects, flying particles, unknown atmospheres with inadequate oxygen or toxic gases, fires, live electrical wiring, or similar emergencies need appropriate personal protective equipment.

Medical Assistance

First aid must be available within 3 to 4 minutes of an emergency. Worksites more than 3 to 4 minutes from an infirmary, clinic, or hospital should have at least one person on-site trained in first aid (available all shifts), have medical personnel readily available for advice and consultation, and develop written emergency medical procedures.

It is essential that first aid supplies are available to the trained first aid providers, that emergency phone numbers are placed in conspicuous places near or on telephones, and prearranged ambulance services for any emergency are available. It may help to coordinate an emergency action plan with the outsider responders such as the fire department, hospital emergency room, EMS providers and local HAZMAT teams.

Further Information

More detailed information on workplace emergencies is provided in "How to Plan for Workplace Emergencies and Evacuations" (OSHA 3088) available free on OSHA's website or from OSHA Publications, Room N3101, 200 Constitution Ave., N.W., Washington, D.C. 20210, telephone 1-800-321-OSHA, or local OSHA offices. Further information is also available in OSHA's Evacuation Plans and Procedure eTool and Emergency Preparedness and Response webpage

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For more complete information:

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4/2004

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Personal Protective Equipment (PPE) Reduces Exposure to Bloodborne Pathogens

OSHA's Bloodborne Pathogens standard (29 CFR 1910.1030) requires employers to protect workers who are occupationally exposed to blood and other potentially infectious materials (OPIM), as defined in the standard. That is, the standard protects workers who can reasonably be anticipated to come into contact with blood or OPIM as a result of doing their job duties.

One way the employer can protect workers against exposure to bloodborne pathogens, such as hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV), the virus that causes AIDS, is by providing and ensuring they use personal protective equipment, or PPE. Wearing appropriate PPE can significantly reduce risk, since it acts as a barrier against exposure. Employers are required to provide, clean, repair, and replace this equipment as needed, and at no cost to workers.

Selecting Personal Protective Equipment

Personal protective equipment may include gloves, gowns, laboratory coats, face shields or masks, eye protection, pocket masks, and other protective gear. The PPE selected must be appropriate for the task. This means the level and type of protection must fit the expected exposure. For example, gloves may be the only PPE needed for a laboratory technician who is drawing blood. However, a pathologist conducting an autopsy would need much more protective clothing because of the different types of exposure (e.g., splashes, sprays) and the increased amount of blood and OPIM that are encountered. PPE must be readily accessible to workers and available in appropriate sizes.

If it can be reasonably expected that a worker could have hand contact with blood, OPIM, or contaminated surfaces or items, the employer must ensure that the worker wears gloves. Single-use gloves cannot be washed or decontaminated for reuse. Utility gloves may be decontaminated if their ability to provide an effective barrier is not compromised. They should be replaced when they show signs of cracking, peeling, tearing, puncturing, or deteriorating. Non-latex gloves, glove liners, powderless gloves or similar alternatives must be provided if workers are allergic to the gloves normally provided.

Gloves are required for all phlebotomies outside of volunteer blood donation centers. If an employer in a volunteer blood donation center judges that routine gloving for all phlebotomies is not necessary, then the employer is required to periodically re-evaluate this policy; make gloves available for workers who want to use them; and cannot discourage their use. In addition, employers must ensure that workers in volunteer blood donation centers use gloves (1) when they have cuts, scratches or other breaks in their skin, (2) while they are in training, or (3) when the worker believes that hand contamination might occur.

When splashes, sprays, splatters, or droplets of blood or OPIM pose a hazard to the eyes, nose or mouth, then masks in conjunction with eye protection (such as goggles or glasses with solid side shields) or chin-length face shields must be worn. Protection against exposure to the body is provided by protective clothing, such as gowns, aprons, lab coats, and similar garments. Surgical caps or hoods, and shoe covers or boots are needed when gross contamination is expected, such as during orthopedic surgery or autopsies.

In HIV and HBV research laboratories and production facilities, laboratory coats, gowns, smocks, uniforms, or other appropriate protective clothing must be used in work areas and animal rooms. Also, protective clothing must not be worn outside of the work area and must be decontaminated before being laundered.

Exception to Use of Personal Protective Equipment

A worker may choose, temporarily and briefly, **under rare and extraordinary circumstances**, to forego use of personal protective equipment. It must be the worker's professional judgment that using the personal protective equipment would prevent the delivery of health care or public safety services or would pose an increased hazard to the safety of the worker or coworker. When such a situation occurs, the employer is required to investigate and document the circumstances to determine if there is a way to avoid it from happening again in the future. Employers and workers should be aware that this is not a blanket exemption to the requirement to use PPE. OSHA expects that this will be an extremely rare occurrence.

Decontaminating and Disposing of Personal Protective Equipment

Employers must ensure that workers remove personal protective equipment before leaving the work area. If a garment is penetrated by blood or OPIM, it must be removed immediately or as soon as feasible. Once PPE is removed, it must be placed in an appropriately designated area or container for storage, washing, decontamination, or disposal. In addition, employers must ensure that workers wash their hands immediately or as soon as feasible after removal of gloves or other personal protective equipment.

Additional Information

For more information, go to OSHA's Bloodborne Pathogens and Needlestick Prevention Safety and Health Topics web page at: https://www.osha.gov/SLTC/bloodbornepathogens/index.html.

To file a complaint by phone, report an emergency, or get OSHA advice, assistance, or products, contact your nearest OSHA office under the "U.S. Department of Labor" listing in your phone book, or call us toll-free at (800) 321-OSHA (6742).

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Personal Protective Equipment

Personal protective equipment, or PPE, is designed to protect workers from serious workplace injuries or illnesses resulting from contact with chemical, radiological, physical, electrical, mechanical, or other workplace hazards. Besides face shields, safety glasses, hard hats, and safety shoes, protective equipment includes a variety of devices and garments such as goggles,coveralls, gloves, vests, earplugs, and respirators.

Employer Responsibilities

OSHA's primary personal protective equipment standards are in Title 29 of the Code of Federal Regulations (CFR), Part 1910 Subpart I, and equivalent regulations in states with OSHA-approved state plans, but you can find protective equipment requirements elsewhere in the General Industry Standards. For example, 29 CFR 1910.156, OSHA's Fire Brigades Standard, has requirements for firefighting gear. In addition, 29 CFR 1926.95-106 covers the construction industry. OSHA's general personal protective equipment requirements mandate that employers conduct a hazard assessment of their workplaces to determine what hazards are present that require the use of protective equipment, provide workers with appropriate protective equipment, and require them to use and maintain it in sanitary and reliable condition.

Using personal protective equipment is often essential, but it is generally the last line of defense after engineering controls, work practices, and administrative controls. Engineering controls involve physically changing a machine or work environment. Administrative controls involve changing how or when workers do their jobs, such as scheduling work and rotating workers to reduce exposures. Work practices involve training workers how to perform tasks in ways that reduce their exposure to workplace hazards.

As an employer, you must assess your workplace to determine if hazards are present that require the use of personal protective equipment. If such hazards are present, you must select protective equipment and require workers to use it, communicate your protective equipment selection decisions to your workers, and select personal protective equipment that properly fits your workers.

You must also train workers who are required to wear personal protective equipment on how to do the following:

- Use protective equipment properly,
- Be aware of when personal protective equipment is necessary,
- Know what kind of protective equipment is necessary,
- Understand the limitations of personal protective equipment in protecting workers from injury,
- Put on, adjust, wear, and take off personal protective equipment, and
- Maintain protective equipment properly.

Protection from Head Injuries

Hard hats can protect your workers from head impact, penetration injuries, and electrical injuries such as those caused by falling or flying objects, fixed objects, or contact with electrical conductors. Also, OSHA regulations require employers to ensure that workers cover and protect long hair to prevent it from getting caught in machine parts such as belts and chains.

Protection from Foot and Leg Injuries

In addition to foot guards and safety shoes, leggings (e.g., leather, aluminized rayon, or otherappropriate material) can help prevent injuries by protecting workers from hazards such as falling or rolling objects, sharp objects, wet and slippery surfaces, molten metals, hot surfaces, and electrical hazards.

Protection from Eye and Face Injuries

Besides spectacles and goggles, personal protective equipment such as special helmets or shields, spectacles with side shields, and faceshields can protect workers from the hazards of flying fragments, large chips, hot sparks,

optical radiation, splashes from molten metals, as well as objects, particles, sand, dirt, mists, dusts, and glare.

Protection from Hearing Loss

Wearing earplugs or earmuffs can help prevent damage to hearing. Exposure to high noise levels can cause irreversible hearing loss or impairment as well as physical and psychological stress. Earplugs made from foam, waxed cotton, or fiberglass wool are self-forming and usually fit well. A professional should fit your workers individually for molded or preformed earplugs. Clean earplugs regularly, and replace those you cannot clean.

Protection from Hand Injuries

Workers exposed to harmful substances through skin absorption, severe cuts or lacerations, severe abrasions, chemical burns, thermal burns, and harmful temperatureextremes will benefit from hand protection.

Protection from Body Injury

In some cases workers must shield most or all of their bodies against hazards in the workplace, such as exposure to heat and radiation as well as hot metals, scalding liquids, body fluids, hazardous materials or waste, and other hazards. In addition to fire-retardant wool and fireretardant cotton, materials used in whole-body personal protective equipment include rubber, leather, synthetics, and plastic.

When to Wear Respiratory Protection

When engineering controls are not feasible, workers must use appropriate respirators to protect against adverse health effects caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors. Respirators generally cover the nose and mouth or the entire face or head and help prevent illness and injury. A proper fit is essential, however, for respirators to be effective. Required respirators must be NIOSH-approved and medical evaluation and training must be provided before use.

Additional Information

For additional information concerning protective equipment view the publication, Assessing the Need for Personal Protective Equipment: A Guide for Small Business Employers (OSHA 3151) available on OSHA's web site at www.osha. gov. For more information about personal protective equipment in the construction industry, visit www.osha-slc.gov/SLTC/constructionppe/ index.html.

Contacting OSHA

To report an emergency, file a complaint or seek OSHA advice, assistance or products, call (800) 321-OSHA or contact your nearest OSHA regional or area office.

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For more complete information:

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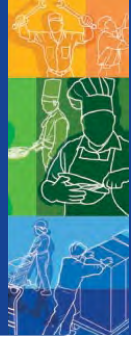
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DOC 4/2006

Recommended Practices



Protecting Temporary Workers

The Occupational Safety and Health Administration (OSHA) and the National Institute for Occupational Safety and Health (NIOSH) are aware of numerous preventable deaths and disabling injuries of temporary workers. One example is the death of a 27-year-old employed through a staffing agency to work as an equipment cleaner at a food manufacturing plant. While cleaning a piece of machinery, he came into contact with rotating parts and was pulled into the machine, sustaining fatal injuries. The manufacturing plant's procedures for cleaning the equipment were unsafe, including steps in which cleaners worked near the machine while it was energized and parts were moving. Additionally, while the company's permanent maintenance employees were provided with training on procedures to ensure workers were not exposed to energized equipment during maintenance or cleaning, this training was not provided to cleaners employed through the staffing agency. Source: Massachusetts Fatality Assessment and Control Evaluation (FACE) Program, 11MA050.

Workers employed through staffing agencies are generally called *temporary* or *supplied* workers. For the purposes of these recommended practices, "temporary workers" are those supplied to a host employer and paid by a staffing agency, whether or not the job is actually temporary. Whether temporary or permanent, **all workers always have a right to a safe and healthy workplace**. The staffing agency and the staffing agency's client (the *host employer*) are joint employers of temporary workers and, therefore, both are responsible for providing and maintaining a safe work environment for those workers. The staffing agency and the host employer must work together to ensure that the *Occupational Safety and Health Act of 1970* (the OSH Act) requirements are fully met. See 29 U.S.C. § 651. The extent of the obligations of each employer will vary depending on workplace conditions and should therefore be described in the agreement or contract between the employers. Their safety and health responsibilities will sometimes overlap. Either the staffing agency or the host employer may be better suited to ensure compliance with a particular requirement, and may assume primary responsibility for it. The joint employment structure requires effective communication and a common understanding of the division of responsibilities for safety and health. Ideally, these will be set forth in a written contract.

OSHA and NIOSH recommend the following practices to staffing agencies and host employers so that they may better protect temporary workers through mutual cooperation and collaboration. *Unless otherwise legally required, these recommendations are for the purpose of guidance and in some cases represent best practices.*

- **Evaluate the Host Employer's Worksite.** Prior to accepting a new host employer as a client, or a new project from a current client host employer, the staffing agency and the host employer should jointly review all worksites to which the worker might foreseeably be sent, the task assignments and job hazard analyses in order to identify and eliminate potential safety and health hazards and identify necessary training and protections for each worker. The staffing agency should provide a document to the host employer that specifies each temporary worker's specific training and competencies related to the tasks to be performed.

  Staffing agencies need not become experts on specific workplace hazards, but should determine what conditions exist at the worksite, what hazards may be encountered, and how to best ensure protection for the temporary workers. Staffing agencies, particularly those without dedicated safety and health professionals on staff, should consider utilizing a third-party safety and health consultant. For example, staffing agencies may be able to utilize the safety and health consultation services provided by their workers' compensation insurance providers. These consultation services are often offered to policyholders at little to no charge. Employers (staffing agencies and host employers) should inquire with their insurance providers about these services. Small and medium-sized businesses may request assistance from OSHA's free on-site consultation service. On-site consultation services are separate from enforcement and do not result in penalties or citations.

  If information becomes available that shows an inadequacy in the host employer's job hazard analyses, such as injury and illness reports, safety and health complaints or OSHA enforcement history, the staffing agency should make efforts to discuss and resolve those issues with the host employer to ensure that existing hazards are properly assessed and abated to protect the workers. In assessing worksite hazards, host employers typically have the safety and health knowledge and control of worksite operations. However, the staffing agency may itself perform an inspection of the workplace, if feasible, to conduct their own hazard assessment or to ensure implementation of the host employer's safety and health obligations for temporary workers.

- **Train Agency Staff to Recognize Safety and Health Hazards.** Many staffing agencies do not have dedicated safety and health professionals and, even when they do, these experts cannot be everywhere at once. By teaching agency representatives about basic safety principles and the hazards commonly faced by its temporary workers, the agency will be better equipped to discover hazards and work with the host employer to eliminate or lessen identified workplace hazards before an injury or illness occurs.

- **Ensure the Employer Meets or Exceeds the Other Employer's Standards.** When feasible, the host employer and staffing agency should exchange and review each other's injury and illness prevention program. Host employers should also request and review the safety training and any certification records of the temporary workers who will be assigned to the job. Host employers in certain industries, for example, will only accept bids from and hire staffing agencies that the host has previously verified as meeting the host employer's safety standards. Similarly, some staffing agencies work only with clients that have robust safety programs.

- **Assign Occupational Safety and Health Responsibilities and Define the Scope of Work in the Contract.** The extent of the responsibilities the staffing agency and the host employer have will vary depending on the workplace conditions and should be described in their agreement. Either the staffing agency or the host employer may be better suited to ensure compliance with

a particular requirement, and may assume primary responsibility for it. When feasible, the agency-host contract should clearly state which employer is responsible for specific safety and health duties. The contract should clearly document the responsibilities to encourage proper implementation of all pertinent safety and health protections for workers. This division of responsibilities should be reviewed regularly.

The tasks that the temporary worker is expected to perform, and the safety and health responsibilities of each employer, should be stated in the agency-host contract and should be communicated to the worker before that worker begins work at the job site. For example, should the job tasks require personal protective equipment, the contract should state what equipment will be needed and which employer will supply it. The worker should be informed of these details before beginning the job. Clearly defining the scope of the temporary worker's tasks in the agency-host contract discourages the host employer from asking the worker to perform tasks that the worker is not qualified or trained to perform or which carry a higher risk of injury. Defining, clarifying, and communicating the employers' and worker's responsibilities protects the workers of both the staffing agency and of the host employer. The contract should specify who is responsible for all such communications with the temporary worker.

- **Injury and Illness Tracking.** Employer knowledge of workplace injuries and investigation of these injuries are vital to preventing future injuries from occurring. Information about injuries should flow between the host employer and staffing agency. If a temporary worker is injured and the host employer knows about it, the staffing agency should be informed promptly, so the staffing agency knows about the hazards facing its workers. Equally, if a staffing agency learns of an injury, it should inform the host employer promptly so that future injuries might be prevented, and the case is recorded appropriately. The parties should therefore also discuss a procedure to share injury and illness information between the employers, ideally specifying that procedure contractually.

  NOTE on Injury and Illness Recordkeeping Requirements: Both the host employer and staffing agency should track and where possible, investigate the cause of workplace injuries. However, for statistical purposes, OSHA requires that injury and illness records (often called OSHA Injury and Illness Logs) be kept by the employer who is providing day-to-day supervision, i.e., controlling the means and manner of the temporary employees' work (the host employer, generally). See 29 CFR 1904.31(b)(2). The agency-host contract should therefore identify the supervising employer and state that this employer is responsible for maintaining the temporary workers' injury and illness records. Employers cannot discharge or contract away responsibilities that pertain to them under law. Further, the contract should specify which employer will make the records available upon request of an employee or an employee representative.

  The supervising employer is required to set up a method for employees to report work-related injuries and illnesses promptly and must inform each employee how to report work-related injuries and illnesses. However, both the staffing agency and the host employer should inform the temporary employee on this process and how to report a work-related injury or illness. See 29 CFR 1904.35(b).

  No policies or programs should be in place that discourage the reporting of injuries, illnesses or hazards. The OSH Act prohibits employers from retaliating against a worker for reporting an injury or illness, including for filing a workers' compensation claim for a work-related condition.

- **Conduct Safety and Health Training and New Project Orientation.** OSHA standards require site- and task-specific safety and health training. The training must be in a language the workers understand. Training helps to protect the workers of both the staffing agency and the host employer.

  The training of temporary workers is a responsibility that is shared between the staffing agency and the host employer. Staffing agencies should provide general safety and health training applicable to different occupational settings, and host employers provide specific training tailored to the particular hazards at their workplaces. The host employer and the staffing agency should each provide — separately or jointly — safety and health orientations for all temporary workers on new projects or newly-placed on existing projects. The orientation should include information on general worker-protection rights and workplace safety and health. At least one of the joint employers, generally the host employer, must provide worksite-specific training and protective equipment to temporary workers, and identify and communicate worksite-specific hazards. The temporary workers' tasks, as defined by the agency-host contract, should also be clearly communicated to the workers and reviewed with the host employer's supervisor(s). **Host employers should provide temporary workers with safety training that is identical or equivalent to that provided to the host employers' own employees performing the same or similar work**. Host employers should inform staffing agencies when such site-specific training for temporary workers has been completed. Informing workers and supervisors of their respective responsibilities agreed upon by the joint employers protects the workers of both the staffing agency and the host employer.

  - **First Aid, Medical Treatment, and Emergencies.** Procedures should be in place for both reporting and obtaining treatment for on-the-job injuries and illnesses. Temporary employees should be provided with information on how to report an injury and obtain treatment on every job assignment. Host employers should train temporary employees on emergency procedures including exit routes.

- **Injury and Illness Prevention Program.** It is recommended that staffing agencies and host employers each have a safety and health program to reduce the number and severity of workplace injuries and illnesses and ensure that their temporary workers understand it and participate in it. The employers' safety programs should be communicated at the start of each new project, whenever new temporary workers are brought onto an existing project, or whenever new hazards are introduced into the workplace.

  NOTE: Employers are required to have hazard-specific programs when workers are exposed to certain hazards. Such programs include bloodborne pathogens, hearing conservation, hazard communication, respiratory protection, and control of hazardous energy (lock-out/tag-out).

  Contractors and employers who do construction work must comply with standards in 29 CFR 1926, Subpart C, General Safety and Health Provisions. These include the responsibilities for each contractor/employer to initiate and maintain accident prevention programs, provide for a competent person to conduct frequent and regular inspections, and instruct each employee to recognize and avoid unsafe conditions and know what regulations are applicable to the work environment.

- **Injury and Illness Prevention Program Assessments.** The employers should identify and track performance measures key to evaluating the program's effectiveness. For both staffing agencies and host employers, a quality program will stipulate how there will be ongoing assessments to evaluate the consistency, timeliness, quality and adequacy of the program. Leading indicators, such as training and number of hazards identified and corrected, should be included in the assessments. Generally speaking, these assessments should take place at least on an annual basis with a competent internal team or a combined internal and external team. The value of these assessments is the resulting prioritized recommendations for program improvement.

- **Incidents, Injury and Illness Investigation.** In addition to reporting responsibilities, employers should conduct thorough investigations of injuries and illnesses, including incidents of close-calls, in order to determine what the root causes were, what immediate corrective actions are necessary, and what opportunities exist to improve the injury and illness prevention programs. It is critical that both the staffing agency and host employer are engaged in partnership when conducting these investigations.

- **Maintain Contact with Workers.** The staffing agency should establish methods to maintain contact with temporary workers. This can be as simple as the agency representatives touching base with the workers throughout the temporary assignment, such as when the representatives are at the site to meet with the host employer or to drop off paychecks, or by phone or email. The staffing agency has the duty to inquire and, to the extent feasible, verify that the host has fulfilled its responsibilities for a safe workplace.

  The staffing agency should have a written procedure for workers to report any hazards and instances when a worker's tasks are altered by the host employer from those previously agreed upon. The staffing agency and host employer should inform workers how to report hazards and/or changes to job tasks. For example, some staffing agencies have a hotline for their workers to call to report problems at the host employer's worksite. The staffing agency distributes this phone number during the orientation.

  The staffing agency should follow up on a worker's safety and health concerns and any complaints with the host employer, as well as investigate any injuries, illnesses and incidents of close calls.

How Can OSHA Help?

OSHA has a great deal of information to assist employers in complying with their responsibilities under the law. Information on OSHA requirements and additional health and safety information is available on the OSHA website (www.osha.gov). Further information on protecting temporary workers is available at the OSHA Temporary Worker webpage (www.osha.gov/temp_workers).

Workers have a right to a safe workplace (www.osha.gov/workers.html#2). For other valuable worker protection information, such as Workers' Rights, Employer Responsibilities and other services OSHA offers, visit OSHA's Workers' page.

The OSH Act prohibits employers from retaliating against their employees for exercising their rights under the OSH Act. These rights include raising a workplace health and safety concern with the employer, reporting an injury or illness, filing an OSHA complaint, and participating in an inspection or talking to an inspector. If workers have been retaliated

against for exercising their rights, they must file a complaint with OSHA within 30 days of the alleged adverse action. For more information, please visit www.whistleblowers.gov.

OSHA can help answer questions or concerns from employers and workers. To reach your regional or area OSHA office, go to OSHA's Regional and Area Offices webpage (www.osha.gov/html/RAmap.html) or call 1-800-321-OSHA (6742). OSHA also provides help to small and medium-sized employers. OSHA's On-site Consultation Program offers free and confidential advice to small and medium-sized businesses in all states across the country, with priority given to high-hazard worksites. On-site consultation services are separate from enforcement activities and do not result in penalties or citations. To contact OSHA's free consultation program, or for additional compliance assistance, call OSHA at 1-800-321-OSHA (6742).

Workers may file a complaint to have OSHA inspect their workplace if they believe that their employer is not following OSHA standards or that there are serious hazards. Employees can file a complaint with OSHA by calling 1-800-321-OSHA (6742) or by printing the complaint form and mailing or faxing it to your local OSHA area office. Complaints that are signed by an employee are more likely to result in an inspection.

If you think your job is unsafe or you have questions, contact OSHA at 1-800-321-OSHA (6742). It's confidential. We can help.

How Can NIOSH Help?

The National Institute for Occupational Safety and Health (NIOSH) is the federal agency that conducts research and makes recommendations to prevent worker injury and illness. Recommendations for preventing worker injuries and illnesses across all industries and for a wide variety of hazards are available on the NIOSH website (www.cdc.gov/niosh). To receive documents or more information about occupational safety and health topics, please contact NIOSH at 1-800-CDC-INFO (1-800-232-4636), TTY 1-888-232-6348.

The NIOSH Fatality Assessment and Control Evaluation (FACE) program investigates selected work-related fatalities to identify high-risk work injury situations and to make recommendations for preventing future similar deaths. Investigations are conducted by NIOSH and state partners. For more information and links to reports of temporary worker deaths, please visit www.cdc.gov/niosh/face. The Michigan and Massachusetts FACE programs have developed 1-2 page Hazard Alerts on temporary worker deaths that are available on their websites (www.oem.msu.edu/userfiles/file/MiFACE/TemporaryWorkerHA17.pdf and www.mass.gov/eohhs/docs/dph/occupational-health/temp-workers.pdf).

The NIOSH Health Hazard Evaluation (HHE) Program provides advice and assistance regarding work-related health hazards. NIOSH may provide assistance and information by phone, in writing, or may visit the workplace. The HHE Program can be reached at www.cdc.gov/NIOSH/HHE or 513-841-4382.

Disclaimer: This document is not a standard or regulation, and it creates no new legal obligations. It contains recommendations as well as descriptions of mandatory safety and health standards. The recommendations are advisory in nature, informational in content, and are intended to assist employers in providing a safe and healthful workplace. The *Occupational Safety and Health Act* requires employers to comply with safety and health standards and regulations promulgated by OSHA or by a state with an OSHA-approved state plan. In addition, the Act's General Duty Clause, Section 5(a)(1), requires employers to provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm.

U.S. Department of Labor

Occupational Safety and Health Administration

CDC Workplace Safety and Health

NIOSH

DHHS (NIOSH) Publication Number 2014-139 OSHA - 3735-2014

OSHA® FactSheet

Protecting Workers during a Pandemic

A pandemic is a global disease outbreak and can be caused by a variety of agents, including influenza and coronaviruses. During a pandemic, transmission can be anticipated in the workplace not only from patients to workers in healthcare settings, but also among co-workers and between members of the general public and workers in other types of workplaces.

Workers who believe that their employer provides a safe and healthy workplace are more likely to report for work during a pandemic. Clear communication promotes confidence in the employer's ability to protect workers and reduces absenteeism.

Employers should ensure that their workers understand:

- Differences between seasonal epidemics and worldwide pandemic disease outbreaks;
- Which job activities may put them at risk for exposure to sources of infection;
- What options may be available for working remotely, or utilizing an employer's flexible leave policy when they are sick;
- Social distancing strategies, including avoiding close physical contact (e.g., shaking hands) and large gatherings of people;
- Good hygiene and appropriate disinfection procedures;
- What personal protective equipment (PPE) is available, and how to wear, use, clean and store it properly;
- What medical services (e.g., vaccination, post-exposure medication) may be available to them; and
- How supervisors will provide updated pandemic-related communications, and where to direct their questions.

Sick Leave

Employers may consider providing sick leave so that workers may stay home if they are sick. Flexible leave policies help stop the spread of disease, including to healthy workers.

Principles of worker protection:

✓ Consistently practice social distancing.
✓ Cover coughs and sneezes.
✓ Maintain hand hygiene.
✓ Clean surfaces frequently.

Training

Following the Centers for Disease Control and Prevention (CDC) recommendations, employers should provide worker training on infection controls, including the importance of avoiding close contact (within 6 feet) with others. Employers should provide adequate supplies and ready access to soap and running water, tissues, alcohol-based hand sanitizers and cleaning agents. Some worksites may need PPE (e.g., gloves, face shields, and respirators). Frequent visual and verbal reminders to workers can improve compliance with hand hygiene practices and thus reduce rates of infection. Handwashing posters are available from the CDC: www.cdc.gov/features/handwashing.

Control Measures

Employers may modify the work environment and/or change work practices to provide additional protection to workers and clients. For example, employers may install physical barriers (e.g., clear plastic sneeze guards), conduct business in a different manner (e.g., use drive-through service windows, implement telework arrangements), improve ventilation (e.g., install high-efficiency air filters, increase ventilation rates), install additional hand

Comparison of Surgical Masks and Respirators

Surgical Masks

- Used by workers to protect themselves against splashes and sprays containing infectious agents.
- Placed on sick individuals to prevent respiratory infections that spread by large droplets; worn by surgeons to avoid contaminating surgical sites.
- May not protect against airborne-transmissible infectious agents due to loose fit and lack of seal.
- Can be used by almost anyone, regardless of training.
- Should be properly disposed of after use.

Respirators (e.g., filtering facepiece)

- Used by workers to prevent inhalation of small particles, including airborne-transmissible infectious agents.
- To be effective, should have the proper filter material (e.g., N95 or better), be NIOSH-certified, and must fit tightly to prevent air leaks.
- For use, require proper training, fit testing, availability of appropriate medical evaluations and monitoring, cleaning and oversight by a knowledgeable staff member.
- Employer must establish a respiratory protection program that is compliant with OSHA's Respiratory Protection standard, 29 CFR 1910.134. OSHA consultation staff can assist with understanding respiratory protection requirements.

sanitizer dispensers, provide facial tissues, and have workers use PPE. Employers should select equipment, such as surgical masks and respirators as described below, that will protect workers against infectious diseases to which they may be exposed.

For additional information, see OSHA's Fact Sheet "Respiratory Infection Control: Respirators versus Surgical Masks" at www.osha.gov/Publications/respirators-vs-surgicalmasks-factsheet.pdf.

Depending on the pandemic, a vaccine may or may not be available to protect people from illness. If available, employers may offer appropriate vaccines to workers to reduce the number of those at risk for infection in their workplace.

Risk Communication

Workers should be aware of the exposure risk level associated with their job duties. In addition, a pandemic may disproportionately affect people in certain age groups or with specific health histories. Workers with job-related exposure to infections who voluntarily disclose personal health risks should be considered for job accommodations and/or additional protective measures, e.g., use of PPE.

Higher risk work settings include those healthcare workplaces where: infected patients may congregate; clinical specimens are handled or transported; or materials contaminated with blood or infectious wastes are handled. These settings warrant: use of physical barriers to control the spread of infectious disease; worker and client management to promote social distancing; and adequate and appropriate PPE, hygiene and cleaning supplies. Additional information, including an OSHA Fact Sheet on exposure risks in healthcare workplaces, can be found on OSHA's Publications page: www.osha.gov/publications. Employers and workers can also learn about preparedness for pandemics and other events at OSHA's Emergency Preparedness and Response page: www.osha.gov/SLTC/emergencypreparedness.

Very High & High Exposure Risk	Medium Exposure Risk	Lower Exposure Risk (Caution)
Healthcare workers, particularly those working with known or suspected pandemic patients.	Workers with high-frequency interaction with the general public (e.g., those working in schools, restaurants and retail establishments, travel and mass transit, or other crowded environments).	Workers who have minimal contact with the general public and other coworkers (e.g., office workers).

Assistance for Employers

OSHA's On-site Consultation Program offers free and confidential advice to small and medium-sized businesses in all states across the country, with priority given to high-hazard worksites. On-site Consultation services are separate from enforcement and do not result in penalties or citations. Consultants from state agencies or universities work with employers to identify workplace hazards, provide advice on compliance with OSHA standards, and assist in establishing safety and health management systems. To locate the OSHA On-site Consultation Program nearest you, call 1-800-321-OSHA (6742) or visit www.osha.gov/consultation.

Note: This document provides guidance for employers during a pandemic, but is not intended to cover all OSHA standards that may apply. State Plans adopt and enforce their own occupational safety and health standards at www.osha.gov/dcsp/osp.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

For assistance, contact us. We can help. It's confidential.

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U.S. Department of Labor

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OSHA® FactSheet

Reducing Falls in Construction: Safe Use of Extension Ladders

Workers who use extension ladders risk permanent injury or death from falls and electrocutions. These hazards can be eliminated or substantially reduced by following good safety practices. This fact sheet examines some of the hazards workers may encounter while working on extension ladders and explains what employers and workers can do to reduce injuries. OSHA's requirements for extension ladders are in Subpart X—Stairways and Ladders of OSHA's Construction standards.

What is an Extension Ladder?

Also known as "portable ladders," extension ladders usually have two sections that operate in brackets or guides allowing for adjustable lengths. (See Figure 1, below.) Because extension ladders are not self-supporting they require a stable structure that can withstand the intended load.

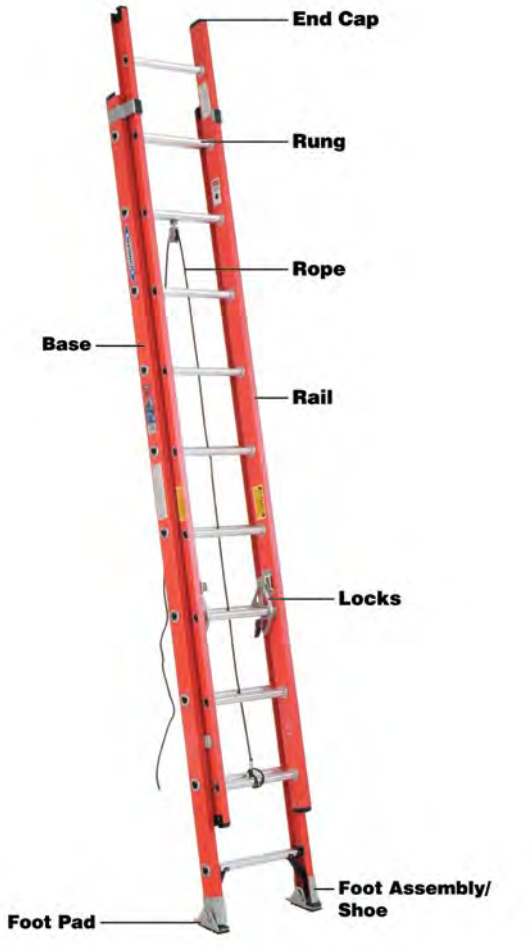


Figure 1: Extension Ladder

PLAN Ahead to Get the Job Done Safely.

- Use a ladder that can sustain at least four times the maximum intended load, except that each extra-heavy duty type 1A metal or plastic ladder shall sustain at least 3.3 times the maximum intended load. Also acceptable are ladders that meet the requirements set forth in Appendix A of Subpart X. Follow the manufacturer's instructions and labels on the ladder. To determine the correct ladder, consider your weight plus the weight of your load. Do not exceed the load rating and always include the weight of all tools, materials and equipment.
- A competent person must visually inspect all extension ladders before use for any defects such as: missing rungs, bolts, cleats, screws and loose components. Where a ladder has these or other defects, it must be immediately marked as defective or tagged with "Do Not Use" or similar language.
- Allow sufficient room to step off the ladder safely. Keep the area around the bottom and the top of the ladder clear of equipment, materials and tools. If access is obstructed, secure the top of the ladder to a rigid support that will not deflect, and add a grasping device to allow workers safe access.
- Set the ladder at the proper angle. When a ladder is leaned against a wall, the bottom of the ladder should be one-quarter of the ladder's working length away from the wall. For access to an elevated work surface, extend the top of the ladder three feet above that surface or secure the ladder at its top.
- Before starting work, survey the area for potential hazards, such as energized overhead power lines. Ladders shall have

nonconductive side rails if they are used where the worker or the ladder could contact exposed energized electrical equipment. Keep all ladders and other tools at least 10 feet away from any power lines.
- Set the base of the ladder so that the bottom sits securely and so both side rails are evenly supported. The ladder rails should be square to the structure against which it is leaning with both footpads placed securely on a stable and level surface.
- Secure the ladder's dogs or pawls before climbing.
- When using a ladder in a high-activity area, secure it to prevent movement and use a barrier to redirect workers and equipment. If the ladder is placed in front of a door, always block off the door.



Figure 2: Ladder extending three feet above the landing area.

PROVIDE the Right Extension Ladder for the Job with the Proper Load Capacity.

Select a ladder based on the expected load capacity (duty rating), the type of work to be done and the correct height. There are five categories of ladder duty ratings.

Type	Duty Rating	Use	Load
IAA*	Special Duty	Rugged	375 lbs.
IA	Extra Duty	Industrial	300 lbs.
I	Heavy Duty	Industrial	250 lbs.
II	Medium Duty	Commercial	225 lbs.
III	Light Duty	Household	200 lbs.

Source for Types IA, I, II, III: Subpart X—Stairways and Ladders, Appendix A (American National Standards Institute (ANSI)) 14.1, 14.2, 14.5 (1982)) of OSHA's Construction standards. Source for Type IAA: ANSI 14.1, 14.2, 14.5 (2009), which are non-mandatory guidelines.

TRAIN Workers to Use Extension Ladders Safely.

Employers must train each worker to recognize and minimize ladder-related hazards.



PLAN. PROVIDE. TRAIN.

Three simple steps to prevent falls.

Safe Ladder Use—DO:

- Maintain a 3-point contact (two hands and a foot, or two feet and a hand) when climbing/descending a ladder.
- Face the ladder when climbing up or descending.
- Keep the body inside the side rails.
- Use extra care when getting on or off the ladder at the top or bottom. Avoid tipping the ladder over sideways or causing the ladder base to slide out.
- Carry tools in a tool belt or raise tools up using a hand line. Never carry tools in your hands while climbing up/down a ladder.
- Extend the top of the ladder three feet above the landing. (See Figure 2.)
- Keep ladders free of any slippery materials.

Safe Ladder Use—DO NOT:

- Place a ladder on boxes, barrels, or unstable bases.
- Use a ladder on soft ground or unstable footing.
- Exceed the ladder's maximum load rating.
- Tie two ladders together to make them longer.
- Ignore nearby overhead power lines.
- Move or shift a ladder with a person or equipment on the ladder.
- Lean out beyond the ladder's side rails.
- Use an extension ladder horizontally like a platform.

OSHA standard: **29 CFR 1926 Subpart X**—Stairways and Ladders

American National Standards Institute standard: **ANSI A14.1, A14.2, A14.5—Ladder Safety Requirements**
(Not an OSHA standard, included to be used as guidance to meet OSHA's requirements)

Employers using extension ladders must follow the ladder requirements set forth in 29 CFR 1926 Subpart X. Per Appendix A to Subpart X of Part 1926—Ladders, ladders designed in accordance with the following ANSI standards will be considered in accordance with 29 CFR 1926.1053(a)(1): ANSI A14.1-1982—American National Standard for Ladders—Portable Wood—Safety Requirements, ANSI A14.2-1982—American National Standard for Ladders—Portable Metal—Safety Requirements, and ANSI A14.5-1982—American National Standard for Ladders—Portable Reinforced Plastic—Safety Requirements.

State plan guidance: States with OSHA-approved state plans may have additional requirements for avoiding falls from ladders. For more information on these requirements, please visit: www.osha.gov/dcsp/osp/statesstandards.html.

Most OSHA offices have compliance assistance specialists to help employers and workers comply with OSHA standards. For details call 1-800-321-OSHA (6742) or visit: www.osha.gov/htm/RAmap.html.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

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OSHA® FactSheet

Reducing Falls in Construction: Safe Use of Stepladders

Workers who use ladders in construction risk permanent injury or death from falls and electrocutions. These hazards can be eliminated or substantially reduced by following good safety practices. This fact sheet examines some of the hazards workers may encounter while working on stepladders and explains what employers and workers can do to reduce injuries. OSHA's requirements for stepladders are in Subpart X—Stairways and Ladders of OSHA's Construction standards.

What is a Stepladder?

A **stepladder** is a portable, self-supporting, A-frame ladder. It has two front side rails and two rear side rails. Generally, there are steps mounted between the front side rails and bracing between the rear side rails. (See Figure 1, below.)

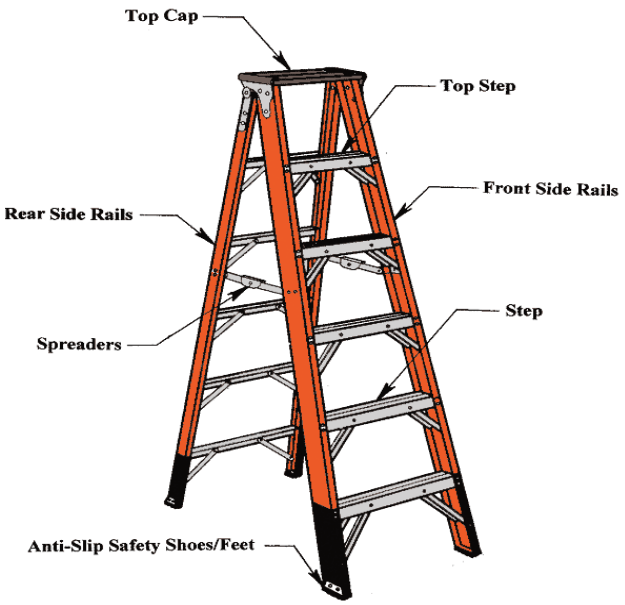


Figure 1: Stepladder

PLAN Ahead to Get the Job Done Safely.

A competent person must visually inspect stepladders for visible defects on a periodic basis and after any occurrence that could affect their safe use. Defects include, but are not limited to:

- Structural damage, split/bent side rails, broken or missing rungs/steps/cleats and missing or damaged safety devices.
- Grease, dirt or other contaminants that could cause slips or falls.
- Paint or stickers (except warning or safety labels) that could hide possible defects.

PROVIDE the Right Stepladder for the Job with the Proper Load Capacity.

- Use a ladder that can sustain at least four times the maximum intended load, except that each extra-heavy duty type 1A metal or plastic ladder shall sustain at least 3.3 times the maximum intended load. Also acceptable are ladders that meet the requirements set forth in Appendix A of Subpart X. Follow the manufacturer's instructions and labels on the ladder. To determine the correct ladder, consider your weight plus the weight of your load. Do not exceed the load rating and always include the weight of all tools, materials and equipment.

Type	Duty Rating	Use	Load
1AA	Special Duty	Rugged	375 lbs.
1A	Extra Heavy Duty	Industrial	300 lbs.
1	Heavy Duty	Industrial	250 lbs.
II	Medium Duty	Commercial	225 lbs.
III	Light Duty	Household	200 lbs.

Source for Types IA, I, II, III: Subpart X—Stairways and Ladders, Appendix A (American National Standards Institute (ANSI) 14.1, 14.2, 14.5 (1982)) of OSHA's Construction standards. Source for Type IAA: ANSI 14.1, 14.2, 14.5 (2009), which are non-mandatory guidelines.

TRAIN Workers to Use Stepladders Safely.

Employers must train each worker to recognize and minimize ladder-related hazards.



PLAN. PROVIDE. TRAIN.
Three simple steps to prevent falls.

Common Stepladder Hazards

- Damaged stepladder
- Ladders on slippery or unstable surface
- Unlocked ladder spreaders
- Standing on the top step or top cap
- Loading ladder beyond rated load
- Ladders in high-traffic location
- Reaching outside ladder side rails
- Ladders in close proximity to electrical wiring/equipment

Safe Stepladder Use—DO:

Read and follow all the manufacturer's instructions and labels on the ladder.

- Look for overhead power lines before handling or climbing a ladder.
- Maintain a 3-point contact (two hands and a foot, or two feet and a hand) when climbing/descending a ladder.
- Stay near the middle of the ladder and face the ladder while climbing up/down.
- Use a barricade to keep traffic away from the ladder.
- Keep ladders free of any slippery materials.
- Only put ladders on a stable and level surface that is not slippery.

Safe Stepladder Use—DO NOT:

- Use ladders for a purpose other than that for which they were designed. For example, do not use a folded stepladder as a single ladder.
- Use a stepladder with spreaders unlocked.
- Use the top step or cap as a step.
- Place a ladder on boxes, barrels or other unstable bases.
- Move or shift a ladder with a person or equipment on the ladder.
- Use cross bracing on the rear of stepladders for climbing.
- Paint a ladder with opaque coatings.
- Use a damaged ladder.
- Leave tools/materials/equipment on stepladder.
- Use a stepladder horizontally like a platform.
- Use a metal stepladder near power lines or electrical equipment.

OSHA standard: 29 CFR 1926 Subpart X—Stairways and Ladders

American National Standards Institute standard: ANSI A14.1, A14.2, A14.5—Ladder Safety Requirements
(Not an OSHA standard, included to be used as guidance to meet OSHA's requirements)

Employers using stepladders must follow the ladder requirements set forth in 29 CFR 1926 Subpart X. Per Appendix A to Subpart X of Part 1926—Ladders, ladders designed in accordance with the following ANSI standards will be considered in accordance with 29 CFR 1926.1053(a)(1): ANSI A14.1-1982—American National Standard for Ladders-Portable Wood-Safety Requirements, ANSI A14.2-1982—American National Standard for Ladders—Portable Metal—Safety Requirements, and ANSI A14.5-1982—American National Standard for Ladders—Portable Reinforced Plastic—Safety Requirements.

State plan guidance: States with OSHA-approved state plans may have additional requirements for avoiding falls from ladders. For more information on these requirements, please visit: www.osha.gov/dcsp/osp/statesstandards.html.

Most OSHA offices have compliance assistance specialists to help employers and workers comply with OSHA standards. For details call 1-800-321-OSHA (6742) or visit: www.osha.gov/htm/RAmap.html.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

For assistance, contact us. We can help. It's confidential.

OSHA® Occupational Safety and Health Administration
U.S. Department of Labor
www.osha.gov (800) 321-OSHA (6742)

DOC FS-3662 05/2013

OSHA® FactSheet

CONTROL SILICA DUST
Breathe Easier

OSHA's Respirable Crystalline Silica Standard for Construction

Workers who are exposed to respirable crystalline silica dust are at increased risk of developing serious silica-related diseases. OSHA's standard requires employers to take steps to protect workers from exposure to respirable crystalline silica.

What is Respirable Crystalline Silica?

Crystalline silica is a common mineral that is found in construction materials such as sand, stone, concrete, brick, and mortar. When workers cut, grind, drill, or crush materials that contain crystalline silica, very small dust particles are created. These tiny particles (known as "respirable" particles) can travel deep into workers' lungs and cause silicosis, an incurable and sometimes deadly lung disease. Respirable crystalline silica also causes lung cancer, other potentially debilitating respiratory diseases such as chronic obstructive pulmonary disease, and kidney disease. In most cases, these diseases occur after years of exposure to respirable crystalline silica.

How are Construction Workers Exposed to Respirable Crystalline Silica?

Exposure to respirable crystalline silica can occur during common construction tasks, such as using masonry saws, grinders, drills, jackhammers and handheld powered chipping tools; operating vehicle-mounted drilling rigs; milling; operating crushing machines; using heavy equipment for demolition or certain other tasks; and during abrasive blasting and tunneling operations. About two million construction workers are exposed to respirable crystalline silica in over 600,000 workplaces.

What Does the Standard Require?

The standard (29 CFR 1926.1153) requires employers to limit worker exposures to respirable crystalline silica and to take other steps to protect workers. Employers can either use a control method laid out in **Table 1** of the construction standard, or they can measure workers' exposure to silica and independently decide which dust controls work best to limit exposures in their workplaces to the permissible exposure limit (PEL).

What is Table 1?

Table 1 matches 18 common construction tasks with effective dust control methods, such as using water to keep dust from getting into the air or using a vacuum dust collection system to capture dust. In some operations, respirators may also be needed. Employers who follow Table 1 correctly are not required to measure workers' exposure to silica from those tasks and are not subject to the PEL.

Table 1 Example: Handheld Power Saws

If workers are sawing silica-containing materials, they can use a saw with a built-in system that applies water to the saw blade. The water limits the amount of respirable crystalline silica that gets into the air.

Table 1: Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica

Equipment/ Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hrs/ shift	> 4 hrs/ shift
Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. • When used outdoors. • When used indoors or in an enclosed area.	None APF 10	APF 10 APF 10

Excerpt from Table 1 in 29 CFR 1926.1153

In this example, if a worker uses the saw outdoors for four hours or less per day, no respirator would be needed. If a worker uses the saw for more than four

hours per day or any time indoors, he or she would need to use a respirator with an assigned protection factor (APF) of at least 10, such as a NIOSH-certified filtering facepiece respirator that covers the nose and mouth (sometimes referred to as a dust mask). See the respiratory protection standard (29 CFR 1910.134) for information on APFs.

Alternative Exposure Control Methods

Employers who do not fully implement the control methods on Table 1 must:

- **Determine the amount of silica that workers are exposed to** if it is, or may reasonably be expected to be, at or above the **action level of 25 µg/m³** (micrograms of silica per cubic meter of air), averaged over an 8-hour day;
- Protect workers from respirable crystalline silica exposures above the **PEL of 50 µg/m³**, averaged over an 8-hour day;
- Use **dust controls** and safer work methods to protect workers from silica exposures above the PEL; and
- Provide **respirators** to workers when dust controls and safer work methods cannot limit exposures to the PEL.

What Else Does the Standard Require?

Regardless of which exposure control method is used, all construction employers covered by the standard are required to:

- Establish and implement a **written exposure control plan** that identifies tasks that involve exposure and methods used to protect workers, including procedures to restrict access to work areas where high exposures may occur;
- Designate a **competent person** to implement the written exposure control plan;
- Restrict **housekeeping** practices that expose workers to silica, such as use of compressed air without a ventilation system to capture the dust and dry sweeping, where effective, safe alternatives are available;
- Offer **medical exams**—including chest X-rays and lung function tests—every three years for workers who are required by the standard to wear a respirator for 30 or more days per year;
- **Train workers** on the health effects of silica exposure, workplace tasks that can expose them to silica, and ways to limit exposure; and
- **Keep records** of workers' silica exposure and medical exams.



Applying water to the blade of a handheld power saw reduces the amount of dust created when cutting.

Additional Information

Additional information on OSHA's silica standard can be found at www.osha.gov/silica.

OSHA can provide compliance assistance through a variety of programs, including technical assistance about effective safety and health programs, workplace consultations, and training and education.

OSHA's On-Site Consultation Program offers free, confidential occupational safety and health services to small and medium-sized businesses in all states and several territories across the country, with priority given to high-hazard worksites. On-Site consultation services are separate from enforcement and do not result in penalties or citations. Consultants from state agencies or universities work with employers to identify workplace hazards, provide advice on compliance with OSHA standards, and assist in establishing and improving safety and health management systems. To locate the OSHA On-Site Consultation Program nearest you, call 1-800-321-OSHA or visit www.osha.gov/consultation.

How to Contact OSHA

Under the Occupational Safety and Health Act of 1970, employers are responsible for providing safe and healthful workplaces for their employees. OSHA's role is to ensure these conditions for America's working men and women by setting and enforcing standards, and providing training, education and assistance. For more information, visit www.osha.gov or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

U.S. Department of Labor

OSHA® Occupational Safety and Health Administration

DSG FS-3681 12/2017

OSHA INFOSHEET

Respirator Medical Evaluation Questionnaire

Respirators must be used in workplaces in which employees are exposed to hazardous airborne contaminants. When respiratory protection is required employers must have a respirator protection program as specified in OSHA's Respiratory Protection standard (29 CFR 1910.134). Before wearing a respirator, workers must first be medically evaluated using the mandatory medical questionnaire or an equivalent method. To facilitate these medical evaluations, this INFOSHEET includes the mandatory medical questionnaire to be used for these evaluations.

Medical Evaluation and Questionnaire Requirements

The requirements of the medical evaluation and for using the questionnaire are provided below:

- The employer must identify a physician or other licensed health care professional (PLHCP) to perform all medical evaluations using the medical questionnaire in Appendix C of the Respiratory Protection standard or a medical examination that obtains the same information. (See Paragraph (e)(2)(i).)
- The medical evaluation must obtain the information requested in Sections 1 and 2, Part A of Appendix C. The questions in Part B of Appendix C may be added at the discretion of the health care professional. (See Paragraph (e)(2)(ii).)
- The employer must ensure that a follow-up medical examination is provided for any employee who gives a positive response to any question among questions 1 through 8 in Part A Section 2, of Appendix C, or whose initial medical examination demonstrates the need for a follow-up medical examination. The employer must provide the employee with an opportunity to discuss the questionnaire and examination results with the PLHCP. (See Paragraph (e)(3)(i).)
- The medical questionnaire and examinations must be administered confidentially during the employee's normal working hours or at a time and place convenient to the employee and in a manner that ensures that he or she understands its content. The employer must not review the employee's responses, and the questionnaire must be provided directly to the PLHCP. (See Paragraph (e)(4)(i).)

Excerpt from Appendix C of 29 CFR 1910.134: OSHA Respirator Medical Evaluation Questionnaire

To the employer: Answers to questions in Section 1, and to question 9 in Section 2 of Part A, do not require a medical examination.

To the employee: Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Once filled out, this form must be given to the PLHCP. This form should **not** be submitted to OSHA.

Part A Section 1. (Mandatory) The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's date:
2. Your name:
3. Your age (to nearest year):
4. Sex (circle one): Male/Female
5. Your height: ft. in.
6. Your weight: lbs.
7. Your job title:
8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code):
9. The best time to phone you at this number:
10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes/No
11. Check the type of respirator you will use (you can check more than one category):

    a. ___ N, R, or P disposable respirator (filter-mask, non-cartridge type only).

    b. ___ Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).

12. Have you worn a respirator (circle one): Yes/No If "yes," what type(s):

Part A. Section 2. (Mandatory) Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle "yes" or "no").

	YES	NO
1. Do you *currently* smoke tobacco, or have you smoked tobacco in the last month?	☐	☐
2. Have you *ever had* any of the following conditions?	☐	☐
a. Seizures	☐	☐
b. Diabetes (sugar disease)	☐	☐
c. Allergic reactions that interfere with your breathing	☐	☐
d. Claustrophobia (fear of closed-in places)	☐	☐
e. Trouble smelling odors	☐	☐
3. Have you *ever had* any of the following pulmonary or lung problems?	☐	☐
a. Asbestosis	☐	☐
b. Asthma	☐	☐

	YES	NO
c. Chronic bronchitis	☐	☐
d. Emphysema	☐	☐
e. Pneumonia	☐	☐
f. Tuberculosis	☐	☐
g. Silicosis	☐	☐
h. Pneumothorax (collapsed lung)	☐	☐
i. Lung cancer	☐	☐
j. Broken ribs	☐	☐
k. Any chest injuries or surgeries	☐	☐
l. Any other lung problem that you've been told about	☐	☐
4. Do you *currently* have any of the following symptoms of pulmonary or lung illness?	☐	☐
a. Shortness of breath	☐	☐
b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline	☐	☐
c. Shortness of breath when walking with other people at an ordinary pace on level ground	☐	☐
d. Have to stop for breath when walking at your own pace on level ground	☐	☐
e. Shortness of breath when washing or dressing yourself	☐	☐
f. Shortness of breath that interferes with your job	☐	☐
g. Coughing that produces phlegm (thick sputum)	☐	☐
h. Coughing that wakes you early in the morning	☐	☐
i. Coughing that occurs mostly when you are lying down	☐	☐
j. Coughing up blood in the last month	☐	☐
k. Wheezing	☐	☐
l. Wheezing that interferes with your job	☐	☐
m. Chest pain when you breathe deeply	☐	☐
n. Any other symptoms that you think may be related to lung problems	☐	☐
5. Have you *ever had* any of the following cardiovascular or heart problems?		
a. Heart attack	☐	☐
b. Stroke	☐	☐
c. Angina	☐	☐
d. Heart failure	☐	☐

	YES	NO
e. Swelling in your legs or feet (not caused by walking)	☐	☐
f. Heart arrhythmia (heart beating irregularly)	☐	☐
g. High blood pressure	☐	☐
h. Any other heart problem that you've been told about	☐	☐
6. Have you *ever had* any of the following cardiovascular or heart symptoms?	☐	☐
a. Frequent pain or tightness in your chest	☐	☐
b. Pain or tightness in your chest during physical activity	☐	☐
c. Pain or tightness in your chest that interferes with your job	☐	☐
d. In the past two years, have you noticed your heart skipping or missing a beat	☐	☐
e. Heartburn or indigestion that is not related to eating	☐	☐
f. Any other symptoms that you think may be related to heart or circulation problems	☐	☐
7. Do you *currently* take medication for any of the following problems?	☐	☐
a. Breathing or lung problems	☐	☐
b. Heart trouble	☐	☐
c. Blood pressure	☐	☐
d. Seizures	☐	☐
8. If you've used a respirator, have you *ever had* any of the following problems? (If you've never used a respirator, check the following space and go to question 9.) ☐	☐	☐
a. Eye irritation	☐	☐
b. Skin allergies or rashes	☐	☐
c. Anxiety	☐	☐
d. General weakness or fatigue	☐	☐
e. Any other problem that interferes with your use of a respirator	☐	☐
9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire?	☐	☐

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you *ever* lost vision in either eye (temporarily or permanently)?	☐	☐
11. Do you *currently* have any of the following vision problems?	☐	☐
a. Wear contact lenses	☐	☐
b. Wear glasses	☐	☐
c. Color blind	☐	☐
d. Any other eye or vision problem	☐	☐

	YES	NO
12. Have you *ever had* an injury to your ears, including a broken eardrum?	☐	☐
13. Do you *currently* have any of the following hearing problems?	☐	☐
a. Difficulty hearing	☐	☐
b. Wear a hearing aid	☐	☐
c. Any other hearing or ear problem	☐	☐
14. Have you *ever had* a back injury?	☐	☐
15. Do you *currently* have any of the following musculoskeletal problems?	☐	☐
a. Weakness in any of your arms, hands, legs, or feet	☐	☐
b. Back pain	☐	☐
c. Difficulty fully moving your arms and legs	☐	☐
d. Pain and stiffness when you lean forward or backward at the waist	☐	☐
e. Difficulty fully moving your head up or down	☐	☐
f. Difficulty fully moving your head side to side	☐	☐
g. Difficulty bending at your knees	☐	☐
h. Difficulty squatting to the ground	☐	☐
i. Climbing a flight of stairs or a ladder carrying more than 25 lbs.	☐	☐
j. Any other muscle or skeletal problem that interferes with using a respirator	☐	☐

This infosheet does not include the questions in Part B because they are not mandatory; rather, they may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire.

OSHA Educational Materials

OSHA has an extensive publications program. For a listing of free items, visit OSHA's web site at www.osha.gov/publications or contact the OSHA Publications Office, U.S. Department of Labor, 200 Constitution Avenue, N.W., N-3101, Washington, DC 20210. Telephone (202) 693-1888 or fax to (202) 693-2498.

Contacting OSHA

To report an emergency, file a complaint or seek OSHA advice, assistance or products, call (800) 321-OSHA (6742) or contact your nearest OSHA regional, area, or State Plan office; TTY: 1-877-889-5627.

This InfoSheet is not a standard or regulation, and it creates no new legal obligations. It contains recommendations as well as descriptions of mandatory safety and health standards. The recommendations are advisory in nature, informational in content, and are intended to assist employers in providing a safe and healthful workplace. The *Occupational Safety and Health Act* requires employers to comply with safety and health standards and regulations promulgated by OSHA or by a state with an OSHA-approved state plan. In addition, the Act's General Duty Clause, Section 5(a)(1), requires employers to provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm.

U.S. Department of Labor

OSHA®
Occupational Safety and Health Administration

DTSEM OSHA 3789-05 2015

HAZARD ALERT

Working Safely with Scissor Lifts

Scissor lifts provide a safe and reliable platform for workers to perform job tasks when used according to the manufacturer's instructions. When not used properly, scissor lifts can present a serious hazard to workers. Employers are responsible for keeping workers safe. This Hazard Alert highlights speci c hazards present in workplaces where scissor lifts are used and controls employers must implement to prevent injuries or fatalities.

Introduction

Scissor lifts are work platforms used to safely move workers vertically and to different locations in a variety of industries including construction, retail, entertainment and manufacturing. Scissor lifts are different from aerial lifts because the lifting mechanism moves the work platform straight up and down using crossed beams functioning in a scissor-like fashion. Although scissor lifts present hazards similar to scaffolding when extended and stationary, using scissor lifts safely depends on considering equipment capabilities, limitations and safe practices.

Over a one-year period, OSHA investigated ten preventable fatalities and more than 20 preventable injuries resulting from a variety of incidents involving scissor lifts. OSHA's investigations found that most injuries and fatalities involving scissor lifts were the result of employers not addressing:

- Fall Protection
- Stabilization
- Positioning

How to Safely Use Scissor Lifts

Employers need to assess the worksite to identify all possible hazards in order to select the appropriate equipment for the task. Employers who use scissor lifts need to evaluate and implement effective controls that address fall protection, stabilization and positioning. Only **trained workers should be allowed to use scissor lifts, and employers should make sure that those workers show that they can use a scissor lift properly**. Safe scissor lift use includes properly maintaining the equipment, following the manufacturer's instructions, providing workers training and needed personal protective equipment (PPE), and implementing safe work practices.





An example of a scissor lift.

Fall Protection

Scissor lifts must have guardrails installed to prevent workers from falling (see 29 CFR 1926.451(g) or 29 CFR 1910.29(a)(3)(vii)).

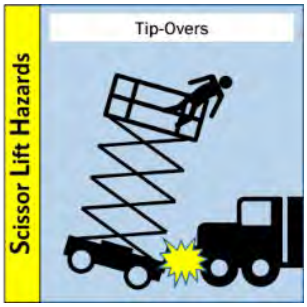
Employers should train workers to:

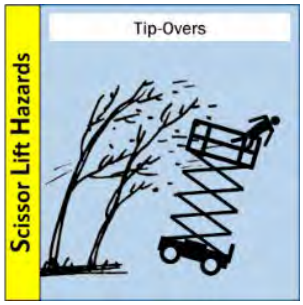
- Check to see that a guardrail system is in place before working on the scissor lift.
- Only stand on the work platform; never stand on the guardrails.
- Keep work within easy reach to avoid leaning away from the scissor lift.

Stabilization

Employers should ensure that scissor lifts are stable and will not tip over or collapse. Some safe work practices to ensure safe, stable conditions for scissor lift use include:

- Follow the manufacturer's instructions for safe movement—this usually rules out moving the lift in an elevated position.
- Isolate the scissor lift or implement traffic control measures to ensure that other equipment cannot contact the scissor lift.
- Select work locations with firm, level surfaces away from hazards that can cause instability (e.g., drop-offs, holes, slopes, bumps, ground obstructions, or debris).
- Use the scissor lift outside only when weather conditions are good. Scissor lifts rated for outdoor use are generally limited to wind speeds below 28 miles per hour.





Although rare, the collapse of scissor lifts can be prevented if employers:

- Ensure that safety systems designed to stop collapsing are maintained and not bypassed.
- Never allow the weight on the work platform to exceed the manufacturer's load rating.
- Never allow equipment other than the scissor mechanism to be used to raise the work platform (e.g., using a forklift to lift the work platform).
- Keep the lift from being struck by other moving equipment on the worksite.



Caution: Wind Can Make Extended Scissor Lifts Unstable

During the Fall 2010 college football season, a student who was also an employee of the University of Notre Dame was killed while lming the school's football team practice from a scissor lift. Reportedly, the untrained worker raised the lift over 39 feet t lm the practice. The wind gusts that day were more than 50 miles per hour. The high winds blew the lift over, killing the worker.

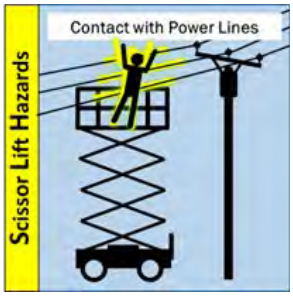
Positioning

Positioning the scissor lift to avoid crushing or electrocution hazards is important for safe use.

Crushing hazards are present in workplaces using scissor lifts and may expose workers nearby, even those not working on the scissor lift.

Scissor lifts present crushing hazards similar to vehicles and other mobile equipment at worksites. Employers should train workers to be watchful when:

- A moving scissor lift is near a fixed object.
- A moving vehicle and the scissor lift are operating closely.
- The scissor lift passes under a fixed object, such as a door frame or a support beam.





Positioning the scissor lift to avoid electrocution, ar ash, and thermal burns is important for safely using scissor lifts near energized power lines. Since electricity can arc or jump from the power line to the scissor lift or worker, electrocution can occur even if neither the scissor lift nor the worker touches the power line.

Employers should use the following work practices to ensure that scissor lifts are safely positioned:

- Implement traffic control measures around the scissor lift to prevent other workers or vehicles from getting too close.
- Use ground guides when operating or moving the scissor lift around the workplace.
- Select work locations that do not approach electrical power sources (e.g., power lines, transformers) by at least 10 feet and that do not pose other overhead hazards (e.g., other utilities, branches, overhangs, etc.).
- If the job task requires work near an electrical source, ensure that the worker is qualified and has received the required electrical training. (29 CFR 1910.269; 29 CFR 1910.333; 29 CFR 1926 Subpart V).

Maintaining Scissor Lifts

Employers must regularly maintain scissor lifts to ensure that they are safe to use (e.g., prevent the lifting mechanism from collapsing). Manufacturer's maintenance and inspection instructions will generally include how to:

- Test and inspect controls and components before each use.
- Ensure that guardrail systems are in good working condition.
- Verify that brakes once set will hold the scissor lift in position.

Training Workers

Employers must provide workers training on hazards, including how to work safely with or near scissor lifts. (29 CFR 1926.454). Training must, at a minimum, include:

- Manufacturer's instructions for operating the scissor lift vertically and while in transit.
- How to handle materials on the scissor lift, including weight limits.
- Other worksite hazards workers may encounter when working on a scissor lift (e.g., contact with electrical wires).
- Reporting any equipment defects or maintenance needs.

OSHA Standards

Employers must comply with the following OSHA standards (29 CFR) to protect workers from hazards associated with scissor lifts.

General Industry

- 1910.23 – Guarding Floor and Wall Openings and Holes
- 1910.28 – Safety Requirements for Scaffolding
- 1910.29 – Manually Propelled Mobile Ladder Stands and Scaffolds (Towers)
- 1910.333 – Selection and Use of Work Practices

Shipyards

- 1915.71 – Scaffolds or Staging

Construction

- 1926.21 – Safety Training and Education
- 1926.451 – General Requirements
- 1926.452 – Additional Requirements to Specific Types of Scaffolds
- 1926.454 – Training Requirements

Additional Information

Many scissor lifts are covered under OSHA's Scaffolding standard. For technical assistance, please refer to OSHA's eTool and other resources on scaffolding.

The American National Standards Institute (ANSI) has standards for manufacturing, owning and operating scissor lifts. They can be found in ANSI A92.3-2006 (Manually Propelled Elevating Aerial Platforms) and A92.6-2006 (Self-Propelled Elevating Work Platforms).

- OSHA's Fall Prevention Campaign
- Safety & Health Topics: Scaffolding, OSHA
- Scaffolding eTool, OSHA

How OSHA Can Help

OSHA has compliance assistance specialists throughout the nation who can provide information to employers and workers about OSHA standards, short educational programs on speci c hazards or OSHA rights and responsibilities, and information on additional compliance assistance resources.

Contact your local OSHA of ce for more information. OSHA's On-site Consultation Program offers free and con dential advice for small and medium-sized businesses with fewer than 250 employees at a site (and no more than 500 employees nationwide) to help identify and correct hazards at worksites. On-site consultation services are separate from enforcement and do not result in penalties or citations. To locate the nearest OSHA Consultation of ce, visit: www.osha.gov/consultation or call 1-800-321-OSHA (6742).

Workers' Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

For more information, see OSHA's Workers page.

Contact OSHA

For questions or to get information or advice, to report an emergency, fatality, inpatient hospitalization, amputation, or loss of an eye, or t le a con dential complaint, or to request OSHA's free on-site consultation service, contact your nearest OSHA of ce, visit www.osha.gov, or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.

Many states operate their own occupational safety and health programs approved by OSHA. States enforce similar standards that may have different or additional requirements. A list of state plans is available at www.osha.gov/dcsp/osp.

Disclaimer

This Hazard Alert is not a standard or regulation, and it creates no new legal obligations. It contains recommendations as well as descriptions of mandatory safety and health standards [and other regulatory requirements]. The recommendations are advisory in nature, informational in content, and are intended to assist employers in providing a safe and healthful workplace. The Occupational Safety and Health Act *requires employers to comply with safety and health standards and regulations promulgated by OSHA or by a state with an OSHA-approved state plan. In addition, the Act's General Duty Clause, Section 5(a)(1), requires employers to provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm. The mention of any non-governmental organization or link to its website in this Hazard Alert does not constitute an endorsement by OSHA or NIOSH of that organization or its products, services, or website.*

U.S. Department of Labor

OSHA®
Occupational Safety and Health Administration

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OSHA® FactSheet

Tube and Coupler Scaffolds — Erection and Use

Workers building scaffolds risk serious injury from falls and tip-overs, being struck by falling tools and other hazards, and electrocution from energized power lines. Before starting any scaffold project, the employer should conduct a hazard assessment to ensure the safety of workers.

A tube and coupler scaffold has a platform(s) supported by tubing, and is erected with coupling devices connecting uprights, braces, bearers, and runners (see Fig. 1). Due to their strength, these scaffolds are frequently used where heavy loads need to be carried, or where multiple platforms must reach several stories high. These scaffolds can be assembled in multiple directions, making them the preferred option for work surfaces with irregular dimensions and/or contours.

When Erecting a Scaffold

- Use footings that are level, sound, rigid and capable of supporting the load without settlement or displacement.
- Plumb and brace poles, legs, posts, frames, and uprights to prevent swaying and displacement.
- Position the first level of bracing as close to the base as possible.
- Plumb and level the scaffold as it is being erected.
- Fasten all couplers and/or connections securely before assembling the next level.
- Install guys, ties, and braces according to the manufacturer's recommendations.
- Do not intermix scaffold components from different manufacturers, unless you can do so while maintaining the scaffold's structural integrity.
- When platform units are abutted together to create a long platform, each abutted end must rest on a separate support surface.
- Once erected, provide toeboards on all railed sides to prevent falling object hazards.

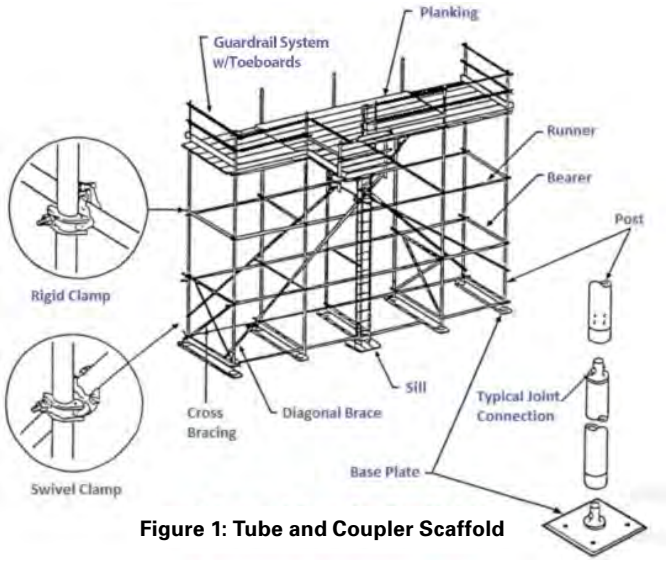


Figure 1: Tube and Coupler Scaffold

When Using a Scaffold

- Make sure that a competent person inspects the scaffold before each work shift.
- If during the inspection a defect or damage to the scaffold is discovered, the scaffold must be tagged out and not used until repairs are made. Attach tags at the access point to the scaffold.

One common tagging system uses the following tags:

Red tag indicates: unsafe, do not use.
Green tag indicates: ready to use.

- Use scaffolds according to the manufacturer's instructions.
- Never load a scaffold beyond its maximum intended load or rated capacity.
- Do not use makeshift methods to increase the working height of the scaffold platform, such as with ladders, buckets or blocks.

- Employees must not work on platforms covered with snow, ice, or other slippery material.
- The employer must provide suitable access to and between scaffolds, such as portable ladders, hook-on ladders, attachable ladders and stairway-type ladders.

When Dismantling a Scaffold

Check to ensure that the scaffold has not been structurally altered in a way which would make it unsafe. Before beginning dismantling procedures, reconstruct and/or stabilize the scaffold as necessary.

Training Workers

Only trained and authorized persons should be allowed to use a scaffold. This training must be provided by a qualified person who understands the hazards associated with the type of scaffold being used and who knows the procedures to control or minimize those hazards. Training must include how to safely:

- Use the scaffold, handle materials on the scaffold and determine the maximum load limits when handling materials.
- Recognize and avoid scaffolding hazards such as electric shock, falls from heights, and being hit by falling objects.
- Erect, maintain and disassemble fall and falling object protection systems.

Erectors and dismantlers of tube and coupler scaffolds are at particular risk because their work starts before ladders, guardrails and platforms are completely installed. These workers must also be trained to:

- Recognize scaffold hazards.
- Properly erect, move, operate, repair, inspect, maintain and disassemble the scaffold;
- Identify the maximum load-carrying capacity and intended use of the scaffold.

Employers should train workers on the following safety factors:

- The shape and structure of the building to be scaffolded.
- Distinctive site conditions and any special features of the building structure in relation to the scaffold (i.e., overhead electric power lines or storage tanks). Also consider the proximity and condition of surrounding buildings.
- Weather and environmental conditions.
- Fall protection requirements for workers using scaffolds, such as guardrail systems or personal fall arrest systems.
- The type and amount of scaffold equipment needed to access all areas to be worked on.
- Proper storage and transporting of scaffolding components, materials and equipment.
- How to access the scaffold, (i.e., via ladders, stair rail systems, etc.).

Workers building scaffolds risk serious injury from falls and tip-overs, being struck by falling tools and other hazards, and electrocution from energized power lines.

To avoid scaffold hazards, employers must:

- Ensure that a competent person supervises and directs workers erecting, moving, dismantling, or altering a scaffold.
- Provide a safe means of access for each worker erecting or dismantling the scaffold. As early as possible, install hook-on or attachable ladders.
- Ensure that workers do not climb diagonal braces to reach the scaffold platform.
- Provide fall protection for workers erecting or dismantling the scaffold.
- Secure scaffolds to the structure during erection and dismantling.

For more information on scaffolding, see OSHA's Safety and Health Topics page at www.osha.gov/SLTC/scaffolding.

Contact OSHA

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For more information, see OSHA's Workers page.

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For assistance, contact us. We can help. It's confidential.

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www.osha.gov (800) 321-OSHA (6742)

U.S. Department of Labor

DOC FS-3759 11/2014

OSHA FactSheet

Using Portable Generators Safely

Portable generators are internal combustion engines used to generate electricity. They are useful when temporary or remote power is needed, and are commonly used during cleanup and recovery efforts following disasters such as hurricanes, tornadoes, etc. This fact sheet discusses specific hazards inherent with the use of generators and also provides helpful information to ensure that workers and others using such equipment remain safe.

Hazards Associated with Generators:

- Shocks and electrocution from improper use of power or accidentally energizing other electrical systems.
- Carbon monoxide from a generator's exhaust.
- Fires from improperly refueling a generator or inappropriately storing the fuel for a generator.
- Noise and vibration hazards.

Shock and Electrocution

The electricity created by generators has the same hazards as normal utility-supplied electricity. It also has some additional hazards because generator users often bypass the safety devices (such as circuit breakers) that are built into electrical systems. The following precautions are provided to reduce shock and electrocution hazards:

- Never attach a generator directly to the electrical system of a structure (home, office, trailer, etc.) unless a qualified electrician has properly installed the generator with a transfer switch. Attaching a generator directly to a building electrical system without a properly installed transfer switch can energize wiring systems for great distances. This creates a risk of electrocution for utility workers and others in the area.
- Always plug electrical appliances directly into the generator using the manufacturer's supplied cords or extension cords that are grounded (3-pronged). Inspect the cords to make sure they are fully intact and not damaged, cut or abraded. Never use frayed or damaged extension cords. Ensure the cords are appropriately rated in watts or amps for the intended use. Do not use underrated cords—replace them with appropriately rated cords that use heavier gauge wires. Do not overload a generator; this can lead to overheating which can create a fire hazard.
- Use ground fault circuit interrupters (GFCIs), especially where electrical equipment is used in or around wet or damp locations. GFCIs shut off power when an electrical current is detected outside normal paths. GFCIs and extension cords with built-in GFCI protection can be purchased at hardware stores, do-it-yourself centers, and other locations that sell electrical equipment. Regardless of GFCI use, electrical equipment used in wet and damp locations must be listed and approved for those conditions.
- Make sure a generator is properly grounded and the grounding connections are tight. Consult the manufacturer's instructions for proper grounding methods.
- Keep a generator dry; do not use it in the rain or wet conditions. If needed, protect a generator with a canopy. Never manipulate a generator's electrical components if you are wet or standing in water.
- Do not use electrical equipment that has been submerged in water. Equipment must be thoroughly dried out and properly evaluated before using. Power off and do not use any electrical equipment that has strange odors or begins smoking.

Carbon Monoxide Poisoning

Carbon monoxide (CO) is a colorless, odorless, toxic gas. Many people have died from CO poisoning because their generator was not adequately ventilated.

- Never use a generator indoors or in enclosed spaces such as garages, crawl spaces, and basements. NOTE: Open windows and doors may NOT prevent CO from building up when a generator is located in an enclosed space.
- Make sure a generator has 3 to 4 feet of clear space on all sides and above it to ensure adequate ventilation.
- Do not use a generator outdoors if its placement near doors, windows, and vents could allow CO to enter and build up in occupied spaces.
- If you or others show symptoms of CO poisoning—dizziness, headaches, nausea, tiredness—get to fresh air immediately and seek medical attention. Do not re-enter the area until it is determined to be safe by trained and properly equipped personnel.

Fire Hazards

- Generators become hot while running and remain hot for long periods after they are stopped. Generator fuels (gasoline, kerosene, etc.) can ignite when spilled on hot engine parts.
- Before refueling, shut down the generator and allow it to cool.
- Gasoline and other generator fuels should be stored and transported in approved containers that are properly designed and marked for their contents, and vented.
- Keep fuel containers away from flame producing and heat generating devices (such as the generator itself, water heaters, cigarettes, lighters, and matches). Do not smoke around fuel containers. Escaping vapors or vapors from spilled materials can travel long distances to ignition sources.
- Do not store generator fuels in your home. Store fuels away from living areas.

Noise and Vibration Hazards

- Generator engines vibrate and create noise. Excessive noise and vibration could cause hearing loss and fatigue that may affect job performance.
- Keep portable generators as far away as possible from work areas and gathering spaces.
- Wear hearing protection if this is not possible.

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For more complete information:

OSHA Occupational Safety and Health Administration

U.S. Department of Labor

www.osha.gov

(800) 321-OSHA

DSTM 9/2005

OSHA® FactSheet

Workers' Exposure to Respirable Crystalline Silica: Final Rule Overview

More than 2 million workers gain protections from deadly dust

Background

Workplace illness takes the lives of thousands of workers each year. Those workers and their families rely on the U.S. Department of Labor's Occupational Safety and Health Administration to set and enforce standards that reduce the risk to those workers of contracting illnesses or suffering injuries on the job, so that no worker is forced to sacrifice their life or health for their livelihood. Respirable crystalline silica is particularly hazardous for the nation's workers.

Workers who inhale very small crystalline silica particles are at increased risk of developing serious — and often deadly — silica-related diseases. These tiny particles (known as "respirable" particles) can penetrate deep into workers' lungs and cause silicosis, an incurable and sometimes fatal lung disease. Crystalline silica exposure also puts workers at risk for developing lung cancer, other potentially debilitating respiratory diseases such as chronic obstructive pulmonary disease, and kidney disease. Approximately 2.3 million people in the U.S. are exposed to silica at work.

To better protect workers from dangerous crystalline silica, OSHA has finalized two new silica standards: one for general industry and maritime, and the other for construction. These rules are based on extensive review of peer-reviewed scientific evidence, current industry consensus standards, an extensive public outreach effort, and nearly a year of public comment, including several weeks of public hearings. They provide commonsense, affordable and flexible strategies for employers to protect workers in their workplaces from the serious risks posed by silica exposure.

OSHA estimates these standards will save the lives of more than 600 workers each year and prevent more than 900 cases of silicosis each year once the full effects of the rule are realized.

What is crystalline silica?

Crystalline silica is a common mineral that is found in materials that we see every day in roads, buildings, and sidewalks. It is a common component of sand, stone, rock, concrete, brick, block, and mortar.

- Exposures to crystalline silica dust occur in common workplace operations involving cutting, sawing, drilling, and crushing of concrete, brick, block, rock, and stone products (such as construction tasks), and operations using sand products (such as in glass manufacturing, foundries, sand blasting, and hydraulic fracturing).

Why do we need new silica standards?

- We have known about the dangers of silica for decades. More than 80 years ago, U.S. Secretary of Labor Frances Perkins first brought experts and stakeholders together to determine the best ways to protect workers from silica.
- OSHA's current permissible exposure limits for silica are more than 40 years old. They are based on research from the 1960s and earlier that do not reflect more recent scientific evidence.
- Strong evidence shows that the current exposure limits do not adequately protect worker health. For example, since the current exposure limits were adopted, respirable crystalline silica exposure has been found to cause lung cancer and kidney disease at the levels currently permitted.
- Many employers are already implementing the necessary measures to protect their workers from silica exposure. The technology for most employers to meet the new standards is widely available and affordable.

How will the rule protect workers?

- The rule significantly reduces the amount of silica dust that workers can be exposed to on the job. That means that employers will have

to implement controls and work practices that reduce workers' exposure to silica dust. For most activities, that means that employers will have to ensure that silica dust is wetted down or vacuumed up before workers can breathe it in.
- Employers are required under the rule to limit access to high exposure areas, provide training, provide respiratory protection when controls are not enough to limit exposure, provide written exposure control plans, and measure exposures in some cases. Employers are also required to offer medical examinations to highly exposed workers. Workers who find out they have an illness, such as lung disease, can use that information to make employment or lifestyle decisions to protect their health.

How will OSHA help employers comply with the rule to protect their workers?

- The rule provides flexibility to help employers — especially small businesses — protect workers from silica exposure, with staggered compliance dates to ensure sufficient time to meet the requirements. Employers have from one to five years to get the right protections in place.
- The rule includes special flexibility for the construction industry. For the most common tasks in construction, OSHA has spelled out exactly how to best protect workers. If employers follow those specifications, they can be sure that they are providing their workers with the required level of protection. If they have better ideas about how to provide protection, they can do that too — as long as they make sure that their methods effectively reduce their workers' exposure to silica dust.

What industries are affected?

Affected industries include:

- Construction
- Glass manufacturing
- Pottery products
- Structural clay products
- Concrete products
- Foundries
- Dental laboratories
- Paintings and coatings
- Jewelry production
- Refractory products
- Ready-mix concrete
- Cut stone and stone products
- Abrasive blasting in maritime, construction, and general industry
- Refractory furnace installation and repair
- Railroad transportation
- Oil and gas operations

Additional information

Additional information on OSHA's silica rule can be found at www.osha.gov/silica.

OSHA can provide extensive help through a variety of programs, including technical assistance about effective safety and health programs, workplace consultations, and training and education.

OSHA's On-site Consultation Program offers free and confidential occupational safety and health services to small and medium-sized businesses in all states and several territories across the country, with priority given to high-hazard worksites. On-site consultation services are separate from enforcement and do not result in penalties or citations. Consultants from state agencies or universities work with employers to identify workplace hazards, provide advice on compliance with OSHA standards, and assist in establishing and improving safety and health management systems. To locate the OSHA On-site Consultation Program nearest you, call 1-800-321-OSHA (6742) or visit www.osha.gov/dcsp/smallbusiness.

For more information on this and other health-related issues impacting workers, to report an emergency, fatality, inpatient hospitalization, or to file a confidential complaint, contact your nearest OSHA office, visit www.osha.gov, or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.

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U.S. Department of Labor

DSG FS-3683 03/2016



OSHA FACT Sheet

Workplace Violence

What is workplace violence?

Workplace violence is violence or the threat of violence against workers. It can occur at or outside the workplace and can range from threats and verbal abuse to physical assaults and homicide, one of the leading causes of job-related deaths. However it manifests itself, workplace violence is a growing concern for employers and employees nationwide.

Who is vulnerable?

Some 2 million American workers are victims of workplace violence each year. Workplace violence can strike anywhere, and no one is immune. Some workers, however, are at increased risk. Among them are workers who exchange money with the public; deliver passengers, goods, or services; or work alone or in small groups, during late night or early morning hours, in high-crime areas, or in community settings and homes where they have extensive contact with the public. This group includes health-care and social service workers such as visiting nurses, psychiatric evaluators, and probation officers; community workers such as gas and water utility employees, phone and cable TV installers, and letter carriers; retail workers; and taxi drivers.

What can these employers do to help protect these employees?

The best protection employers can offer is to establish a zero-tolerance policy toward workplace violence against or by their employees. The employer should establish a workplace violence prevention program or incorporate the information into an existing accident prevention program, employee handbook, or manual of standard operating procedures. It is critical to ensure that all employees know the policy and understand that all claims of workplace violence will be investigated and remedied promptly. In addition, employers can offer additional protections such as the following:

- Provide safety education for employees so they know what conduct is not acceptable, what to do if they witness or are subjected to workplace violence, and how to protect themselves.
- Secure the workplace. Where appropriate to the business, install video surveillance, extra lighting, and alarm systems and minimize access by outsiders through identification badges, electronic keys, and guards.
- Provide drop safes to limit the amount of cash on hand. Keep a minimal amount of cash in registers during evenings and late-night hours.
- Equip field staff with cellular phones and hand-held alarms or noise devices, and require them to prepare a daily work plan and keep a contact person informed of their location throughout the day. Keep employer-provided vehicles properly maintained.
- Instruct employees not to enter any location where they feel unsafe. Introduce a "buddy system" or provide an escort service or police assistance in potentially dangerous situations or at night.
- Develop policies and procedures covering visits by home health-care providers. Address the conduct of home visits, the presence of others in the home during visits, and the worker's right to refuse to provide services in a clearly hazardous situation.

How can the employees protect themselves?

Nothing can guarantee that an employee will not become a victim of workplace violence. These steps, however, can help reduce the odds:

- Learn how to recognize, avoid, or diffuse potentially violent situations by attending personal safety training programs.
- Alert supervisors to any concerns about safety or security and report all incidents immediately in writing.

Workplace Violence

- Avoid traveling alone into unfamiliar locations or situations whenever possible.
- Carry only minimal money and required identification into community settings.

What should employers do following an incident of workplace violence?

- Encourage employees to report and log all incidents and threats of workplace violence.
- Provide prompt medical evaluation and treatment after the incident.
- Report violent incidents to the local police promptly.
- Inform victims of their legal right to prosecute perpetrators.
- Discuss the circumstances of the incident with staff members. Encourage employees to share information about ways to avoid similar situations in the future.
- Offer stress debriefing sessions and post-traumatic counseling services to help workers recover from a violent incident.
- Investigate all violent incidents and threats, monitor trends in violent incidents by type or circumstance, and institute corrective actions.
- Discuss changes in the program during regular employee meetings.

What protections does OSHA offer?

The *Occupational Safety and Health Act's* (*OSH Act*) General Duty Clause requires employers to provide a safe and healthful workplace for all workers covered by the *OSH Act*. Employers who do not take reasonable steps to prevent or abate a recognized violence hazard in the workplace can be cited. Failure to implement suggestions in this fact sheet, however, is not in itself a violation of the General Duty Clause.

How can you get more information?

OSHA has various publications, standards, technical assistance, and compliance tools to help you, and offers extensive assistance through its many safety and health programs: workplace consultation, voluntary protection programs, grants, strategic partnerships, state plans, training, and education. Guidance such as *OSHA's Safety and Health Management Program Guidelines* identify elements that are critical to the development of a successful safety and health management system. This and other information are available on OSHA's website at **www.osha.gov**.

- For a free copy of OSHA publications, send a self-addressed mailing label to this address: OSHA Publications Office, P.O. Box 37535, Washington, DC 20013-7535; or send a request to our fax at (202) 693-2498, or call us at (202) 693-1888.
- To file a complaint by phone, report an emergency, or get OSHA advice, assistance, or products, contact your nearest OSHA office under the "U.S. Department of Labor" listing in your phone book, or call us toll-free at **(800) 321-OSHA (6742)**. The teletypewriter (TTY) number is (877) 889-5627.
- To file a complaint online or obtain more information on OSHA federal and state programs, visit OSHA's website.

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