GRACE CONSULTING, INC.

Grace Consulting, Inc.
Safety Services

Company

Safety and Health

Manual

***Revised* 3/2016**

GCI offers all written policies, procedures, documents and signs in the language understood by every employee. If you need an alternate language format please contact Safety Manager prior to beginning orientation.

Safety Program Statement and Introduction

Safety is the #1 concern in all of Grace Consulting Inc. (hereinafter referred to as *GCI*) operations. It is our policy and goal to provide a healthy, safe working environment, to abide by federal, state, and local standards, and to follow safe work practices. Prior to bidding jobs Grace Consulting Inc. will conduct pre-job planning to assess what exact safety equipment is needed and purchase new equipment if necessary to complete the job safely. Accident prevention shall be considered of primary importance in all phases of operation and administration. *GCI* considers OSHA standards, guidelines and regulations as the minimum standards. The primary responsibility for the coordination, implementation, and maintenance of our safety program has been assigned to our Safety Manager, Michael Whitt. The Safety Manager reports to the President and Vice President of the company any and all safety issues. A Safety Committee consisting of Safety Manager and Safety Coordinators has also been established to assist in evaluating safety rules and regulations, reviewing incidents, identifying and recommending corrective measures and improvements for the safety program.

Safety training is provided and required for everyone at GCI, including management, which includes written materials, power points and job hazard analysis. All new hire employees are required to complete safety training prior to beginning work, which includes the full contents of this safety manual and will be documented upon completion. The documents will be kept on file by office specific Safety Coordinator. Responsibility and accountability for safety is also assigned to all other supervisory personnel within their areas of operations. Safety to the worker, as well as to others engaged in the same operations, is not only dependent upon total commitment from management, but also on the individual workers themselves. All *GCI* personnel are expected to apply good sense and use safe practices while working on jobsites and at each *GCI* office location while implementing all safe work policies. Grace Consulting Inc. President, Supervisors, Managers, Crew Chiefs and all full time employees will complete the OSHA 10 Hour Safety Certification, which will be updated every 5 years. The Safety Manager and Safety Coordinators have the OSHA 30 Hour Safety Certification as well as First Aid and CPR Training, only the people certified in First Aid & CPR are allowed to administer treatment.

This program's instruction and rules must be followed for the safety of all workers. Proper safety devices and precautions must be used. Setting the tone for safety at the beginning of each day will make a tremendous difference in keeping all employees safe. No employee will begin work without being trained in the work being performed or before identifying the hazards, potential hazards and corrective measures to be used, for the task at hand. In the event an employee feels unsure of how to proceed in a safe and proper way after being given direction, contact the Safety Coordinator, Safety Manager for clarification. *GCI* personnel on all jobsites and offices are expected to comply with the safety rules and regulations in effect at each site and perform their work in a safe manner. *GCI* will strive to ensure that the operations of other contractors not under our control do not

endanger the safety of our employees. All employees are required to report any hazardous and unsafe activities to the appropriate *GCI* officials for correction.

This policy statement and corresponding safety program expresses management's commitment to and involvement in providing and maintaining a safe and healthy work environment. It is a condition of employment that all *GCI* employees comply with this policy, as well as the safety rules, instructions, guidelines and procedures. Repeated or willful failure by an employee to comply with these rules could result in disciplinary action, which will be kept in their personal file or immediate dismissal as outlined in this program.

It is our goal to strive for zero injuries and to be an industry leader in safety performance. A portion of each project bids are allocated for the development and on going training with our safety program. The combined efforts of our employees and management, working together is essential to the safety of all employees. Our direction and progress towards being "Accident Free" will be communicated during the annual employee safety training. All employees will be trained on the specific safety responsibilities, goals and their progress during employment. Management will be trained on all safety practices for each job and will be available to review safety procedures with each employee if a question should arise. If at any time an employee would like additional safety information or training, they may contact their Safety Coordinator or Safety Manager directly.

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Scott Teague, President

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Chapter 1

Injury and Illness Prevention Program

Written Plan

Every employer should have a written Injury and Illness Prevention plan. This is our plan, please read it carefully. While no plan can guarantee an accident free work place, following the safety procedures set forth in this manual will significantly reduce the risk of danger to you and your co-workers. If at any time you are unclear or need assistance regarding the information contained herein, notify your immediate supervisor, Safety Coordinator or Safety Manager immediately.

Introduction to Our Program

State and federal laws, as well as company policy, make the safety and health of our employees the first consideration in operating our business. Safety and health in our business must be a part of every operation, and every employee's responsibility at all levels. It is the intent of Grace Consulting Inc. to comply with all laws concerning the operation of the business and the health and safety of our employees and the public. To do this, we must constantly be aware of conditions in all work areas that can produce or lead to injuries. No employee is required to work at a job known to be unsafe or dangerous to their health. Your cooperation in detecting hazards, reporting dangerous conditions and controlling workplace hazards is a condition of employment. Inform your supervisor immediately of any situation beyond your ability or authority to correct. Employees will not be disciplined or suffer any retaliation for reporting a safety violation in good faith.

Safety First Priority

The personal safety and health of each employee of Grace Consulting Inc. is of primary importance. Prevention of occupationally induced injuries and illnesses is of such consequence that it will be given precedence over operating productivity. To the greatest degree possible, management will provide all mechanical and physical protection required for personal safety and health, but our employees must bear primary responsibility for working safely. A little common sense and caution can prevent most accidents from occurring.

Individual Cooperation Necessary

Grace Consulting Inc. maintains a safety and health program conforming to the best practices of our field. To be successful, such a program must embody proper attitudes towards injury and illness prevention on the part of supervisors and employees. It requires the cooperation in all safety and health matters, not only of the employer and employee, but also between the employee and all co-workers. Only through such a cooperative effort can a safety program in the best interest of all be established and preserved. Safety is no accident; think safety and the job will be safer.

Safety Program Goals

The objective of Grace Consulting Inc. is a safety and health program that will reduce the number of injuries and illnesses to an absolute minimum, not merely in keeping with, but surpassing the best experience of similar operations by others. Our goal is zero accidents and injuries.

Safety Policy Statement

It is the policy of Grace Consulting Inc. that accident prevention shall be considered of primary importance in all phases of operation and administration. It is the intention of Grace Consulting Inc.'s management to provide safe and healthy working conditions and to establish and insist upon safe practices at all times by all employees.

The prevention of accidents is an objective affecting all levels of our company and its operations. It is, therefore, a basic requirement that each supervisor make the safety of all employees an integral part of his or her regular management function. It is equally the duty of each employee to accept and follow established safety regulations and procedures.

Every effort will be made to provide adequate training to employees. However, if an employee is ever in doubt about how to do a job or task safely, it is his or her duty to ask a qualified person for assistance. Employees are expected to assist management in accident prevention activities. Unsafe conditions must be reported immediately. Fellow employees that need help should be assisted. Everyone is responsible for the housekeeping duties that pertain to their jobs.

Every injury that occurs on the job, even a slight cut or strain, must be reported to management and/or the Safety Manager, Aaron Conner as soon as possible.

Under no circumstances, except emergency trips to the hospital, should an employee leave the work site without reporting an injury. When you have an accident, everyone is hurt. Please work safely. Safety is everyone's business.

Safety Policies for All Employees & New Hires

It is the policy of Grace Consulting Inc. that everything possible will be done to protect you from accidents, injuries and/or occupational disease while on the job. Safety is a cooperative undertaking requiring an ever-present safety consciousness on the part of every employee, feedback is essential. If an employee is injured, positive action must be taken promptly to see that the employee receives adequate treatment. Therefore, all operations must be planned to prevent accidents. To carry out this policy, the following rules will apply:

1. All employees shall follow the safe practices and rules contained in this manual and such other rules and practices communicated on the job. All employees shall report all unsafe conditions or practices to the proper authority, including the Supervisor on the project, Safety

Manager and, if corrective action is not taken immediately, president of the company.

2. The RSO shall be responsible for implementing these policies by insisting that employees observe and obey all rules and regulations necessary to maintain a safe work place and safe work habits and practices.

3. Good housekeeping must be practiced at all times in the work area. Clean up all waste and eliminate any dangers in the work area, as you work.

4. Suitable clothing and footwear must be worn at all times. Hardhats and safety glasses shall be worn at all times. Other personal protection equipment (such as respirators, fall protection, ear plugs, etc.) will be worn whenever needed by the situation.

5. All employees will participate in Job Hazard Analysis' conducted by their supervisor on a regular basis to continuously provide a safe workplace for all. This is an essential part of our program for protecting our employees from accidents and illness.

6. Anyone under the influence of intoxicating liquor or drugs, including prescription drugs which might impair motor skills and judgment, shall not be allowed on the job.

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7. Horseplay, scuffling, and other acts which tend to have an adverse influence on safety or well-being of other employees are prohibited.

8. Work shall be well planned and supervised to avoid injuries in the handling of heavy materials and while using equipment.

9. No one shall be permitted to work while the employee's ability or alertness is so impaired by fatigue, illness, or other causes that it might expose the employee or others to injury.

10. There will be no consumption of liquor or beer within 8 hours prior to arriving to work.

11. Employees should be alert to see that all guards and other protective devices are in their proper places and adjusted, and shall report deficiencies promptly to the RSO.

12. Employees shall not handle or tamper with any electrical equipment, machinery, air or water lines in a manner not within the scope of their duties, unless they have received specific training and instruction.

13. All injuries should be reported to the Supervisor, Responsible Safety Officer, or RSO so that arrangements can be made for medical or first aid treatment.

14. When lifting heavy objects, use the large muscles of the leg instead of the smaller muscles of the back.

15. Do not throw things, especially material and equipment. Dispose of all waste properly and carefully. Bend all exposed nails so they do not hurt anyone removing the waste.

16. Do not wear shoes with thin or torn soles.

17. All employees who are approved to operate company vehicles will follow all vehicle laws. If an approved employee is convicted of any moving violation, they are required to notify their RSO within 24 hours of conviction.

18. All employees are required to complete a self-inspection checklist prior to beginning work. If you do not have a self-inspection checklist as see the Safety Coordinator for the necessary checklist.

19. All locations employees perform work have a occupational medical facility listed in the job trailer or office location, including address and phone number, if medical attention is required. Non-compliance will result in disciplinary action or dismissal.

New Hire Orientation

All new hire employees will complete all safety training prior to beginning work. Safety programs will consist of but not limited to:

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- President Statement
- Objectives
- Goals
- Responsibilities
- Disciplinary Procedures
- Hazard Identification and reporting procedures
- Substance Abuse
- Designated Health Care
- Personal Protective Equipment
- Identifying Hazards
- Site Specific Training

All employees will receive a copy of this Safety Manual and are required to follow all safety policies. Anyone not following safety rules and policies may be subject to disciplinary action or dismissal. This Safety Manual is a summary of the safety training you will receive. The Safety Manual will be reviewed annually by Safety Coordinators and Safety Manager for changes or updating.

Disciplinary Policy

Any employee that does not strictly adhere to company policy will be subject to the following:

- Verbal Warning
- Written warning with re-training if deemed necessary

- After 3 written warnings in a 12-month period the employee will receive 7-14 days off without pay and maybe subject to dismissal.

All written disciplinary actions will be documented on GCI discipline form and kept in the employee's Personal file. Disciplinary action will be carried out by managers, executives and checked for trends.

Responsible Safety Officer

The identity of the person who is responsible for the Grace Consulting Inc. Safety Program is Safety Manager, Aaron Conner. This person must be someone of sufficient authority to implement the program. In addition to other titles, this person is called the *Responsible Safety Officer.*

Safety Committee

At Grace Consulting Inc. there are three employees designated as members of the Company Safety Committee. These members will meet on a regular basis to discuss and evaluate the effectiveness of all company safety programs and policies, and implement any changes that may be necessary to keep all programs and policies current. Minutes from these meetings should be recorded and filed for future reference.

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Employee Compliance

All employees are required to attend all safety meeting, Job Hazard Analysis, Tool Box Talks and any further training deemed necessary by Grace Consulting Director of Safety. J.H.A. will be used at a minimum of weekly, using company J.H.A. form and address specific hazards associated with all jobs, whether out in the field or in the shop. All employees are required to participate in J.H.A. (Tool Box Talks). All safety meetings and training sessions will be documented as to the topics covered and employees' attendance. Documentation will be forwarded to the Safety Manager upon completion. Strict compliance is mandatory of all Safety Rules and Programs and will be at minimum monthly.

Agreement to Participate

Every employer is required to provide a safe and healthful workplace. Grace Consulting Inc. is committed to fulfilling this requirement. A safe and healthful workplace is one of the highest priorities of Grace Consulting Inc..

The information in this manual constitutes a written injury and illness prevention program. While Grace Consulting Inc. cannot anticipate every workplace hazard, the following general principals should guide your conduct. To be safe, you must never stop being safety conscious.

Study the guidelines contained in this manual. Discuss the workplace situation with the supervisor or the RSO. Attend all company sponsored training and safety meetings. Read all posters and warnings. Listen to instructions carefully. Follow the Code of Safe Work Place Practices contained herein. Participate in accident investigations as requested. Accept responsibility for the safety of

others. Maintain all required documentation.

Each employee shall read and implement this injury and illness prevention program. If you do not understand any policy, please ask your supervisor.

Employee Safety Suggestion Box

Please give your written safety suggestions to your supervisor during the safety meetings. All safety suggestions will be discussed at the meeting. Management is the sole judge of the value of safety suggestions, and will implement as many good suggestions as possible.

Employee Safety Perception Program

All employees will participate in safety perception surveys, meetings and training. These tools will help Grace Consulting Inc. better evaluate safety programs, personal protective equipment and our employees' perception of its effectiveness.

Reporting

All employees are to report any unsafe work practices, environments or any employee who is perceived as conducting unsafe work practices to their immediate supervisor, safety coordinator or safety manager. Employees will not be allowed to continue work where a hazard exists until management has conducted a hazard assessment and completed a corrective action report. The corrective action report will be discussed by management and or safety manager conveyed to all employees and will be logged for analysis in preventing further unsafe environments or actions.

Training

Employee safety training is another requirement of an effective injury and illness prevention program. While Grace Consulting Inc. believes in skills training, we also want to emphasize safety training. All management employees are required to complete management training prior to their supervision of employees. Management employees will be required to train employees as well in all areas of safety and implement all Grace Consulting Inc. safety programs, safety forms, inspections and corrective actions.

All employees should start the safety training by reading this manual and discussing any problems or safety concerns with your direct supervisor.

Safety and Health Training

Training is one of the most important elements of any injury and illness prevention program. Such training is designed to enable employees to learn their jobs properly, bring new ideas to the workplace, reinforce existing safety policies and put the injury and illness prevention program into

action. All safety training will be documented and kept on file by Safety Managers or Director of safety. Safety Coordinators and Safety Manager will implement the assistance of visual aids in the training process and potentially at safety meetings.

Training is required for both supervision and employees alike. The content of each training session will vary, but each session will attempt to teach the following:

a) The success of Grace Consulting Inc.'s injury and illness prevention program depends on the actions of individual employees as well as a commitment by the Company.

b) Each employee's immediate supervisor will review the safe work procedures unique to that employee's job, and how these safe work procedures protect against risk and danger.

c) Each employee will learn when personal protective equipment is required or necessary, and how to use and maintain the equipment in good condition.

d) Each employee will learn what to do in case of emergencies occurring in the workplace. Supervisors are also vested with special duties concerning the safety of employees. The managers and supervisors are key figures in the establishment and success of Grace Consulting Inc.'s injury and illness prevention program. They have primary responsibility for actually implementing the injury and illness prevention program, especially as it relates directly to the workplace. Supervisors are responsible for being familiar with safety and health hazards to which employees are exposed, how to recognize them, the potential effects of these hazards, and rules and procedures for maintaining a safe workplace.

Supervisors shall convey this information to the employees at the workplace, and shall investigate accidents according to the accident investigation policies contained in this manual.

Safety Meetings, Training, J.H.A.'s

All employees will utilize Grace Consulting Inc.'s Job Hazard Analysis forms which will define hazardous operations by phase of work and corrective / preventative action. Supervisors will train all employees on the proper use of this valuable tool. JHA's will be used prior to beginning any work activity and at a minimum daily.

Safety meetings every month - The purpose of the meeting is to convey safety information and answer employee questions.

The format of most meetings will be to review, in language understandable to every employee, the content of the injury prevention program, JHA and Toolbox talks, special work site hazards, serious concealed dangers, and material safety data sheets. Each week, the RSO will review a portion of the company's safe work practices contained in this booklet, or other safety related information. Whenever a new practice or procedure is introduced into the workplace, it will be thoroughly reviewed for safety. All employees must pass a written test to show comprehension of material reviewed. A sign-up sheet will be passed around each meeting. A copy of the sign-up sheet and any applicable

notes will also be placed in the office file. Employee attendance is mandatory, safety training & updates will continue to be a part of our ongoing safety program.

Employee Responsibility for Training

Teaching safety is a two-way street. Grace Consulting Inc. can preach safety, but only employees can practice safety. Safety education requires employee participation.

Every month, a meeting of all employees and management will be conducted for the purpose of safety instruction. The employees will discuss the application of the Company's injury and illness prevention program to actual job assignments. They will also read and discuss a section of the manual and review application of general safety rules to specific situations.

The following general rules apply in all situations to all employees:

a) No employee should undertake a job that appears to be unsafe.

b) No employee is expected to undertake a job until he/she has received adequate safety instructions, and is authorized to perform the task.

c) No employee should use chemicals without fully understanding their toxic properties and without the knowledge required to work with these chemicals safely. Use the MSDS regularly.

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d) Mechanical safeguards must be kept in place.

e) Employees must report any unsafe conditions to the job site supervisor and the Responsible Safety Officer, prior to continuing work.

f) Any work-related injury or illness must be reported to management immediately.

g) Personal protective equipment must be used when and where required. All such equipment must be properly maintained.

h) Will complete corrective action awareness training to understand the process and documentation of all corrective actions. Which are always passed on to management.

Communication

Employers should communicate to employees their commitment to safety and to make sure that all employees are familiar with the elements of the company safety program. Grace Consulting Inc. communicates with its employees orally, in the form of directions and statements from your supervisor, written, in the form of directives and this manual, and by example. If you see a supervisor or management do something unsafe, please tell that person. We sometimes forget actions speak louder than words.

Incident Reporting

Definitions

Incident: Any unplanned event that occurs during the performance of work.

First Aid Case: An occupational injury or illness where care given that is not classified as medical treatment according to OSHA Recordkeeping guidelines.

Medical Treatment Case (OSHA Recordable Case): An occupational injury or illness requiring medical treatment as defined by the OSHA Recordkeeping guidelines. Common examples include intrusive procedures (i.e. lancing, stitches, drilling), second or subsequent return visits for treatments of any kind, prescribing medication, broken bones, loss of consciousness, restricted work activities, lost days from work, and welding flash burns of the eye.

Responsibilities

Employee: Employees are required to immediately report all incidents upon their occurrence to their supervisor.

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Field Supervision: Supervisors are responsible for ensuring the medical needs of employees are met when an injury or illness results from an incident at work. When medical needs are satisfied, supervisors are responsible for reporting the event, securing the accident scene and initiating the incident investigation process.

Site or Project Safety Representative: Safety representatives are responsible for coordinating the accident investigation process, coordinating root cause analysis meetings, and ensuring accident investigation reports are submitted properly and in a timely manner.

Director of Safety: The Director of Safety, Aaron Conner is responsible for the administration of the incident reporting and investigation process, distribution of corporate reports, and maintaining the incident database.

Management Personnel: Management personnel are responsible for ensuring all incidents are reported, and investigated in accordance with company requirements.

Reporting and Investigation Requirements

Project Reporting Procedures

All locations are required to have a written reporting process that is communicated to all employees.

The reporting process shall include client requirements.

Reporting All Incidents

All incidents shall be verbally reported upon their occurrence to the following:

1. Site or location Manager / Crew Chief
2. Responsible supervisor
3. Safety Manager (RSO)

All incidents shall be documented on the “Incident and Investigation Report” and submitted no later than 10:00 A.M. the following day. A copy of the Incident report will be forwarded to management.

1. Safety Manager (RSO)

Significant Event Reporting: Significant Incidents must be reported in accordance with this section. Significant events include:

1. Classified as OSHA Recordable Cases & Serious Events
2. Could have resulted in serious injury or property damage
3. Example of an unfavorable trend
4. Significant property damage or repeated property damage
5. Theft
6. Involvement of Third Parties
7. A high level of occurrence
8. Must be communicated to affirm a change in a policy, procedure, or standard
9. A new lesson learned
10. As requested by any member of management from Supervisor to the President

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Site or Project Safety Representative:

1. Gather pertinent information
2. Notify *GCI* president immediately.
3. Schedule Root Cause Investigation.
4. Complete Root Cause investigation.
5. Share all information and learning experiences with all employees where incident occurred with 24 hours of root cause investigation conclusion.
6. Forward all information to GCI President within 24 hours of the completion of root cause investigation.
7. Forward all information to the Workers' Compensation Administrator within 24 hours of the completion of root cause investigation.

Safety Manager: The RSO**,** Aaron Conner will:

1. Notify President and Vice President that an incident or accident has occurred.

2. Perform Investigations or assist Safety Managers, review and approve all documentation with Root Cause Investigations.
3. Share information with client “EH&S” representatives at each site within three days of the completion of Root Cause Investigation. The information to be communicated for Significant Events include the following information to the extent possible:

a. Type of Event
b. Classification
c. Date
d. Description
e. Root Cause and Factors
f. Lesson Learned
g. Authorized Photographs, diagrams and other information that are descriptive of the event

Field Supervision

1. Receive information from Safety Manager or Crew Chief that a significant incident has occurred.
2. Communicate significant incident with all Grace Consulting Inc. employees on site or project within 24 hours of receiving information from Safety Manager.

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Fatal Events: In the event of a fatal event certain government agencies, company officials, client/owners and others as are required to be notified as defined below:

1. President
2. Safety Manager
3. Manager of Human Resources
4. Safety Contact responsible for Area
5. Workers' Compensation Administrator
6. Public law enforcement agency (who will contact the coroner)
7. Area Federal or State Occupational Safety and Health Office (OSHA). Director of Safety or a company legal representative must be notified prior to contacting this agency.
8. Mine Safety and Health Administration (MSHA) if they have jurisdiction.

OSHA Reporting: The Safety Manager must be notified before any contact with the Occupational Safety and Health Administration regarding the reporting of work related injuries.

The general requirements for reporting accidents to OSHA are:

Within eight (8) hours after the death of any employee from a work-related incident or the in-patient hospitalization of three or more employees as a result of a work-related incident, you must orally report the fatality/multiple hospitalization by telephone or in person to the Area Office of the Occupational Safety and Health Administration (OSHA), U.S. Department of Labor, that is nearest to the site of the incident. You may also use the OSHA toll-free central telephone number, 1-800-321-OSHA (1-800-321-6742).

If the Area Office is closed, the incident must be reported by using the 800-telephone number.

Accident Prevention Policy Posting

Each employee has a personal responsibility to prevent accidents. You have a responsibility to your family, to your fellow workers and to the Company. You will be expected to observe safe practice rules and instructions relating to the efficient handling of your work.

Your responsibilities include but not limited to the following:

***** Incorporate safety into every job procedure. No job is done efficiently unless it has been done safely.

***** Know and obey safe work practices.

***** Know that disciplinary action may result from a violation of the safety rules.

***** Report all injuries immediately, no matter how slight the injury may be.

***** Caution fellow workers when they perform unsafe acts.

***** Don't take chances.

***** Ask questions when there is any doubt concerning safety.

***** Don't tamper with anything you do not understand.

***** Report all unsafe conditions or equipment to your supervisor immediately.

Accident Prevention Policy Posting

A copy of this manual will be posted in the work area.

It is the policy of Grace Consulting Inc. to provide a safe and clean workplace and to maintain sound operating practices. Concentrated efforts shall produce safe working conditions and result in efficient, productive operations. Safeguarding the health and welfare of our employees cannot be stressed enough.

Accident prevention is the responsibility of all of us. Department heads and supervisors at all levels shall be responsible for continuous efforts directed toward the prevention of accidents. Employees are responsible for performing their jobs in a safe manner.

The observance of safe and clean work practices, coupled with ongoing compliance of all established safety standards and codes, will reduce accidents and make our company a better place

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to work.

Substance Abuse Program and Policy

It is the policy of Grace Consulting Inc. to have a drug-free workplace. All employees are expected to report to work in a drug-free, physical and mental condition that will allow them to perform their work in a safe, and competent manner. Employees who voluntarily, or through testing prove to have a substance abuse problem may be referred to a substance abuse program to seek help.

Prohibited/ Illegal Substances

The type of illegal substances prohibited includes, but is not limited to the following:

1. Illegal and unauthorized drugs (including any amounts in the urine or bloodstream).
2. Unauthorized alcoholic beverages.
3. Drug-related paraphernalia.
4. Unauthorized weapons, firearms, or explosive devices (including those found in vehicles).
5. Stolen property (including proprietary information).
6. Abuse of prescription or legally controlled substances.

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Detection

As part of our substance abuse program, new workers may be given an initial drug screening/ test. Workers who test positive for drugs, or other signs of substance abuse will not be hired. Additionally, random drug testing may be performed throughout your term of employment at Grace Consulting Inc.'s discretion, including but not limited to the following:

1. Any workers involved in jobsite or vehicular accidents, or near-misses may be subject to immediate drug testing.
2. Random searches by outside inspection services (including drug detection dogs).
3. Reasonable suspicion (or cause) testing.
4. Post rehabilitation/ probationary testing.
5. Testing to comply with contractual obligations, or governmental agencies.
6. Routine, periodical testing.

Workers already employed by Grace Consulting Inc. who test positive for drugs may be terminated, or referred to a community substance abuse program for help, disciplinary action, or notification of authorities, is the discretion of the employer.

Hazard Identification & Abatement

This written safety and health plan sets out a system for identifying workplace hazards and correcting them in a timely fashion. Please review it carefully with your supervisor. Remember, safety is everyone's responsibility. Any employee not following any safety policy or procedure will be

subject to disciplinary action.

Safety Audits

The best method to establish a safer workplace is to study past accidents and worker compensation complaints. By focusing on past injuries, incidents and near misses, Grace Consulting Inc. hopes to avoid similar problems in the future. Therefore, whenever there is an accident, and in many cases upon review of past accidents, you may be requested to participate in a safety audit interview. During the interview, there will be questions about the nature of the investigation and the workplace safety related to the incident. Please answer these questions honestly and completely. Also, please volunteer any personal observations and/or suggestions for improved workplace safety.

Based upon the study of past accidents and industry recommendations, a safety training program has been implemented. In addition to other preventative practices, there will be a group discussion of the cause of the accident and methods to avoid the type of accidents and injury situations experienced in the past. Work rules will be reviewed and modified based upon the study of these accidents.

In addition to historical information, workplace safety depends on workplace observation. You and your supervisor are responsible for inspecting your working area daily before and while you are working. Each day, before you begin work, inspect the area for any dangerous conditions. Inform your supervisor of anything significant, so other employees are advised. You may also be given written communications regarding unsafe conditions or serious concealed dangers. Review this communication carefully and adjust your workplace behavior to avoid any danger or hazards. If you are unclear or unsure of the significance of this written communication, contact your supervisor and review your planned actions before starting to work. It is better to wait and check, then to go ahead and possibly cause an injury to yourself and others.

Managers must provide written notice to employees of any serious concealed dangers of which they have actual knowledge. In addition to providing written notice of all serious concealed dangers to employees, managers are required to report serious concealed dangers to the Safety Manager and either OSHA or an appropriate administrative agency within fifteen days, or immediately if such danger would cause imminent harm, unless the danger is abated.

Merely identifying the problem is not sufficient. The danger must be reported to the appropriate supervisor and the Safety Manager (RSO) who then will correct the problem. If the danger cannot be corrected, then all employees will be warned to take protective action so that the danger will not result in any injuries.

Workplace Inspections

In addition to the examination of records, work place safety inspections will occur periodically every week, when conditions change, or when a new process or procedure is implemented. During these inspections, there will be a review of the injury and illness prevention policy and Grace Consulting Inc.'s code of safe work practices. All inspections are maintained in a company database

allowing for review annually, checking for trends and reported to upper management. The inspection process will be conducted monthly and corrective measures implemented using, GCI Workplace Analysis form by the Safety Manager or other competent person, who have been trained in the techniques used to conduct such inspections. Training is mandatory prior to conducting a work place inspection. Corrective measures will be inspected by management to ensure completion and that the hazard has been eliminated. Incident Investigations and corrective actions implemented as a result of this process must be carried out within 24 hours.

Accident Investigation

A primary tool used by Grace Consulting Inc. to identify the areas responsible for accidents is a thorough and properly completed accident investigation. The results of each investigation will be reduced to writing and submitted for review by the Safety Manager and Grace Consulting Inc.'s insurance risk management advisors, and, if the accident resulted in serious injury, to company attorneys.

If the accident resulted in serious injury, the procedure will be directed by the attorneys to provide the most reliable evidence or description legally permissible. All investigations pursuant to the directions of legal counsel will be protected by all applicable privileges, if any. The attorney will provide more detail on this topic during the investigation.

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Every job activity will be analyzed and reviewed when an incident or accident occurs. Take pictures immediately after any accident occurrence.

A written report should be prepared from notes and diagrams made at the scene, or a portable Dictaphone will be used to record direct employee and eyewitness statements as near to the actual time of observation as possible. All statements should include the time and date given, and the town or county where the statement was made. If the statement is intended to be used in court proceedings, a suitable jurat is required, otherwise, a simple statement that the description is sworn to be true under penalty of perjury with the date, place and time should be included. All pictures should be similarly identified. Let people know on tape that they are being recorded. Also, make sure that the names, addresses, day and evening phone numbers of all eye witnesses are noted or recorded.

If a formal police report or other official investigation is conducted by any government agency, get the name and badge number of the official, or a business card, and find out when a copy of the official report will be available to the public. If you are requested to make a statement, you have the right to have the company lawyer or representative attend your statement at no cost to you.

A satisfactory accident report will answer the following questions:

1. What happened? The investigation report should begin by describing the accident, the injury sustained, the eyewitnesses, the date, time and location of the incident and the date and time of the report. Remember: who, what, when, where and how are the questions that the report must answer.

2. Why did the accident occur? The ultimate cause of the accident may not be known for several days after all the data are analyzed. However, if an obvious cause suggests itself, include your conclusions as a hypothesis at the time you give your information to the person in charge of the investigation.

3. What should be done? Once a report determines the cause of the accident, it should suggest a method for avoiding future accidents of a similar character.

This is a decision by the Director of Safety, Safety Managers and upper management. Once a solution has been adopted, it is everyone's responsibility to implement it.

4. What has been done? A follow up report will be issued after a reasonable amount of time to determine if the suggested solution was implemented, and if so, whether the likelihood of accident has been reduced.

Records

Grace Consulting Inc. maintains records of employee training, hazard identification and abatement, and accident investigations in a company database.

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OSHA Records Required

Copies of required accident investigations and certification of employee safety training shall be maintained by the Director of Safety. A written report will be maintained on each accident, injury or on-the-job illness requiring medical treatment. A record of each such injury or illness is recorded on OSHA Log and Summary of Occupational Injuries Form 300 according to its instructions. Supplemental records of each injury are maintained on OSHA Form 301, or Employers Report of Injury or Illness Form 5020. Every year, a summary of all reported injuries or illnesses is posted no later than February 1, for three months, until April 30, on OSHA Form 301. These records are maintained for five years from the date of preparation.

General Statement on Safety

Grace Consulting Inc. strives to maintain a safe place to work and to employ safe workers. It is your responsibility to conduct your work in a safe, responsible manner. Immediately report all accidents occurring on Company premises to your supervisor.

General Statement on Safety

Each employee has an individual responsibility to prevent accidents. It is to the benefit of all employees and Grace Consulting Inc. that you report any situation or condition you believe may present a safety hazard, including any known or concealed dangers in your work area. Grace

Consulting Inc. encourages you to report your concern either to your immediate supervisor or to a member of the Safety Committee. The supervisor or a member of the Safety Committee will take immediate action to investigate the matter.

Safety Equipment

Proper safety equipment is necessary for your protection. The company provides the best protective equipment it is possible to obtain.

Use all safeguards, safety appliances, or devices furnished for your protection and comply with all regulations that may concern or affect your safety. Wear your gear properly - all snaps and straps fastened, cuffs not cut or rolled. All safety equipment is to be visually inspected by each employee prior to beginning work. Any defects are to be reported to your supervisor and Safety Managers which will inspect equipment in question and take the appropriate corrective measures.

Your supervisor will advise you as to what protective equipment is required for your job.

Certain jobs require standard safety apparel and appliances for the protection of the employee. Your supervisor is aware of the requirements and will furnish you with the necessary approved protective appliances. These items shall be worn and effectively maintained as a condition of your continued employment and part of our mutual obligation to comply with the Occupational Safety and Health Act.

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Safety goggles, glasses and face shields shall correspond to the degree of hazard, i.e., chemical splashes, welding flashes, impact hazard, dust, etc. Do not alter or replace an approved appliance without permission from your supervisor.

Rubber gloves and rubber aprons shall be worn when working with acids, caustics or other corrosive materials.

Specified footwear must be worn.

No jewelry shall be worn around power equipment and on plant sites.

Hearing protection appliances (approved muffs or plugs) shall be worn by all employees working within any area identified as having excess noise levels. Your supervisor will instruct you in the proper use of the appliance.

Protective Clothing

Proper safety equipment is necessary for your protection. The company provides the best protective equipment possible. Use all safeguards, safety appliances, or devices furnished for your protection and carry out all regulations that may concern or affect your safety. Wear your gear properly - all snaps and straps fastened, cuffs not cut or rolled.

Your supervisor will advise you as to what protective equipment is required for your job.

Smoking and Fire Safety

Fire is one of the worst enemies of any facility. Learn the location of the fire extinguishers. Learn how to use them. You can help prevent fires by observing the smoking rules:

***** Smoking is not allowed on the site, except in designated areas.

***** Smoking is not permitted in any building.

***** If you are not sure about where you may smoke, ask the supervisor.

Safety Recognition

Definitions

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Milestone Safety Achievement: A level of safety performance that meets or exceeds a statistical objective or expectations.

Safe Behavior Performance: An individual or individuals performing work in accordance with standards, requirements and expectations.

Behavior Based Safety: a process where behavioral performance of individuals is the key element of accomplishing safe work objectives.

Responsibilities

The Director of Safety and Training, Aaron Conner is responsible for the general administration of this policy. Project management is responsible for implementing project level recognition programs.

Recognition Guides

Recognition of safe performance should not be the driving force in achieving safety success. Safe work performance should be viewed as part of successful planning and execution of work.

Milestone Safety Achievement

On a corporate level, Grace Consulting Inc. itself will recognize group safe work performance. The President, and Director of Safety will determine the type and extent of group recognition. The

expectation of employees to work each day without an incident dictates that acceptable statistical performance objectives are “0”.

Milestone safety achievements should be based on this premise. Recognition for such performance should be based upon the level of hours worked.

Key milestone markers are:

Calendar Year
50,000 hour increments
100,000 hour increments

Behavior Based Recognition

Projects and locations are encouraged to implement behavior based safety recognition of individuals and groups. Examples of safe behavior include:

*Effective participation in the proactive evaluation process
*Proactive safety suggestions
*Demonstration of consistent safe behavior
*Making observations and taking intervening actions
*Participation in safety meetings

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Safe Behavior Performance Recognition

Any member of supervision or management may recommend recognition of an individual, project, group or discipline. This recommendation must be in written form and submitted to the RSO, Aaron Conner for consideration. This recommendation must be based upon safe behavior performance.

Information that must be submitted includes:

*Project or Group Name
*Employee Name as applicable
*Reason for recommendation and time frame
*Type of corporate recognition recommended

Chapter 2

General Code of Safe Work Practices

General Fire Safety

Our local fire department is well acquainted with our facility, its location and specific hazards.

All fire doors and shutters must be maintained in good operating condition. Fire doors and shutters should be unobstructed and protected against obstructions, including their counterweights. Fire door and shutter fusible links must be in place. All automatic sprinkler water control valves, if any, air and water pressures should be checked routinely. The maintenance of automatic sprinkler systems is assigned to the Responsible Safety Officer. Sprinkler heads should be protected by metal guards if they could possibly be exposed to damage. Proper clearance must be maintained below sprinkler heads.

Portable fire extinguishers are provided in adequate number and type and are located throughout the facility. Fire extinguishers are mounted in readily accessible locations. Fire extinguishers are recharged regularly and the date of last inspection noted on their tags. All employees are periodically instructed in the use of extinguishers and fire protection procedures. Notify the Responsible Safety Officer of any damage to fire protection equipment.

Powder Actuated Tools

Grace Consulting Inc. does not use powder actuated tools and employees are to never use or operate such tools.

Machine Guarding

Before operating any machine, every employee must have completed a training program on safe methods of machine operations. It is the primary purpose of supervision to ensure that employees are following safe machine operating procedures. There will be a regular program of safety inspection of machinery and equipment.

All machinery and equipment must be kept clean and properly maintained. There must be sufficient clearance provided around and between machines to allow for safe operations, set up, servicing, material handling and waste removal.

All equipment and machinery should be securely placed, and anchored when necessary, to prevent tipping or other movement that could result in personal injury. Most of the time, machinery should be bolted to the floor to improve stability and the electrical cord to the machinery fixed with a

breaker or other shut-off device to stop power in case of machine movement.

There must be a power shut-off switch within reach of the operator's position at each machine. Electrical power to each machine shall be capable of being locked out for maintenance, repair or security. The non-current carrying metal parts of electrically operated machines must be bonded and grounded.

The foot-operated switches are guarded and/or arranged to prevent accidental actuation by personnel or falling objects. All manually operated valves and switches controlling the operation of equipment and machines must be clearly identified and readily accessible.

All EMERGENCY stop buttons are colored RED. If applicable, the pulleys and belts which are within 7 feet of the floor or working level are properly guarded. All moving chains and gears must be properly guarded. All splash guards mounted on machines that use coolant must be positioned to prevent coolant from splashing the employees.

The Shop Manager will instruct every employee in the work area on the methods provided to protect the operator and other employees in the shop area from hazards created by the operation of a machine, such as pinch points, rotating parts, flying chips and sparks. The machinery guards must be secure and arranged so they do not present a hazard. All special hand tools used for placing and removing material must protect the operator's hands. All revolving drums, barrels and containers should be guarded by an enclosure that is interlocked with the drive mechanisms, so that revolution cannot occur unless the guard enclosure is in place. All arbors and mandrels must have firm and secure bearings and be free of play. A protective mechanism has been installed to prevent machines from automatically starting when power is restored after a power failure or shutdown. Machines should be constructed so as to be free from excessive vibration when the size tool is mounted and run at full speed. If the machinery is cleaned with compressed air, the air must be pressure controlled and personal protective equipment or other safeguards used to protect operators and other workers from eye and bodily injury. All fan blades should be protected by a guard having openings no larger than 1/2 inch when operating within 7 feet of the floor.

Saws used for ripping equipment must be installed with anti-kickback devices and spreaders. All radial arm saws must be arranged so that the cutting head will gently return to the back of the table when released.

Lockout-Tagout Procedures

All machinery or equipment capable of movement must be de-energized or disengaged and blocked or locked out during cleaning, servicing, adjusting or setting up operations, whenever required. The locking-out of the control circuits in lieu of locking-out main power disconnects is prohibited. All equipment control valve handles must be provided with a means for locking out. The lock-out procedure requires that stored energy (i.e. mechanical, hydraulic, air) be released or blocked before equipment is locked out for repairs.

Appropriate employees are provided with individually keyed safety locks. Employees are required

to keep personal control of these key(s) while they have safety locks in use. Employees must check the safety of the lockout by attempting a start up after making sure no one is exposed.

Where the power disconnector does not also disconnect the electrical control circuit, the appropriate electrical enclosures must be identified. The control circuit can also be disconnected and locked out.

Welding, Cutting and Brazing

Only authorized and trained personnel are permitted to use welding, cutting or brazing equipment. All operators must have a copy of the appropriate operating instructions and are directed to follow them. Many areas may require a HOT WORK permit to be used before starting any welding or cutting operations. Check with the RSO before attempting any work without a permit.

Compressed gas cylinders should be regularly examined for obvious signs of defects, deep rusting, or leakage. Use care in handling and storing cylinders, safety valves, relief valves and the like, to prevent damage. Precaution must be taken to prevent mixture of air or oxygen with flammable gases, except at a burner or in a standard torch. Only approved apparatus (torches, regulators, pressure-reducing valves, acetylene generators, manifolds) may be used.

Cylinders must be kept away from sources of heat and Oxygen storage (minimum 20'). It is prohibited to use cylinders as rollers or supports. Empty cylinders must be appropriately marked, their valves closed and valve-protection caps on.

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Signs reading: DANGER - NO SMOKING, FLAMES, OR OPEN LIGHTS, or equivalent must be posted. Cylinders must be labeled properly with concentration levels and bottle contents, cylinder valves, couplings, regulators, hoses and apparatus must be kept free of oily or greasy substances. Care must be taken not to drop or strike cylinders.

All regulators must be removed and valve-protection caps put in place before moving cylinders. All cylinders without fixed hand wheels must have keys, handles, or non-adjustable wrenches on stem valves when in service. Liquefied gases must be stored and shipped valve-end up with valve covers in place. Before a regulator is removed, the valve must be closed and gas released from the regulator. All employees are instructed never to crack a fuel-gas cylinder valve near sources of ignition. Red is used to identify the acetylene (and other fuel-gas) hose, green for oxygen hose, and black for inert gas and air hose. All pressure-reducing regulators must be used only for the gas and pressures for which they are intended.

The open circuit (No Load) voltage of arc welding and cutting machines must be as low as possible and not in excess of the recommended limits. Under wet conditions, automatic controls for reducing no-load voltage must be used. Grounding of the machine frame and safety ground connections of portable machines must be checked periodically. Electrodes must be removed from the holders when not in use. All electric power to the welder must be shut off when no one is in attendance.

Suitable fire extinguishing equipment must be available for immediate use before starting to ignite the welding torch. The welder is strictly forbidden to coil or loop welding electrode cable around his/her body.

All wet welding machines must be thoroughly dried and tested before being used. All work and electrode lead cables must be frequently inspected for wear and damage, and replaced when needed. All connecting cable lengths must have adequate insulation. When the object to be welded cannot be moved and fire hazards cannot be removed, shields must be used to confine heat, sparks and slag.

Fire watchers will be assigned when welding or cutting is performed in locations where a serious fire might develop. All combustible floors must be kept wet, covered by damp sand, or protected by fire-resistant shields. When floors are wet down, personnel should be protected from possible electrical shock.

When welding is done on metal walls, precautions must be taken to protect combustibles on the other side. Before hot work is begun, used drums, barrels, tanks and other containers must be so thoroughly cleaned that no substances remain that could explode, ignite or produce toxic vapors. It is required that eye protection helmets, hand shields and goggles meet appropriate standards.

Employees exposed to the hazards created by welding, cutting or brazing operations must be protected with personal protective equipment and clothing. Check for adequate ventilation where welding or cutting is performed. When working in confined spaces, environmental monitoring tests should be taken and means provided for quick removal of welders in case of emergency.

Compressors and Compressed Air

All compressors must be equipped with pressure relief valves and pressure gauges. All compressor air intakes must be installed and equipped to ensure that only clean, uncontaminated air enters the compressor. Every air receiver must be provided with a drainpipe and valve at the lowest point for the removal of accumulated oil and water. Compressed air receivers must be periodically drained of moisture and oil. All safety valves shall be tested frequently and at regular intervals to determine whether they are in good operating condition. A current operating permit issued by the Division of Occupational Safety and Health shall be maintained. The inlet of air receivers and piping systems must be kept free of accumulated oil and carbonaceous materials.

Compressed Gas and Cylinders

Cylinders with a water weight capacity over 30 pounds must be equipped with means for connecting a valve protector device, or with a collar or recess to protect the valve. Cylinders must be legibly labeled to identify clearly the gas contained. Compressed gas cylinders should be stored only in areas, which are protected from external heat sources such as flame impingement, intense radiant heat, electric arcs or high temperature lines. Cylinders must not be located or stored in areas where unauthorized persons will damage them by passing or falling objects, or subject to tampering.

Cylinders must be stored or transported in a manner to prevent them from creating a hazard by tipping, falling or rolling. All cylinders containing liquefied fuel gas must be stored or transported in a position so that the safety relief device is always in direct contact with the vapor space in the cylinder. Valve protectors must always be placed on cylinders when the cylinders are not in use or connected for use. All valves must be closed off before a cylinder is moved, when the cylinder is empty, and at the completion of each job.

Low pressure fuel-gas cylinders must be checked periodically for corrosion, general distortion, cracks, or any other defect that might indicate a weakness or render them unfit for service. The periodic check of low-pressure fuel-gas cylinders includes a close inspection of the cylinder's bottom.

Employees are prohibited to release unwanted pressures from any compressed gas cylinders. This process will only be performed by the distributor used by Grace Consulting Inc. and will be performed only when offsite.

Hoists and Auxiliary Equipment

When applicable every overhead electrical hoist shall be equipped with a limit device to stop the hook travel at its highest and lowest points of safe travel. Check these limits without a load to ensure the device is working correctly. Each hoist should automatically stop and hold any load up to 125 percent of its rated load if its actuating force is removed. Check this periodically under controlled conditions. Make sure that the rated load of each hoist is legibly marked and visible to the operator. Stops should be provided at the safe limits of travel for trolley hoists.

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The controls of hoists should be plainly marked to indicate direction of travel or motion. Every cage-controlled hoist must be equipped with an effective warning device. Close-fitting guards or other suitable devices should be installed on hoists to assure hoist ropes will be maintained in the sheave grooves.

All hoist chains or ropes must be of sufficient length to handle the full range of movement for the application, while maintaining two full wraps on the drum at all times.

All nip points or contact points between hoist ropes and sheaves which are permanently located within 7 feet of the floor, ground or working platform must be guarded. It is prohibited to use chains or rope slings that are kinked or twisted.

The operator should avoid carrying loads over people. Only employees who have been trained in the proper use of hoists are allowed to operate them.

Industrial Trucks-Forklifts

Only trained personnel should be allowed to operate industrial trucks. Lift Truck Operating rules must be posted and will be strictly enforced.

When operating any industrial truck, substantial overhead protective equipment will be provided on

high lift rider equipment. Directional lighting is also provided on each industrial truck that operates in an area with less than 2 foot candles per square foot of general lighting.

Each industrial truck must have a warning horn, whistle, gong or other device which can be clearly heard above the normal noise in the area where operated. Before using a forklift, check that the brakes on each industrial truck are capable of bringing the vehicle to a complete and safe stop when fully loaded. The parking brake must effectively prevent the vehicle from moving when unattended. When motorized hand and hand/rider trucks are operated, and when the operator releases the steering mechanism, make sure that both the brakes are applied and power to the motor shut off. Maintenance records are available so that a driver can check on the servicing of the truck in case of questions.

When an industrial truck operates in areas where flammable gases, vapors, combustible dust, or ignitable fibers may be present in the atmosphere, the vehicle must be approved for such locations with a tag showing such approval posted on the vehicle itself.

Industrial trucks with internal combustion engines, operated in buildings or enclosed areas, should be carefully checked to ensure that the operation of the vehicle does not cause harmful concentration of dangerous gases or fumes.

Spraying Operations

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In any spraying operation there should be adequate ventilation before starting any spraying job. As to the conditions of the area where the spray job is to be done, consideration should be taken before beginning work.

If the area is enclosed, does it require mechanical ventilation? Before working, make sure that the area is free of combustible materials, and that there are "No Smoking" signs adequately posted and easily seen. If mechanical ventilation is provided when spraying in enclosed areas, air should not be recirculated so as to avoid contamination. There should be adequate space and ventilation for all drying areas.

Also in an enclosed area, spray operations must be at least 20 feet from flames, sparks, operating electrical motors and other ignition sources. The spray area should be free of any hot surfaces. Any solvent used in the cleaning process should not have a flash point of 100 degrees or less. If portable lamps are used to illuminate the spray areas they must be approved for the location and must be suitable for use in a hazardous area.

Approved respiratory equipment will be provided and must be used when appropriate during spraying operations. If a sprinkler system is within the confines of the spraying area operation, it should be in working order and will be inspected semi-annually to make sure that it is in operating condition.

If a spraying booth is used for the spraying operation, it must be made of metal, masonry or other noncombustible material. Make sure that "NO SMOKING" signs are posted in spray areas, paint

rooms, paint booths and paint storage areas. The spray booth must be completely ventilated. Booth floors and baffles must be easily cleaned and noncombustible. Ducts and access doors must be easily cleaned. Lighting fixtures for both outside and inside the spray booth must be enclosed in clear see-through sealed panels. Electric motors for exhaust fans must be placed outside the booth. Belts and pulleys must be completely enclosed. Drying apparatus should be located in a well ventilated area in the booth and properly grounded.

Infrared drying apparatus must be kept out of the spray area during a spraying operation.

Confined Spaces

Before entry into a confined space, all impellers, agitators, or other moving equipment contained in the confined space must be locked-out. Ventilation must be either natural or mechanically provided into the confined space. All hazardous or corrosive substances that contain inert, toxic, flammable or corrosive materials must be valved off, blanked, disconnected and separated. Atmospheric tests should be performed to check for oxygen content, toxicity and explosive concentration. Atmospheric tests must be performed every 4 hours in a confined area where entry is required.

The area must also be checked for decaying vegetation or animal matter that could produce methane. Adequate lighting must be provided within the space. If the confined area is located below the ground or near where motor vehicles are operating, care must be taken that vehicle exhaust or carbon monoxide does not enter the space.

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When personnel enter a confined area, assigned safety standby employees who are alert to the work being done, are able to sound an alarm if necessary and to render assistance, must be in the area. These standby employees must be trained to assist in handling lifelines, respiratory equipment, CPR, first aid, and be able to employ rescue equipment that will remove the individual from the confined area. Standby personnel should be in teams of two during such an operation or else within the vicinity if working separately. There must also be an effective communication system utilized while the operation is occurring.

When equipment which utilizes oxygen, such as salamanders, torches or furnaces,
is used in a confined space, adequate ventilation must be provided to guarantee oxygen content and combustion for the equipment. When this equipment is used, adequate measures must be taken to assure that exhaust gases are vented outside the enclosure. When gas welding or burning is used, hoses must be checked for leaks. Compressed bottled gas must be outside the area and torches must be lit outside the area also. The atmosphere must be tested each time before lighting a torch.

Environmental Controls

All employees must be aware of the hazards involved when working with chemicals and the remedies that need to be used when an accident does occur. A training program will give instructions on how to handle the chemical being used and first aid to be applied to victims of chemical exposure. First aid and caution signs will be conspicuously posted so as to alert individuals on a constant basis. Charts identifying the chemicals utilized in the workplace, their symptoms and effects must also be

posted. The workers must know what the acceptable level of exposure to a chemical is and what safety systems must be in place when working with a chemical. Staff should also be aware of new chemical products which may be available that are less harmful, and they must ensure that facilities are adequately ventilated when using chemicals on the premises.

If welding is done, the welder should be certified. In the area of operation where the welding is taking place, the welder must be aware of ventilation available, the type of respirator that can be used in the area, and if exposure time or other means will suffice as a safe and adequate measure when welding as to the fumes that will be emitted. Welders should also be supplied with protective clothing and a flash shield during welding operations.

When forklifts and other vehicles are used in buildings or other enclosed areas, carbon monoxide levels must be kept below maximum acceptable concentration.

Noise levels also present a potential hazard. Noise levels within a facility must be at acceptable levels and if not, steps must be taken to reduce the level using recommended engineering controls.

Employees are prohibited from disturbing asbestos containing materials. Materials such as asbestos are handled by a company approved Asbestos abatement team which will take the necessary precautions to protect the employee from the material. The material must be labeled, along with signs conspicuously posted that these materials are being used in the area. Employees should be aware of effective methods used to prevent emission of airborne asbestos fibers, silica dust and other similar hazardous materials. Some of the recommended methods of controlling the emission of these materials are by using water and vacuuming, rather than blowing and sweeping, the materials.

Machinery such as grinders, saws and other tools that produce a fine airborne dust must be vented. In any ventilation system the system should be designed and operated at an airflow and volume necessary for proper application and effectiveness. In the design of the ventilation system the ducts and belts must be free of obstructions and slippage.

As with all operations, there must be written standards on the procedures for the equipment, description of the job task, usage of the protective equipment provided, such as the selection and use of respirators, and when they are needed.

Any water that is provided to an employee throughout the facility should be clearly identified as to whether it is for drinking or that it is non potable. All restrooms must be kept clean and sanitary.

Employees should be screened before taking positions that may expose them to hazards they are not physically capable of handling. An employee who takes an assignment which requires physical labor must be trained to lift heavy loads properly so as not to damage themselves physically.

Hazardous Chemical Exposures

In any company, which utilizes chemical substances, a training program on the handling, hazards, storage, exposure risks, symptoms of chemical exposure, and first aid needs to be part of any new

employees training. There must also be follow-up training sessions as to any new chemical or processes that may be initiated by the company. Follow-up training sessions act as a reinforcement of safety standards that need to be followed on a daily basis.

In a training program, employees will learn acceptable levels of chemical exposure, proper storage and labeling of chemicals, and usage of protective clothing and equipment for handling chemicals. They will also learn about potential fire and toxicity hazards, when not to have a chemical in a confined area, or to store in closed containers, usage of eye wash fountains and safety showers, and the necessary posting of open, and dangerous areas. It is important that an employee recognize the Threshold Limit Values or Permissible Exposure Limits of airborne contaminants and physical agents in the workplace.

A procedural manual or set of instructions must be part of the program, with periodic inspections that clearly indicate whether an employee may be mishandling a chemical or endangering himself or others. Part of the manual or procedures must establish a standard of when and how to deal with chemical spills, neutralizing, and disposing of spills or overflows. These procedures must also be posted in an area that is easily accessible for reference usage.

First aid training and equipment will be routine in any facility where chemicals are used. Employees must know how to handle equipment in emergency situations, what equipment needs to be used and whether the equipment is adequate for the situation.

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Respirators may be used either as protective safety equipment or for emergency usage. Therefore, the employee should recognize that respirators need to be stored in a clean, sanitary and convenient location and inspected on a regular basis. Also what respirators are approved by NIOSH for their particular applications.

With a first aid program an employee will recognize when a problem may be occurring by exposure to a chemical ranging from headaches, nausea, dermatitis problems to other factors of discomfort when they use solvents or chemicals.

Ventilation is another major factor in the design of any facility. Whether by natural means or mechanical, the system must be designed to control dust, fumes, solvents, gases, smoke or vapors which may be generated in the workplace.

Hazardous Substances Communication

When hazardous substances are used in the workplace, a hazard communication program dealing with Material Safety Data Sheets (MSDS), labeling and employee training will be in operation. MSDS materials will be readily available for each hazardous substance used at all locations. A training program plus regular question and answer sessions on dealing with hazardous materials will be given to keep all employees trained and informed. The Safety Manager will be responsible for administration.

The program will include an explanation of what an MSDS is, where it is located and how to use

and obtain one; MSDS contents for each hazardous substance or class of substances; explanation of the "Right to Know"; identification of where employees can see the employer's written hazard communication program and where hazardous substances are present in their work area; the health hazards of substances in the work area, how to detect their presence, and specific protective measures to be used; as well as informing them of hazards of non-routine tasks for all job sites .

Electrical
Non-Qualified Workers

The workplace will be aware of the OSHA Electrical Safety Standards and will comply with the same. All employees are required to use proper Personal Protective Equipment while working with electricity. Employees will use the following but not limited to: leather glove, face shield and rubber boots (provided by GCI). Non-Qualified Employees will be required to report any hazard to life or property that is observed in connection with a job, electrical equipment or lines.

Non-Qualified Employees will be expected to make preliminary inspections or appropriate tests to determine conditions before starting work. When equipment or lines are to be serviced, maintained or adjusted, employees must be aware of open switches. Lockouts must be tagged whenever possible.

Equipment such as electrical tools or appliance must be grounded or of the double insulated type. Extension cords being used must have a ground fault circuit interrupter.

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In wet or damp locations, electrical tools and equipment must be appropriate for the use or location, or otherwise protected.

The location of electrical power lines and cables (overhead, underground, under floor, other side of walls) must be determined before digging, drilling or similar work is begun.

All metal measuring tapes, ropes, hand lines or similar devices with metallic thread woven into the fabric are prohibited for use where they could come in contact with energized parts of equipment or circuit conductors.

The use of metal ladders is prohibited in areas where the ladder or the person using the ladder could come in contact with energized parts of equipment, fixtures or conductors.

Use ground-fault circuit interrupters for each temporary 15 or 20-ampere, 120 volt AC circuit at all locations.

Qualified Electricians

Qualified Electricians must be aware of the following:

Exposed wiring and cords with frayed or deteriorated insulation must be repaired or replaced.

Clamps or other securing means must be provided on flexible cords or cables at plugs, receptacles, tools, equipment. The cord jacket must be held securely in place.

All cord, cable and raceway connections must be intact and secure.

All disconnecting switches and circuit breakers must be labeled to indicate their use or equipment served.

A means for disconnecting equipment must always be opened before fuses are replaced.

All interior-wiring systems must include provisions for grounding metal parts or electrical raceways, equipment and enclosures.

All electrical raceways and enclosures must be fastened securely in place.

All energized parts of electrical circuits and equipment must be guarded against accidental contact by approved cabinets or enclosures.

Sufficient access and working space will be provided and maintained around all electrical equipment to permit ready and safe operations and maintenance.

All unused openings (including conduit knockouts) in electrical enclosures and fittings must be closed with appropriate covers, plugs or plates.

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Electrical enclosures such as switches, receptacles, junction boxes must be provided with tight-fitting covers or plates.

Disconnecting switches for electrical motors in excess of two horsepower must be capable of opening the circuit when the motor is in a stalled condition without exploding. (Switches must be horsepower rated equal to or in excess of the motor hp rating).

Low voltage protection must be provided in the control device of motor driven machines or equipment, which could cause injury from inadvertent starting.

A motor disconnecting switch or circuit breaker must be located within sight of the motor control device.

Motors: a) must be located within sight of their controller; b) must have their controller disconnecting means capable of being locked in the open position; c) or must have separate disconnecting means installed in the circuit within sight of the motor.

A controller for a motor in excess of two horsepower must be rated equal to but not in excess of the motor it services.

Employees who regularly work on or around energized electrical equipment or lines will be

instructed in cardio-pulmonary resuscitation (CPR) methods.

Employees will be trained on how to work on energized lines or equipment over 600 volts.

Noise

Noise levels are measured using a sound level meter or an octave bank analyzer and records kept. Engineering controls will be used to reduce excessive noise levels. When engineering controls are not feasible, administrative controls (i.e., worker rotation) will be used to minimize individual employee exposure to noise. An ongoing preventive health program will be utilized to educate employees in safe levels of noise, exposure, effects of noise on their health, and use of personal protection. Approved hearing protective equipment (noise attenuating devices) will be available to every employee working in areas where continuous noise levels exceed 85 dB. To be effective, ear protectors must be properly fitted and employees will be instructed in their use and care.

Flammable Liquids

Where flammable liquids are used, employees will be trained to deal with spillage, how it is to be cleaned, and stored.

Employees must be aware that an open flame or light near any flammable liquid is prohibited. "NO SMOKING" signs will be posted conspicuously.

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Piping Systems

Substances that are transported through piping need to be identified by color or labeling. Signs must be posted identifying the substance being transported through the pipes as to whether it is hazardous and where turn-off valves, connections and outlets are located. All tags used for labeling will be of a durable material with distinguishable and clearly written print.

When non-potable water is piped through a facility, outlets or taps, notices will be posted to alert employees that it is unsafe and not to be used for drinking, washing or personal use. When pipelines are heated by electricity, steam or other external sources, warning signs or tags placed at unions, valves, or other serviceable parts will be part of the system.

Material Handling

In the handling of materials, employees must know the following:

*There must be safe clearance for equipment through aisles and doorways.

*Aisle ways must be designated, permanently marked, and kept clear to allow unhindered passage.

*Motorized vehicles and mechanized equipment will be inspected daily or prior to use.

*Vehicles must be shut off and brakes must be set prior to loading or unloading.

*If dock boards (bridge plates) are used when loading or unloading operations are taking place between vehicles and docks, precautions must be observed.

*Trucks and trailers will be secured from movement during loading and unloading operations.

*Dock plates and loading ramps will be constructed and maintained with sufficient strength to support imposed loading.

*Hand trucks must be maintained in safe operating condition.

*Material Safety Data Sheets will be available to employees handling hazardous substances.

Transporting Employees and Materials

When employees are transporting either employees or materials, they must have an operator's license for that classification of vehicle and be certified or trained in the operation of that vehicle. For a safety program to be effective, they must also have knowledge of first aid courses and safety equipment, as well as the vehicle and how it operates.

As employees are transported by truck, provisions must be provided to prevent their falling from the vehicle. Vehicles should be in good working condition, inspected on a regular basis and must be equipped with lamps, brakes, horns, mirrors, windshields and turn signals in good working order. If the vehicle transports numerous individuals it must be equipped with handrails, steps, stirrups or similar devices, placed and arranged so that employees can safely mount or dismount.

Safety measures to ensure passenger safety should be observed at all times.

Ergonomics

With the introduction of computers into the workplace, new areas of physical debilitation have been recognized.

These new potential hazards have required a redesigning of both the workplace and how employees work.

Furniture will be adjustable, positioned and arranged to minimize strain on all parts of the body. The glare of a computer screen will be minimized by a glare screen to prevent eye strain. Repetitive motions can harm, back, shoulders, neck, wrists and other parts of the body, so employees will not proceed with a task when they are physically feeling impairment.

Safety Posters

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Grace Consulting Inc. is required to post certain employment related information. The required information is maintained in the shop where employees can find the following required posters:

*Various state and federal orders regulating the Wages, Hours and Working Conditions

*Anti-Discrimination Poster

*Equal Employment Opportunity is the Law (EEOC form)

*OSHA Safety and Health Protection on the Job

*Notice of Workers Compensation Carrier

*Notice to Employees: Unemployment Insurance and Disability Insurance

*Notice: Employee Polygraph Protection Act (form WH 1462)

*Access to Medical and Exposure Records

In addition to some of the above listed notices, a copy of this injury prevention program, a log and summary of Occupational Injuries and Illnesses, a copy of Grace Consulting Inc. code of Safe Work Practices and a Fire Prevention and Evacuation Plan will be available.

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Material Safety Data Sheets for Grace Consulting Inc.'s premises or worksites are available in the vehicle or office. When employees are required to work on the premises of any client, check with the site safety coordinator or supervisor for the exact location of the MSDS information.

In addition to these required safety postings, emergency numbers are maintained in the vehicle.

In most cases of real emergency call 911. State your name, the nature of the emergency, and exact location of the injury. Answer all questions completely. DO NOT use 911 for routine or non-emergency calls to police or fire departments.

Licenses and Permits

In addition to other postings required by law, Grace Consulting Inc. maintains a copy of all necessary business licenses, permits, and notices required by the National Labor Relations Board or other governmental bodies, notices of citations during abatement periods, and other required information which are posted during the appropriate times in the shop.

Personal Protective Equipment Clothing

1. Where there is a danger of flying particles or corrosive materials, employees must wear protective

goggles and/or face shields provided [or approved] by Grace Consulting Inc..

2. Employees are required to wear safety glasses at all times in areas where there is a risk of eye injuries such as punctures, contusions or burns.

3. Employees who need corrective lenses are required to wear only approved safety glasses, protective goggles, or other medically approved precautionary procedures when working in areas with harmful exposures, or risk of eye injury.

4. Employees are required to wear protective gloves, aprons, shields and other means provided in areas where they may be subject to cuts, corrosive liquids and/or harmful chemicals.

5. Hardhats must be worn in areas subject to falling objects, and at all times while at plant sites.

6. Appropriate footwear must be worn in an area where there is any risk of foot injuries from hot, corrosive, poisonous substances, falling objects, crushing or penetrating action.

7. When necessary employees must use the approved respirators which are provided for regular and emergency use.

8. All safety equipment must be maintained in sanitary condition and ready for use. Report any defective equipment immediately.

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9. Eye wash is located at all locations where work is being performed. If any irritant gets into an employee's eyes, call for medical assistance immediately and flush the eye out with clean water.

10. A shower may be provided for emergencies. Ask your supervisor for more details on use of this facility if available.

11. Food may not be eaten in work areas, or in places where there is any danger of exposure to toxic materials or other health hazards. Ask your supervisor to identify safe eating places.

12. In cases where the noise level exceeds 85 db, ear protection is required.

13. In cases of cleaning toxic or hazardous materials, protective clothing provided must be worn.

Hardhats

At Grace Consulting Inc., hardhats are required at all times, in designated areas, when appropriate.

There was a time, about one hundred years ago, when no one wore a hardhat. But, over time, the value of hardhats to save lives was firmly proven, so that the entire industry now accepts this safety device as a natural article of clothing, like a football player wearing a helmet during a game.

Sometimes a person fails to wear a hardhat, either through forgetfulness or through underestimating the risk of head injury which can be prevented by wearing one. Remember that all it takes is a carelessly dropped tool or piece of material coming down on your head to cause severe injury or even death. There are a number of workers disabled with various type of head injuries and vision problems because they didn't wear a hardhat.

When you wear a hardhat, wear it right. Keep it squarely on your head with the inside band properly adjusted. See you supervisor if you're having trouble adjusting the hardhat.

Work Environment, General

Work sites must be cleaned up during and at the end of your shift. Work surfaces must be kept dry or appropriate means taken to assure the surfaces are slip-resistant. Spills must be cleaned up immediately. All combustible scrap, debris and waste must be stored safely and removed promptly. Combustible dust must be cleaned up with a vacuum system to prevent the dust from going into suspension. The accumulated combustible dust must be removed routinely. Metallic or conductive dust must be prevented from entering or accumulating on or around electrical enclosures or equipment.

Waste containers must be covered. Oily and paint soaked rags are combustible and should be discarded in sealable metal containers only.

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All oil and gas fired devices should be equipped with flame failure controls that will prevent flow of fuel if pilots or main burners are not working. Ask your supervisor where these controls are located.

Make sure all pits and floor openings are either covered or otherwise guarded.

Walkways

All aisles and passageways must be kept clear. Also, aisles and passageways should be clearly marked. Wet surfaces must be covered with non-slip material and all holes properly covered or marked with warning guards.

All spills must be cleaned up immediately, and a caution sign placed on all wet or drying surfaces.

In cases of passageways used by forklifts, trucks or other machinery, use a separate aisle for walking, if available. If no separately marked aisle is available, use extreme caution. Remember, walking in a passageway used by machinery is like walking in the middle of a street used by cars: You may have the right of way, but the heavier vehicle can't always see you and can't always stop in time. The key to moving around in such circumstances is to stop, look and listen and then to move when there is no danger. Make eye contact with the drivers of moving vehicles so that you know that they know you are there.

Equipment must be properly stored so that sharp edges do not protrude into walkways. Changes in elevations must be clearly marked, as must passageways near dangerous operations like welding,

machinery operation or painting. If there is a low ceiling, a warning sign must be posted. If the walkway or stairway is more than thirty inches above the floor or ground, it must have a guardrail.

If an employee is aware of any breach of these standards, please inform the workplace supervisor.

Floor and Wall Openings

Be careful when working near floor and wall openings. All floor openings (holes) should be guarded by a cover, guardrail or equivalent barrier on all sides except at the entrance to stairways and ladders. Toe boards must be installed around the edges of a permanent floor opening. Skylights must be able to withstand at least 200 pounds pressure. Glass used in windows, doors, and walls (including glass block) must be able to withstand a human impact, and if required by code, be shatterproof "safety glass." Before beginning work at a new location, inspect it to insure that all floor openings which must remain open, such as floor drains, are covered with grates or similar covers. In roadways and driveways, covers with capacity to support without failure twice the maximum axle load of the largest vehicle expected to cross over the cover shall be used. In office buildings, fire resistive construction requires that the doors and hallway closures be properly rated and be equipped with self-closing features. Be sure that there are at least two fire emergency exits accessible from your location, at all times.

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Work Area, General

*Fire extinguishers must remain accessible at all times.

*Means of egress should be kept unblocked, well-lighted and unlocked during work hours. Excessive combustibles may be not stored in work areas.

*Aisles and hallways must be kept clear at all times. Designated employees have been trained to respond to a fire or other emergency. Workplaces are to be kept free of debris, floor storage and electrical cords.

*Adequate aisle space is to be maintained. File cabinet drawers should be opened one at a time and closed when work is finished.

*Proper lifting techniques are to be used by employees to avoid over exertion and strain when carrying loads. No alcohol or any intoxicating substance may be consumed prior to or during work.

Driving

Drive safely. If vehicles are used during the work day, seat belts and shoulder harnesses are to be worn at all times. Vehicles must be locked when unattended to avoid criminal misconduct. Do not exceed the speed limit. Vehicles must be parked in legal spaces and must not obstruct traffic. Defensive driving must be practiced by all employees. Employees should park their vehicles in well-lighted areas at/or near entrances to avoid criminal misconduct.

Vehicle Maintenance

Work safely when repairing vehicles. Routine maintenance will be conducted as needed. Prior to operating a company vehicle you must first perform a inspection of the vehicle to assure that there are no deficiencies in regards to safety, fluid levels and cosmetic issues.

Employees are strictly forbidden from taking a position directly over or in front of a tire while it's being inflated. Proper lifting techniques must be used by employees to avoid over-exertion when lifting packages.

Cleanliness

All work sites must be clean and orderly. All work surfaces must be kept dry or appropriate means taken to assure that surfaces are slip-resistant. All spill materials or liquids should be cleaned up immediately and combustible scrap, debris and waste stored safely and removed from the work site promptly.

Any accumulations of combustible dust must be routinely removed from elevated surfaces including the overhead structure of buildings. Combustible dust should be cleaned up with a vacuum system to prevent the dust going into suspension. Metallic or conductive dust must be prevented from entering or accumulating on or around electrical enclosures or equipment.

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Covered metal waste cans are provided for oily and paint-soaked waste. Use them. All oil and gas fired devices must be equipped with flame failure controls that will prevent flow of fuel if pilots or main burners are not working.

Washing facilities are provided, so wash your hands after handling materials.

Tool Maintenance

Faulty or improperly used hand tools are a safety hazard. All employees shall be responsible for ensuring that tools and equipment (both company and employee-owned) used by them or other employees at their workplace are in good condition. Hand tools such as chisels, punches, etc., which develop mushroom heads during use, must be reconditioned or replaced as necessary. Broken or fractured handles on hammers, axes and similar equipment must be replaced promptly. Worn or bent wrenches should be replaced regularly. Appropriate handles must be used on files and similar tools.

Appropriate safety glasses, face shields, etc., must be worn while using hand tools or equipment which might produce flying materials or be subject to breakage. Eye and face protection must be worn when driving in nails.

Check your tools often for wear or defect. Jacks must be checked periodically to assure they are in good operating condition. Tool handles must be wedged tightly into the heads of tools. Tool cutting edges should be kept sharp enough so the tool will move smoothly without binding or

skipping. When not in use, tools should be stored in a dry, secure location.

Ladder Safety

All employees must complete ladder safety training prior to using any company ladder. Check ladders each and every time before you climb. Ladders should be maintained in good condition: joints between steps and side rails should be tight; hardware and fittings securely attached; and movable parts operating freely without binding or undue play. Non-slip safety feet are provided on each ladder. Ladder rungs and steps should be free of grease and oil. Employees are prohibited from using ladders that are broken, missing steps, rungs, or cleats, or that have broken side rails or other faulty equipment.

It is prohibited to place a ladder in front of doors opening toward the ladder except when the door is blocked open, locked or guarded. It is prohibited to place ladders on boxes, barrels, or other unstable bases to obtain additional height. Face the ladder when ascending or descending.

Be careful when you climb a ladder. Do not use the top step of ordinary stepladders as a step. When portable rung ladders are used to gain access to elevated platforms, roofs, etc., the ladder must always extend at least 3 feet above the elevated surface and be secured.

It is required that when portable rung or cleat type ladders are used, the base must be so placed that slipping will not occur, unless it is lashed or otherwise held in place.

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All portable metal ladders must be legibly marked with signs reading "CAUTION". Employees are prohibited from using ladders as braces, skids, gin poles, or for other than their intended purposes. Only adjust extension ladders while standing at a base (not while standing on the ladder or from a position above the ladder). Metal ladders should be inspected for tears and signs of corrosion.

Portable Power Tools

Portable power tools pose a special danger to employees because they are deceptively small and light, yet they can do great bodily harm if used improperly or poorly maintained. These rules apply to all power tools, but are especially important when handling portable saws, drills and power screw drivers.

Check your equipment before you use it. All grinders, saws and similar equipment should be equipped with appropriate safety guards. Power tools should not be used without the correct shield, guard, or attachment, recommended by the manufacturer.

Portable circular saws must be equipped with guards above and below the base shoe. Circular saw guards should be checked periodically and before each use to assure they are not wedged up, thus leaving the lower portion of the blade unguarded.

All rotating or moving parts of equipment should be guarded to prevent physical contact. All cord-connected, electrically-operated tools and equipment should be effectively grounded or of the

approved double insulated type. Effective guards must be in place over belts, pulleys, chains, sprockets, on equipment such as concrete mixers, air compressors, etc. If portable fans are provided, they must be equipped with full guards or screens having openings 1/2 inch or less.

Do not attempt to lift heavy objects without proper equipment. Hoisting equipment will be made available for lifting heavy objects, with hoist ratings and characteristics appropriate for the task.

Power tools are either battery operated or wired. If battery operated, don't under-estimate their power. A small electric drill or power screw driver can cause a severe injury if it lands in the wrong place. While not usually a shock hazard, the battery pack contains toxic chemicals and does emit a low voltage electric current. Don't drop or incinerate the battery pack, or a tool with a self-contained power source.

Hard wired equipment can be portable or fixed. Typically used with extension cords, the more powerful hard wired equipment presents a double safety problem: the actual equipment plus its electrical power source. Ground-fault circuit interrupters must be provided on all temporary electrical 15 and 20 ampere circuits used during periods of construction. Pneumatic and hydraulic hoses on power-operated tools should be checked regularly for deterioration or damage.

Combustible Materials

All combustible scrap, debris and waste materials (oily rags, etc.) must be stored in covered metal receptacles and removed from the work site promptly. Proper storage to minimize the risk of fire, including spontaneous combustion must be practiced. Only approved containers and tanks are to be used for the storage and handling of flammable and combustible liquids. All connections on drums and combustible liquid piping, vapor and liquid must be kept tight. All flammable liquids should be kept in closed containers when not in use (e.g., parts-cleaning tanks, pans, etc.).

Bulk drums of flammable liquids must be grounded and bonded to containers during dispensing.

Storage rooms for flammable and combustible liquids should have mechanical or gravity ventilation. Liquefied petroleum gas must be stored, handled, and used in accordance with safe practices and standards.

“No smoking” signs must be posted on liquefied petroleum gas tanks. Liquefied petroleum storage tanks should be guarded to prevent damage from vehicles. All solvent wastes and flammable liquids should be kept in fire-resistant, covered containers until they are removed from the work site.

Vacuuming should be used whenever possible rather than blowing or sweeping combustible dust. Fire separators should be placed between containers of combustibles or flammables when stacked one upon another to assure their support and stability. Fuel gas cylinders and oxygen cylinders must be separated by a distance, fire resistant barriers, etc., while in storage.

Fire extinguishers are selected for the types of materials and placed in areas where they are to be used. These fire extinguishers are classified as follows:

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Class A - Ordinary combustible materials fires.

Class B - Flammable liquid, gas or grease fires.

Class C - Energized-electrical equipment fires.

Appropriate fire extinguishers must be mounted within 75 ft. of outside areas containing flammable liquids, and within 10 ft. of any inside storage area for such materials. All extinguishers must be serviced, maintained and tagged at intervals not to exceed one year. Extinguishers should be placed free from obstructions or blockage. All extinguishers must be fully charged and in their designated places unless in use.

"NO SMOKING" rules will be enforced in areas involving storage and use of hazardous materials. "NO SMOKING" signs have been posted where appropriate in areas where flammable or combustible materials are used and/or stored. Safety cans must be used for dispensing flammable or combustible liquids at point of use. All spills of flammable or combustible liquids must be cleaned up promptly.

Storage tanks should be adequately vented to prevent the development of excessive vacuum or pressure as a result of filling, emptying, or atmosphere temperature changes. Storage tanks are equipped with emergency venting that will relieve excessive internal pressure caused by fire exposure.

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FIRST AID - RESPONSIBILITIES

Project safety representatives are responsible for establishing first aid and medical services for the treatment of occupational injuries and illnesses. In the absence of a safety representative, the RSO, Aaron Conner or designated representative is responsible for this activity.

MEDICAL TREATMENT

Medical treatment provided on a project shall be in accordance with protocols established by a licensed physician. Personnel who render medical treatment shall be certified to perform these services and have the sponsorship of a licensed physician or medical professional in accordance with established laws.

FIRST AID TREATMENT

Personnel who provide first-aid services shall have current certifications from recognized agencies such as the American Red Cross, Heart Association, Medic First Aid or equivalent. Under no circumstances shall first-aid trained personnel render medical treatment.

TRANSPORTATION

A representative of Grace Consulting Inc. is required to be present during the transportation and treatment of company personnel.

During emergency situations when an employee requires medical treatment for an occupational injury or illness, the local emergency ambulance shall be used to provide transportation for that employee unless other arrangements have been made. In all other cases a representative of Grace Consulting Inc. will transport personnel to clinics and medical facilities.

MODIFIED WORK (LIGHT DUTY POLICY)

It is the policy of Grace Consulting Inc. to provide modified work to persons who have been injured on the job or become ill because of an occupational exposure. Work provided for employees will be compatible with their work restrictions, and will not expose the employee to additional harm or injury.

Employees who are injured or become ill must provide the company with a written medical statement of release from their treating physician or other licensed provider. Upon return to work, this release must be submitted to the Safety Manager or authorized company representative who will coordinate with Health Care Provider.

The policy of Grace Consulting Inc. is to not schedule persons on modified duty work status to work overtime. Persons who are permitted to return to work on a modified duty status will be scheduled to work their normal work schedule not including any overtime hours they would have normally worked unless the supervisor or other responsible management person directs otherwise.

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NON-OCCUPATIONAL ILLNESSES AND INJURIES

Employees who are injured or become ill at home or during non-work hours must provide Grace Consulting Inc. with a written medical release without restrictions upon returning to work. Employees who have been injured severely or have had a contagious illness must provide Grace Consulting Inc. with written proof that they have recovered from their condition. If an injury or illness is of a serious nature the RSO, Aaron Conner and Human Resources must be consulted before a person is permitted to return to work.

RETURN TO WORK POLICY

In all cases employees who have sustained an on-the-job injury or illness must provide written medical proof of their condition and ability to perform their work upon their return to work.

FIRST AID LOG

Any injury or illness that is reported to a first-aid facility or medical facility must be recorded on a First-Aid Log form. This includes non-occupational cases and injuries or illnesses treated that involve vendors, suppliers, Contractors/Subcontractors, client personnel, and any other third party. First-Aid Logs or any portion of a log are not for general distribution. Requests for such information shall be processed by the RSO, Aaron Conner.

MEDICATIONS

Employees who are taking over-the-counter and prescription medications must report such usage to their immediate supervisor or the RSO.

First Aid Kits

First-aid kits and required contents are maintained in a serviceable condition. Unit-type kits have all items in the first-aid kit individually wrapped, sealed, and packaged in comparable sized packages. The commercial or cabinet-type kits do not require all items to be individually wrapped and sealed, but only those which must be kept sterile. Items such as scissors, tweezers, tubes of ointments with caps, or rolls of adhesive tape, need not be individually wrapped, sealed, or disposed of after a single use or application. Individual packaging and sealing shall be required only for those items which must be kept sterile in a first-aid kit.

First-aid kits shall contain at least the following items:

10 Package Kit:

1 Pkg. Adhesive bandages, 1" (16 per pkg.)

1 Pkg. Bandage compress, 4" (1 per pkg.)

1 Pkg. Scissors* and tweezers (1 each per pkg.)

1 Pkg. Triangular bandage, 40" (1 per pkg.)

1 Pkg. Antiseptic soap or pads (3 per pkg.)

5 Pkgs. of consulting physician's choice

16 Package Kit:

1 Pkg. Absorbent gauze, 24" x 72" (1 per pkg.)

1 Pkg. Adhesive bandages, 1" (16 per pkg.)

2 Pkgs. Bandage compresses, 4" (1 per pkg.)

1 Pkg. Eye dressing (1 per pkg.)

1 Pkg. Scissors* and tweezers (1 each per pkg.)

2 Pkgs. Triangular bandages, 40" (1 per pkg.)

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1 Pkg. Antiseptic soap or pads (3 per pkg.)

7 Pkgs. of consulting physician's choice

24 Package Kit:

2 Pkgs. Absorbent gauze, 24" x 72" (1 per pkg.)

2 Pkgs. Adhesive bandages, 1" (16 per pkg.)

2 Pkgs. Bandage compresses, 4" (1 per pkg.)

1 Pkg. Eye dressing (1 per pkg.)

1 Pkg. Scissors* and tweezers (1 each per pkg.)

6 Pkgs. Triangular bandages (1 per pkg.)

1 Pkg. Antiseptic soap or pads (3 per pkg.)

9 Pkgs. of consulting physician's choice

36 Package Kit:

4 Pkgs. Absorbent gauze, 24" x 72" (1 per pkg.)

2 Pkgs. Adhesive bandages, 1" (16 per pkg.)

5 Pkgs. Bandage compresses, 4" (1 per pkg.)

2 Pkgs. Eye dressing (1 per pkg.)

1 Pkg. Scissors* and tweezers (1 each per pkg.)

8 Pkgs. Triangular bandages, 40" (1 per pkg.)

1 Pkg. Antiseptic soap or pads (3 per pkg.)

13 Pkgs. of consulting physician's choice

Scissors shall be capable of cutting 2 layers of 15 oz. cotton cloth or its equivalent. The first-aid kits are maintained at the ten, sixteen, twenty-four or thirty-six package level.

Where the eyes or body of any person may be exposed to injurious chemicals and/or materials,

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suitable facilities for quick drenching or flushing of the eyes and body are provided, within the work area, for immediate emergency use. A poster shall be fastened and maintained either on or in the cover of each first- aid kit and at or near all phones plainly stating, the phone numbers of available doctors, hospitals, and ambulance services within the district of the work site.

First Aid Station

If a fixed establishment employs more than 200 employees at one central location, First-aid stations shall be located as close as practicable to the highest concentration of personnel.

First-aid stations shall be well marked and available to personnel during all working hours.

One person holding a valid first-aid certificate shall be responsible for the proper use and maintenance of the first-aid station.

First-aid stations shall be equipped with a minimum of two first-aid kits, the size of which shall be dependent upon the number of personnel normally employed at the work site. One first-aid kit may be a permanent wall-mounted kit, but in all cases the station shall be equipped with at least one portable first-aid kit.

When required by the circumstances, the station shall be equipped with two wool blankets and a stretcher in addition to first-aid kits.

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A roster, denoting the telephone numbers and addresses of doctors, hospitals and ambulance services available to the work site, shall be posted at or near each first-aid station.

First-aid kits shall be checked and maintained (if necessary) every week.

First-aid stations and/or portable first-aid kits used at Grace Consulting Inc. are located in the vehicle.

Chapter 3

Housekeeping

Clean Work Areas

All areas controlled by Grace Consulting Inc. must be kept in orderly and clean condition and used only for activities or operations for which they have been approved. The following specific rules must also be followed:

Keep stairs, corridors, and aisles clear. Traffic lanes and loading areas must be kept clear and marked appropriately.

Store materials in workrooms or designated storage areas only. Do not use hallways or equipment rooms as storage areas.

Do not allow exits, passageways, or access to equipment to become obstructed by either stored materials or materials and equipment that is being used.

Arrange stored materials safely to prevent tipping, falling, collapsing, rolling, or spreading - that is, any undesired and unsafe motion.

Do not exceed the rated floor capacity of stored material for the area. The load limit and the maximum height to which material may be stacked must be posted.

Place materials such as cartons, boxes, drums, lumber, pipe, and bar stock in racks or in stable piles as appropriate for the type of material.

Store materials that are radioactive, fissile, flammable, explosive, oxidizing, corrosive, or pyrophoric only under conditions approved for the specific use by the Responsible Safety Officer.

Segregate and store incompatible materials in separate locations.

Remove items that will not be required for extended periods from work areas and put them in separate storage areas.

Temporary equipment required for special projects or support activities must be installed so that it will not constitute a hazard. A minimum clearance of 36 inches must be maintained around electrical power panels. Wiring and cables must be installed in a safe and orderly manner, preferably in cable trays. Machinery and possible contact points with electrical power must have appropriate guarding. The controls for temporary equipment must be located to prevent inadvertent actuation or awkward manipulation. When heat-producing equipment must be installed, avoid accidental ignition of combustible materials or touching of surfaces above 60 degrees C (140 F). Every work location must be provided with illumination that meets Cal/OSHA requirements. Evaluation of illumination quality and requirements is made by the Responsible Safety Officer, but the supervisor of an area is responsible for obtaining and maintaining suitable illumination.

Areas without natural lighting and areas where hazardous operations are conducted must be provided with enough automatically activated emergency lighting to permit exit or entry of personnel if the primary lighting fails.

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Chapter 4

Confined Spaces

INTRODUCTION

The hazards that may be present in a confined space are not easily seen, smelled, heard or felt, but can represent deadly risks. The worker who enters confined spaces may be, or often is, exposed to multiple hazards due primarily to ignorance or negligence in the enforcement of safety regulations. This ignorance and neglect has led to countless deaths by asphyxiation, fire and/or explosion, and by fatal exposure to toxic materials.

A permit-required confined space is one in which dangerous air contaminants may be generated and may not be removed by ventilation. When an employee works in this type of environment, the chance exists that atmospheres present may be oxygen deficient / enriched, combustible or toxic. Prevention of injuries to the life and health of workers requires that they be properly trained and well equipped to recognize, understand and control the hazards they could encounter. In the process of identifying a confined space, the supervisor in charge should always assume that a hazard is present.

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RESPONSIBILITIES

Employees Who Enter Confined Spaces

1. Appoint an individual(s) to serve as authorized individual(s) to perform the required monitoring and to issue entry permits.
2. Assure that the authorized individual(s) receive all the necessary training to effectively discharge their duties.
3. Assure that all individuals who enter confined spaces receive the required training.
4. Assure that all necessary equipment and supplies to effectively protect the health and safety of the workers are provided and maintained in a good state of repair.
5. Develop departmental policies that will assure that all confined space entries are performed in compliance with this written program and all applicable regulations.
6. Develop departmental policies that will assure that all required records are maintained.
7. Department heads, or designated agents, shall be responsible for ensuring that the confined spaces under their control have been posted.

Responsible Safety Officer

1. Develop a written control plan and perform an annual review to determine necessary revisions.
2. Monitor the compliance of the respective departments with the plan and regulations to include compliance with training, monitoring, permitting, record keeping, etc.
3. Provide guidance and technical assistance to departments in the design and selection of appropriate engineering and work practice controls.
4. Provide guidance and technical assistance to departments in the selection of the most appropriate types and quantities of personal protective equipment.
5. Provide consultation to the departments to assist them in fulfilling their training program.
6. Promote compliance with the OSHA Standard.
7. Provide a means in which employees can direct suggestions, complaints and concerns regarding the campus Confined Space Entry Program.
8. Identify, log, and classify confined spaces before entry. This information shall be communicated to the entrants.

Employee

1. Participate willingly in all training programs offered by Grace Consulting Inc. and learn as much as possible about the confined space entry protection procedure.
2. Abide by all work rules and apply to the fullest extent possible the safety and health precautions specified by Grace Consulting Inc..
3. Report any problems that are observed, which could compromise health and safety, to the RSO or through the immediate supervisor.

CONFINED SPACE HAZARDS

Types of Confined Spaces

1. Those of such design that restrict the movement of air in such a manner that ventilation may be inadequate.
2. Enclosed areas with very limited openings for entry and exit. Examples of open-topped confined spaces are pits, degreasers, and certain storage tanks. Gases that are heavier than air (such as butane and propane) can remain in low places of these type spaces where they are difficult to remove. Other hazards may also develop due to the nature of the work being involved or by a residue remaining in the space.
3. Confined spaces may contain an engulfment or entrapment hazard. See the definition section of this document for a more detailed explanation of these terms. Confined spaces, such as trenches, sewers, tanks or silos usually have limited access and are considered the most hazardous. Gases, such as carbon dioxide and propane, that are heavier than air, may lie in

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recessed areas for hours or even days. Because many of these gases are odorless, the hazard may be overlooked with fatal results. At the opposite end, gases which are lighter than air may be trapped at the top of a space where access is from the bottom.

HAZARDOUS ATMOSPHERES

Flammable Atmosphere

A flammable atmosphere generally arises from an enriched oxygen atmosphere, vaporization of a flammable liquid, chemical reaction, a by-product of work, heavy concentrations of combustible dust, and even desorption (release of entrapped substances) of chemicals from inner linings of confined spaces.

An atmosphere becomes flammable when the ratio of oxygen to combustible material in the air is neither too rich nor too lean for combustion to occur. Combustible gases or vapors will accumulate when there is inadequate ventilation in areas such as confined spaces. Flammable atmospheres may also be formed by chemical reactions. These occur when surfaces are initially exposed to the atmosphere or when chemicals combine to form flammable gases.

Combustible dust concentrations are usually found during loading, unloading, or conveying coal, grain, fertilizers or other combustible materials. The explosion from these concentrations occurs when high amounts of static electricity accumulates at low humidity readings and causes a spark which ignites the combustible mixtures present in the air. Also, desorption of chemicals from the inner linings of surfaces of a tank or vessel may produce a flammable mixture. An example of desorption can occur when propane is emptied from a tank. After the removal, the walls may desorb some remaining gas and create a flammable mixture in the tank.

Toxic Atmospheres

Toxic atmospheres can be created from almost any gas, vapor, or airborne dust. Examples of the source of these substances include:

1. The manufacturing process itself.
2. The product being stored.
3. The operation being performed in the confined space (e.g. welding or brazing certain metals).
4. Leakage of lines within the space.
5. Leakage of substances into the space from the outside.

Certain gases are prevalent in various vessels; one is carbon monoxide (CO). This odorless and colorless gas has approximately the same density as air and is formed from the incomplete combustion of such materials as wood, oil, gas, etc. It has poor warning signals as to its level of intoxification. Higher levels (more than 1,000 ppm) can occur without warning and are almost always fatal. Another prevalently released gas is hydrogen sulfide (H_2S). Hydrogen sulfide may be formed several ways, but the most common way occurs when hydrochloric acid is combined with iron sulfide,

as in the cleaning of vessel walls. Another common source of hydrogen sulfide is microbial breakdown of organic material, such as sewage, manure, garbage, etc.

Irritant (Corrosive) Atmospheres

Irritant or corrosive atmospheres can be divided into primary and secondary groups. Primary irritants exert no systemic toxic effects. The adverse effect exerted by them on the respiratory tract is direct irritation to the tissue. Examples of these are hydrochloric acid, sulfuric acid, and ammonia. A secondary irritant produces toxic effects plus surface irritation. Examples of this type are benzene and carbon tetrachloride. Prolonged exposure at high levels of irritant atmospheres may produce a general weakening of the nerve endings in the upper respiratory tract. The danger is that the worker generally is not aware of the onset of distress.

Oxygen-Deficient or Oxygen-Enriched Atmosphere

An oxygen-deficient atmosphere is caused when the oxygen (O_2) level of an atmosphere depreciates below 19.5% by either consumption or displacement. The consumption of O_2 takes place during combustion of flammable substances, such as in welding. Oxygen may also be consumed during chemical reactions, such as the formation of iron oxide (rust). A second factor in an asphyxiating atmosphere is displacement by another gas. One such example of displacement is by "inerting" a tank by placing nitrogen in it. The total displacement of O_2 will cause immediate collapse and death. Since these gases are colorless and odorless, they pose an immediate hazard unless ventilation and oxygen measurements are carried out. A confined space should never be purged with nitrogen or other gas used in welding as this could lead to an oxygen-deficient atmosphere.

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An oxygen-enriched atmosphere contains greater than 23.5% oxygen. The main hazard associated with an oxygen-enriched atmosphere is fire. Combustible materials burn much faster in the presence of an oxygen-enriched environment. Some materials which are generally not considered fire hazards will burn rapidly when the oxygen concentration is increased. A contaminated atmosphere must never be purged with oxygen as this would greatly increase the fire hazard in the space.

DEFINITIONS

Acceptable Entry Condition

Means the conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter and work within the space.

Atmosphere

Refers to the gases, vapors, mists, fumes, and dusts within a confined space.

Attendant

Means an individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant duties assigned in the employer's permit space program.

Authorized Entrance

Means an employee who is authorized by the employer to enter a permit space.

Combustible Dust

A dust capable of undergoing combustion or burning when subjected to a source of ignition.

Confined Space

Refers to a space that (1) Is large enough and so configured that an employee can bodily enter and perform assigned work; (2) Has limited or restricted means of entry or exit; and (3) Is not designed for continuous employee occupancy.

Emergency

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

Engulfment

Engulfment is the surrounding and effective capture of a person by a liquid or finely (flowing) solid substance that can be aspirated or cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

Entrapment

A condition where an uninjured person is unable to remove themselves, or any body part, from a confined space. Entrapment occurs as a result of the configuration of a confined space and is often associated with converging or convoluted surfaces.

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Entry

Entry is the action by which a person passes through an opening into a permit-required 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.

Entry Permit

The entry permit is the written or printed document that is provided by the employer to allow and control entry into a permit space.

Entry Supervisor

The entry supervisor (such as the employer, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required.

Flammable or Explosive Limits

When flammable vapors are mixed with air in the proper proportions, the mixture can be ignited. The range of concentrations over which the flash will occur is designated by the Lower Explosive Limit (LEL) and the Upper Explosive Limit (UEL). Flammable limits (explosive limits) are expressed as percent volume of vapor in air.

Hazardous Atmosphere

A hazardous atmosphere may expose employees to the risk of death, incapacitation,

impairment of ability to self-rescue, injury, or acute illness from one or more of the following causes:

1. Flammable gas, vapor, or mist in excess of 10% of the lower flammable limit.
2. Airborne combustible dust at a concentration that meets or exceeds the lower flammable limit.
3. Atmospheric oxygen concentration below 19.5% or above 23.5%
4. Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published. Note: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, and impairment of ability or self-rescue, injury or acute illness due to its health effects is not covered by this provision.
5. Any other atmospheric condition that is immediately dangerous to life or health.

Hot Work

Any work involving burning, welding, riveting, or similar fire producing operations as well as work which produces a source of ignition, such as drilling or abrasive blasting. Immediately Dangerous to Life or Health

Means any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individuals' ability to escape unaided from a permit space.

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Inerting

Displacement of an area's atmosphere by a non-reactive gas (such as nitrogen) to such an extent that the resulting atmosphere is non-combustible.

Isolation

The process whereby the confined space is removed from service and completely protected against an inadvertent release of material. Examples are blanking off lines, lockout of electrical systems, and disconnecting mechanical linkages.

Non-Permit Required Confined Space

A non-permit confined space means a confined space that does not contain a recognized acute hazard or does not have the potential to contain, any hazard causing death or serious physical harm.

Oxygen Deficiency

An atmosphere where the oxygen concentration is less than 19.5%.

Oxygen Enrichment

An atmosphere where the oxygen concentration is greater than 23.5%.

Permissible Exposure Limit (PEL)

The maximum 8 hours, time weighted average of an airborne contaminant to which an employee may be exposed. At no time shall the exposure level exceed the ceiling

concentration for the contaminants as listed in 29 CFR 1910 Subpart Z.

Permit-Required Confined Space

A permit-required confined space has one or more of the following characteristics:

1. Contains or has a potential to contain a hazardous atmosphere;
2. Contains a material that has the potential for engulfing an entrant;
3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
4. Contains any other recognized serious safety or health hazard.

Permit System

The permit system is the employer's written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

Purging

The method by which gases, vapors, or other airborne impurities are displaced from a confined space.

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Retrieval system

The retrieval system (including a retrieval line, full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

Threshold Limit Value (TLV)

An occupational exposure guide published by the American Conference of Government Industrial Hygienist (ACGIH), extensively used to judge acceptable exposure levels to hazardous substances.

GENERAL SAFETY HAZARDS

1. Mechanical

   If the activation of any electrical or mechanical equipment could cause injury to persons in a confined space, each piece of equipment shall be manually isolated and inactivated (locked out) before workers are allowed to enter a confined space. Also, there may be other hazards associated with confined spaces, such as flammable vapors or gases, in which special precautions must be taken. Preventing vapor leaks, flashbacks, and other hazards by closing valves is not sufficient. All pipes should be physically disconnected or isolation blanks bolted in place. Some tanks or vessels must also be blanked off and a blanket of inert gas placed within the tank to prevent a build-up of flammable vapors.

2. Communications for Permit-Required Confined Spaces

Communication between the worker and personnel outside is of the utmost importance. If a worker becomes unconscious or suddenly feels distressed, an injury may quickly become a fatality without proper communication. Communications should include visual monitoring at a minimum. Frequently, there are situations where visual monitoring is impossible and communication by means of an electronic communication system will be necessary.

3. Entry and Exit

The extent of the time required to enter and exit is of major significance as a physical limitation and is directly related to the potential hazard of the confined space. The extent of precautions taken and the standby equipment needed to maintain a safe work area will be determined by the means of access and rescue. The following should be considered:

1. Type of confined space to be entered
2. Access to the entrance
3. Number and size of openings
4. Barriers within the space
5. Occupancy load
6. Time required to exit confined space

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4. Physical Effects

A. Thermal Effects

When working in confined spaces, certain considerations must be taken to prevent conditions such as frostbite, hypothermia (excessive body heat loss), and heat stress. The use of protective clothing for both hot and cold environments will add additional bulk to the worker and must be considered in allowing for movement in the confined space and also for exit time in emergencies.

B. Noise

Noise problems are usually intensified in a confined space because the interior tends to cause sound to reverberate and cause extremely high noise levels. This high noise level can sometimes cause hearing damage to workers and can create problems with communication between workers inside the confined space, and assisting workers outside the confined space. Hearing protection must be provided when the time-weighted sound level pressure exceeds 85 decibels.

C. General

Some physical hazards cannot be eliminated because of the nature of a confined space or the work to be performed. These hazards include such items as scaffolding, surface residues, and structural hazards. These hazards pose an almost unrecognizable threat

when compared to threats posed by oxygen deficiency, combustible or lethal gas pockets, engulfment, entrapment, etc. These lesser problems, however, account for more injuries because of oversight. A sample of these problems are slips and falls, reaction of incompatible materials, improper scaffolding, electrical shock, etc. Because of these hazards, careful planning must be given to the relationship between the internal structure, the exit, and the worker.

D. Medical Requirements

Medical requirements of employees who enter a confined space must be taken into consideration due to the increased hazard potential. In this type setting, employees must rely more heavily upon their physical, mental, and sensory attributes, especially under emergency conditions. In areas where the hazard potential is high, a person certified in CPR and First Aid should be in attendance.

E. Training

Training of employees for entering and working in confined spaces is required because of the potential hazards and the use of life-saving equipment. To ensure worker safety, the training program must be especially designed for the type of problems encountered. Instructional areas to be covered in the training program are:

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1. Potential dangers of confined space work
2. Emergency exit procedures
3. Use of respirators
4. First Aid and Cardio-Pulmonary Resuscitation
5. Lockout and Tagging procedures
6. Fire Protection
7. Communications
8. Air Quality Monitoring
9. Space Ventilation Procedures
10. Training employees in permitting requirements must be done by a qualified person or someone knowledgeable in all relevant aspects of confined space entry procedures. The qualified person must be proficient in the following areas:
    a. Types of confined spaces that employees will be entering
    b. Chemical and physical hazards
    c. Work practices and techniques

d. Testing requirements, permissible exposure limits, etc.

e. Safety equipment such as respirators, protective clothing, and other protection such as helmets and shields

f. Rescue procedures

g. Knowledge of applicable Federal, State, and Local regulations

h. Evaluation and test methods

The effectiveness of the training program can be determined by the qualified person to see if safe work practices are being followed and testing the employee for knowledge of the operations and hazards. Training shall be provided an approved source.

CONFINED SPACE IDENTIFICATION AND WARNING

All permit-required confined spaces located inside buildings shall be identified and posted with appropriate signs to discourage the entry of unauthorized individuals. Where possible, they shall be secured to prevent unauthorized entry. The RSO shall identify, classify, and log the location of confined spaces. A copy of the log shall be provided to the rescue service and to departments that have employees who enter confined spaces. Contractors that enter confined spaces shall be provided with a list of the confined spaces in the building or areas in which they will be working. If a location is encountered that appears to meet the definition of a confined space, and it is not posted as such nor does it appear on the log, contact the RSO.

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PERMIT RETENTION AND RECORD KEEPING

Individual departments should maintain a copy of these forms. Any records kept by the RSO shall be retained for the time period specified below. The following records shall be maintained:

1. Training. Information to include the date, location, instructor, content of course, name, and signature of trainee, etc. 3 years

2. Permits and pre-entry check lists. 3 years

3. Equipment calibration and maintenance log. 3 years

4. Confined space log. Indefinitely

EQUIPMENT

The RSO will provide and maintain at least one multi-channel gas detectors for use by Grace Consulting Inc. personnel. These units shall be calibrated per manufacturer's requirements. Departments may wish to purchase their own gas detectors or may borrow the detectors from the RSO. In addition, the RSO shall make available a single rescue tripod/winch, lifeline, and body harness for outside rescue.

CONTRACTORS

Contractors who enter confined spaces shall be apprised of this written program and the entry procedure. Grace Consulting Inc. shall inform the contractor of hazards present in the space, Grace Consulting Inc.'s experience, any precautions or procedures. When employees of Grace Consulting Inc. and the contractor enter a confined space together, the entry shall be coordinated to minimize hazards to the employees.

SPECIFIC PROCEDURES AND WORK PRACTICES

The Confined Space Entry procedure does not cover all possible situations or conditions that could be encountered. Additional or different safety features or procedures may be necessary for specific operations.

These procedures must be followed when entering confined spaces such as manholes, vaults, boilers, ductwork, vessels, etc. Its intent is to protect entering personnel against such hazards as oxygen deficiency, combustible gas and vapors, toxic gases and vapors, mechanical hazards, entrapment, etc.

Confined spaces may be closed on all sides, top and bottom, with entry provided through restricted openings, or may be open completely on one side, top or bottom. Entry is defined as breaking the plane of the confined space with any part of the body.

Permit-required confined spaces are of greater hazard than non-permit required confined space. The entry points to permit-required confined spaces located within a building are marked with red stenciled signs stating: Danger - Permit-Required Confined Space, Do Not Enter.

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It is important to realize that a non-permit required confined space may require re-classification based on the type of work to be performed. For example, an underground vault may be classified as non-permit required; however, if an employee will be applying a solvent within this space, it could be upgraded to a permit-required confined space.

WARNING: SMOKING IS NOT PERMITTED IN A CONFINED SPACE OR NEAR THE ENTRANCE TO A CONFINED SPACE AT ANY TIME. THIS IS ESPECIALLY IMPORTANT WHEN THE SPACE IS BEING INITIALLY OPENED AND THE ATMOSPHERE TESTED.

WARNING: ALL ENERGY SOURCES MUST BE LOCKED OUT OR TAGGED OUT BEFORE ENTRY, UNLESS HOT WORK PERMITS HAVE BEEN AUTHORIZED BY THE SUPERVISOR.

I. Before entering the confined space, the employee should follow these minimum requirements:

   A. Employees may not enter the confined space without specific training in confined space entry and approval of their supervisor;

   B. Any conditions making it unsafe to remove an entrance opening cover shall be evaluated and the necessary precautions applied before the cover is removed;

   C. When an entrance opening cover is removed, the opening will be promptly guarded by a railing, temporary cover or other temporary barrier that will prevent an accidental fall through the opening and will protect each employee working in the space from foreign

objects entering the space.

D. At this point a check list must be completed. The permit form can be used for permit-required confined spaces will serve as the check list in non-permit required confined spaces.

II. In addition to the minimum requirements before entry, the following procedures must be observed for entry into a permit-required confined space:

A. Before an employee enters the space, the internal atmosphere must be tested with a calibrated direct-reading instrument for oxygen content, flammable gases and vapors and toxic gases and vapors (in that order). Note that some instruments test for multiple gases simultaneously. If the presence of a toxic gas or vapor is suspected in a confined space, other than carbon monoxide or hydrogen sulfide, contact the RSO for advice on air sampling. Hot air and steam shall be ventilated from steam vaults before testing the atmosphere.

1. If possible, the atmosphere immediately inside the cover (entry point) must be tested without removing the cover. This testing can be accomplished by using the gas meter and the hand-held probe and sampling line attached to the pump. If the cover does not have a sampling port, carefully open the cover a small amount and check the atmosphere immediately inside the cover by lowering the gas meter into the space or inserting the hand-held probe and sampling line attached to the pump;

2. After testing the atmosphere immediately inside the confined space, carefully remove the cover. Test the atmosphere from the top to bottom and around ductwork and uneven surfaces. This testing can be done by slowly lowering the gas meter by its attached rope or string or using the hand-held probe and sampling line attached to the pump. Do not let the gas meter or end of the tubing submerge in any water that might be present. For horizontal confined spaces and confined spaces that must be entered from the bottom, it will be necessary to use a pole to test the atmosphere;

3. Avoid leaning over the space or placing your head inside the confined space you are testing.

B. If the oxygen concentration test indicates an oxygen deficiency (less than 19.5%) or an excess (more than 23.5%), the gas meter should sound an alarm and forced ventilation must be provided. For ventilation of confined spaces, see Appendix I at the back of this procedure. No entry into the confined space will be permitted until follow-up tests after ventilation indicate that the atmosphere is safe.

C. If the flammability test (combustible gas) indicates a flammable concentrations greater than 10% of the lower explosive limit, the gas meter should sound an alarm and forced ventilation must be provided. No entry shall be permitted until follow-up tests indicate that the atmosphere is safe.

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D. The gas meters test for carbon monoxide and hydrogen sulfide. Carbon monoxide is produced by internal combustion engines and hydrogen sulfide is often found in sewers. If the gas meter indicates levels of either carbon monoxide that exceed 25 parts per million (ppm) or hydrogen sulfide that exceed 10 ppm, the gas meter should sound an alarm and forced ventilation is required. No entry shall be made until the atmosphere is safe.

E. After purging, sufficient ventilation shall be supplied to the confined space where needed, making sure that your source of ventilation air is not contaminating the confined space (i.e. carbon monoxide from traffic).

F. At this point the confined space entry permit must be completed. Each person entering the confined space must sign the confined space entry permit. The confined space entry permit must be posted near the entrance to the confined space. For outdoor entry points during wet or windy weather, the permit may be kept in a nearby safe location such as a department vehicle. It is now acceptable to enter the confined space. Continuous air monitoring must be conducted while the confined space is occupied. A gas meter should be worn by an employee in the confined space.

G. Pre-entry retesting for air contaminants in the confined space atmosphere must be made after every work break.

H. If a hazardous atmosphere is detected while individuals are in the space, each employee shall leave the space immediately.

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I. If an attendant outside the confined space orders an evacuation or if the gas meter signals an alarm, all employees must immediately evacuate the confined space. The space shall not be re-entered until the source of the problem has been identified and corrected.

J. The completed confined space entry permit or check list must be kept in the department files.

K. Upon completion of a work shift, the gas meter must be returned to its charger. If the next shift will continue the work, a gas meter with a fully charged battery must be obtained. If the gas meter is damaged or malfunctioning, tag the unit as being out of service. Repairs and recalibration must be performed before re-use.

L. An attendant must be stationed outside the confined space to maintain voice and/or visual contact with entrants and to recognize the early symptoms of danger in the space. The attendant must be fully familiar with rescue procedures and be able to recognize hazardous conditions. The attendant must not enter the confined space in an emergency. The attendant must order an evacuation of the confined space if a hazardous condition develops or when the workers inside the confined space appear to be in danger;

M. When applicable, wristlets, life line or full-body harnesses will be provided for each

person in the confined space. In some cases, it will not be possible to use these rescue features based on the shape, size or contents of the particular confined space;

N. A mechanical winch and tripod, approved for rescue, must be provided for top entry permit-required confined spaces. The equipment shall be inspected upon set up. The attendant outside the confined space must be trained in the use of this equipment. In some cases, the winch and tripod cannot be used if they create a hazard.

O. A portable radio or other device must be used to maintain communication between the attendant and the entrant(s);

P. The number of employees allowed to enter a permit-required confined space must be kept to a minimum. The supervisor on site, or a designated authorized person, must complete the entry permit and make sure all entrants have signed before entry. The supervisor will cancel the permit at the completion of the job or when conditions substantially change within the confined space such that the permit is no longer valid.

RESCUE PROCEDURES

A. If an employee is injured, or becomes unconscious in a permit-required confined space, the employee must be retrieved using the rescue tripod and winch or lifeline (if provided). Emergency personnel should be summoned via 911 as soon as possible after it is recognized that a problem exists. In some instances, the notification may have to be delayed until the injured person has been removed from the space.

B. The attendant must never enter a confined space. If rescue cannot be accomplished outside the confined space by using a tripod/winch or lifeline, then rescue assistance must be summoned immediately by calling 911 or by using portable radios to contact the UT Police dispatcher.

MECHANICAL VENTILATION OF CONFINED SPACES

In many situations, it will be necessary to ventilate a confined space before entry and to maintain forced ventilation while the space is occupied. Forced ventilation is required to remove air contaminants, provide oxygen and to keep the air as clean as possible. The following is a guide to help ventilate confined spaces. Some confined spaces have a single opening, others have multiple opening; or are connected to tunnels, etc.

1. It is best to blow air into the confined space and draw it out simultaneously. This procedure generally requires two or more openings. For ventilation purposes, it is best to open as many of the adjacent entry points as possible.

2. With a confined space that has only a single entry point or when only a single fan is available, air should be blown into the confined space. A flexible hose is helpful in directing the air to the bottom of the confined space.

3. It is important that the fresh air intake not be contaminated. In some cases, a portable gasoline powered generator will be used to power the ventilation fan(s). The generator should be

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located as far as possible from the fan air intake. Motor vehicles or other internal combustion engines should not be allowed to operate with their exhaust pipes located near the air intakes.

4. When using ventilation, it is important to have a rough idea of the volume of the confined space to be entered. It is also important to know the rating of the ventilation fan. When forced ventilation of a confined space is required, at least three air changes should be provided before re-sampling. Here is an example:

   An underground fault is 10 feet wide by 8 feet high by 10 feet long. Multiplying these three dimensions yields 800 cubic feet. The fan to be used is rated for 400 cubic feet per minute.

   800 cubic feet = one air change every 2 minutes

   400 cubic feet per minute

   Thus it will take the fan two minutes to ventilate the confined space. It will take 6 minutes to provide the necessary three air changes.

EQUIPMENT FOR CONFINED SPACE ENTRY

The following is a list of equipment that may be necessary for safe entry into the confined space.

A. Hard hats, safety shoes, safety glasses and ear protection
B. Ladder, respirator, lock, key, multiple-lock hasp, tags, lights, fans, barriers and fire extinguisher
C. Portable radios
D. Harness, lifelines, wristlets, tripod and winch
E. Permit or checklist

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CONFINED SPACE ENTRY PERMIT

NOTE: This form must be completed prior to entry of the confined space and posted near the entry opening. Upon completion of the project or expiration of a permit, a copy must be forwarded to EHSS.

Date of Issue:	Expiration Date:
Time:	Time:
Location of Space:	
Description of Space:	
Purpose of Entry:	
Hazard Assessment:	
Attendant(s):	
Signature of Employees to Enter:	

SAFETY EQUIPMENT/REQUIREMENTS	Y	N	PERSONAL PROTECTIVE EQUIPMENT	Y	N
PIPE LINES PURGES OR FLUSHED			AIR PURIFYING RESPIRATOR - TYPE		
AREA SECURE AND SIGNS POSTED			SAFETY GLASSES OR GOGGLES		
TRIPOD/RETRIEVAL SYSTEM			HARD HAT		
COMMUNICATION EQUIPMENT			CHEMICAL RESISTANT CLOTHING		
GAS DETECTOR			PROTECTIVE BOOTS AND/OR GLOVES		
FIRE EXTINGUISHER			HEARING PROTECTION		
GROUND FAULT CIRCUIT INTERRUPT			CHEST HARNESS AND LIFE LINE		
LIGHTING			OTHER		
LOCKOUT/TAGOUT					
PIPE LINES CAPPED OR BLANKED					
MECHANICAL VENTILATION					

TIME/DATE	%LEL(10%)	$\%O_2$(19.5-23.5)	H_2S 10ppm	CO 35ppm	INITIALS	INSTRUMENT

SUPERVISOR AUTHORIZING ENTRY (PRINT)	SIGNATURE

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Chapter 5

Electrical Safety

Policy

It is the policy of Grace Consulting Inc. to take every reasonable precaution in the performance of work to protect the health and safety of employees and the public and to minimize the probability of damage to property. The electrical safety requirements contained in this chapter are regulations set forth by Grace Consulting Inc. Employees are not allowed to perform maintenance work on equipment or circuits requiring de-energizing. Grace Consulting Inc. will employ a licensed electrician for all electrical work.

Employee Responsibility

All Grace Consulting Inc. personnel are responsible for all aspects of safety within their own groups. The Responsible Safety Officer is responsible for providing information, instruction, and assistance, as appropriate, concerning Grace Consulting Inc. electrical safety requirements and procedures.

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Individual employees are responsible for their own and their co-workers' safety.

This means:

Become acquainted with all potential hazards in the area in which they work.

Learn and follow the appropriate standards, procedures, and hazard-control methods.

Never undertake a potentially hazardous operation without consulting with appropriate supervision.

Stop any operation you believe to be hazardous.

Notify a supervisor of any condition or behavior that poses a potential hazard.

Wear and use appropriate protective equipment.

Immediately report any occupational injury or illness to the Responsible Safety Officer, any on site Medical Services Department and the appropriate supervisor.

Each employee acting in a supervisory capacity has specific safety responsibilities that include, but are not limited to:

Developing an attitude and awareness of safety in the employees supervised and seeing that individual safety responsibilities are fully carried out.

Maintaining a safe work environment and taking corrective action on any potentially hazardous operation or condition.

Ensuring that the personnel he/she directs are knowledgeable and trained in the tasks they are asked to perform.

Ensuring that safe conditions prevail in the area and that everyone is properly informed of the area's safety regulations and procedures.

Ensuring that contract personnel are properly protected by means of instructions, signs, barriers, or other appropriate resources.

Ensuring that no employee assigned to potentially hazardous work appears to be fatigued, ill, emotionally disturbed, or under the influence of alcohol or drugs (prescription, over the counter medicine or otherwise).

Management at every level has the responsibility for maintaining the work environment at a minimal level of risk throughout all areas of control.

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Each supervisor:

Is responsible for being aware of all potentially hazardous activities within the area of responsibility.

May assign responsibility or delegate authority for performance of any function, but -
remains accountable to higher management for any oversight or error that leads to injury, illness, or damage to property.

Procedures

It is the policy of Grace Consulting Inc. to follow the fundamental principles of safety, which are described below. A clear understanding of these principles will improve the safety of working with or around electrical equipment.

Practice proper housekeeping and cleanliness. Poor housekeeping is a major factor in many accidents. A cluttered area is likely to be both unsafe and inefficient. Every employee is responsible for keeping a clean area and every supervisor is responsible for ensuring that his or her areas of responsibility remain clean.

Identify hazards and anticipate problems. Think through what might go wrong and what the consequences would be. Do not hesitate to discuss any situation or question with your supervisor

and coworkers.

Resist "hurry-up" pressure. Program pressures should not cause you to bypass thoughtful consideration and planned procedures.

Design for safety. Consider safety to be an integral part of the design process. Protective devices, warning signs, and administrative procedures are supplements to good design but can never fully compensate for its absence. Completed designs should include provisions for safe maintenance.

Maintain for safety. Good maintenance is essential to safe operations. Maintenance procedures and schedules for servicing and maintaining equipment and facilities, including documentation of repairs, removals, replacements, and disposals, should be established.

Document your work. An up-to-date set of documentation adequate for operation, maintenance, testing, and safety should be available to anyone working on potentially hazardous equipment. Keep drawings and prints up to date.

Have designs reviewed. All systems and modifications to systems performing a safety function or controlling a potentially hazardous operation must be reviewed and approved at the level of project engineer or above.

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Have designs and operation verified. All systems performing safety functions or controlling a potentially hazardous operation must be periodically validated by actual test procedures at least once a year, and both the procedures and actual tests must be documented.

Test equipment safety. Tests should be made when the electrical equipment is de-energized, or, at most, energized with reduced hazard.

Know emergency procedures. All persons working in areas of high hazard (with high-voltage power supplies, capacitor banks, etc.) must be trained in emergency response procedures, including cardiopulmonary resuscitation (CPR) certification.

Working with Energized Equipment

This section contains safety requirements that must be met in constructing electrical equipment and in working on energized electrical equipment. All employees who may come into contact with electrical equipment are required to complete electrical training. Special emphasis is placed on problems associated with personnel working on hazardous electrical equipment in an energized condition. Such work is permissible, but only after extensive effort to perform the necessary tasks with the equipment in a securely de-energized condition has proven unsuccessful, or if the equipment is so enclosed and protected that contact with hazardous voltages is essentially impossible.

Safety Glasses

Either safety glasses or a face shield must be worn when working on electrical equipment.

Personal Protective Devices

For work on any energized circuitry with a Class B or Class C hazard, the use of personal protective devices (e.g., face shields, blast jackets, gloves, and insulated floor mats) is encouraged, even if not required.

Elevated Locations

Any person working on electrical equipment on a crane or other elevated location must take necessary precautions to prevent a fall from reaction to electrical shock or other causes. A second person, knowledgeable as a safety watch, must assume the best possible position to assist the worker in case of an accident.

Protective Systems

Equipment must be designed and constructed to provide personnel protection. First-line and backup safeguards should be provided to prevent personnel access to energized circuits. Periodic tests must be established to verify that these protective systems are operative. For all 120 volt, 15 and 20 amp (branch) circuits the are cord/ plug connected, Ground Fault Circuit Interrupters (GFCI's) shall be used. this is the primary protection.

Secondary protection benefits may be realized from utilizing an Assured Equipment Grounding Conductor Program (AEGCP). This program provides for initial and periodic verification of ground continuity of all electrical power tool and extension cords. If used, continuity checks are made initially and at three month intervals. Cords that are checked shall have distinguishable taped markings placed within one foot of the male end of the cord. This program is not, however mandatory if GFCI's are faithfully used - which is the company policy.

The following tests shall be performed on all cord sets, receptacles that are not part of the permanent wiring of the building or structure, and cord- and plug-connected equipment required to be grounded.

(1) All equipment grounding conductors shall be tested for continuity and shall be electrically continuous.

(2) Each receptacle and attachment plug shall be tested for correct attachment of the equipment grounding conductor. The equipment grounding conductor shall be connected to its proper terminal.

(3) All required tests shall be performed

(a) Before each use on site

(b) When there is evidence of damage

(c) Before equipment is returned to service following any repairs

(d) At intervals not exceeding 3 months

The tests required shall be recorded and made available to any authority having jurisdiction.

Safety Practices

Additional safety practices are described below.

Cable Clamping: A suitable mechanical-strain-relief device such as a cord grip, cable clamp, or plug must be used for any wire or cable penetrating an enclosure where external movement or force can exert stress on the internal connection. Grommets or similar devices must not be used as strain relief.

Emergency Lighting: There must be an emergency lighting system that activates when normal power fails in Class C conditions.

Flammable and Toxic Material Control: The use of flammable or toxic material must be kept to a minimum. When components with such fluids are used, a catch basin or other approved method must be provided to prevent the spread of these materials should the normal component case fail.

Isolation: All sources of dangerous voltage and current must be isolated by covers and enclosures. Access to lethal circuits must be either via screw-on panels, each containing no less than four screws or bolts, or by interlocked doors. The frame or chassis of the enclosure must be connected to a good electrical ground with a conductor capable of handling any potential fault current.

Lighting: Adequate lighting must be provided for easy visual inspection.

Overload Protection: Overload protection and well marked disconnects must be provided. Local "off" controls must be provided on remote-controlled equipment.

All disconnects and breakers should be clearly labeled as to which loads they control.

Power: All ac and dc power cabling to equipment not having a separate external ground but having wire-to-wire or wire-to-ground voltage of 50 volts or more must carry a ground conductor unless cabling is inside an interlocked enclosure, rack, grounded wire way, or conduit, or feeds a commercial double-insulated or UL-approved device.

This requirement will ensure that loads such as portable test equipment, temporary or experimental, is grounded. UL-approved devices such as coffeepots, timers, etc., used per the manufacturer's original intent are permissible.

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Rating: All conductors, switches, resistors, etc., should be operated within their design capabilities. Pulsed equipment must not exceed, either the average, the rms, or the peak rating of components. The equipment should be derated as necessary for the environment and the application of the components.

Safety Grounding : Automatic discharge devices must be used on equipment with stored energy of 5 joules or more. Suitable and visible manual grounding devices must also be provided to short-to-ground all dangerous equipment while work is being performed.

Safety Practices, Medium - High Voltage

The following check list must be used as a guide for circuits operating at 300 volts or more or storing more than 5 joules. An enclosure may be a room, a barricaded area, or an equipment cabinet.

Access: Easily opened doors, panels, etc., must be interlocked so that the act of opening de-energizes the circuit. Automatic discharge of stored-energy devices must be provided. Doors should be key-locked, with the same required key being also used for the locks in the control-circuit-interlock chain. This key must be removable from the door only when the door is closed and locked.

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Heat: Heat-generating components, such as resistors, must be mounted so that heat is safely dissipated and does not affect adjacent components.

Isolation: The enclosure must physically prevent contact with live circuits. The enclosure can be constructed of conductive or non-conductive material. If conductive, the material must be electrically interconnected and connected to a good electrical ground. These connections must be adequate to carry all potential fault currents.

Strength: Enclosures must be strong enough to contain flying debris due to component failure.

Temporary Enclosure: Temporary enclosures (less than 6-month duration) not conforming to the normal requirements must be considered Class C hazards.

Ventilation: Ventilation must be adequate to prevent overheating of equipment and to purge toxic fumes produced by a fault.

Visibility: Enclosures large enough to be occupied by personnel must allow exterior observation of equipment and personnel working inside the enclosure.

Warning Indicators: When systems other than conventional facilities represent Class C hazards, the systems should be provided with one of the following two safety measures: (1) A conspicuous visual indicator that is clearly visible from any point where a person might make hazardous contact or entry; and (2) A clearly visible primary circuit breaker or "OFF" control button on the front of the enclosure.

Safety Practices

Because a wide range of power supplies exist, no one set of considerations can be applied to all cases. The following classification scheme may be helpful in assessing power-supply hazards.

Power supplies of 50 volts or less with high current capability too often are not considered a shock hazard, although these voltages are capable of producing fatal shocks. Since they are not "high voltage," such power sources frequently are not treated with proper respect.

In addition to the obvious shock and burn hazards, there is also the likelihood of injuries incurred in trying to get away from the source of a shock. Cuts or bruises, and even serious and sometimes fatal falls, have resulted from otherwise insignificant shocks.

Power supplies of 300 volts or more, with lethal current capability, have the same hazards to an even greater degree. Because supplies in this category are considered Class C hazards, they must be treated accordingly.

High-voltage supplies that do not have dangerous current capabilities are not serious shock or burn hazards in themselves and are therefore often treated in a casual manner. However, they are frequently used adjacent to lower-voltage lethal circuits, and a minor shock could cause a rebound into such a circuit. Also, an involuntary reaction to a minor shock could cause a serious fall (for example, from a ladder or from experimental apparatus).

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The following are additional safety considerations for power supplies.

Primary disconnect. A means of positively disconnecting the input must be provided. This disconnect must be clearly marked and located where the workmen can easily lock or tag it out while servicing the power supply. If provided with a lockout device, the key must not be removable unless the switch or breaker is in the "off" position.

Overload Protection. Overload protection must be provided on the input and should be provided on the output.

More than 300 Volts

To work on systems with voltages greater than 300 volts (CLASS B OR C HAZARD): Open the feeder breaker, roll out if possible, tag out, and lock if in enclosure. If work is on circuits of 600 V or more, positive grounding cables should be attached to all three phases.

Tag should contain who, why, and when information, and it is of vital importance because a person's life may depend on it. "Vital" in this case means that the presence and status of the tag are inviolate, and the tag must not be altered or removed except by the person who attached it.

Less than 300 Volts

To work on systems with voltages less than 300 volts (CLASS A HAZARD): Turn-off and tag the feeder breaker. Tag is inviolate except on projects where established circuit checkout procedure allows a qualified person to remove it and energize circuit after checkout is complete.

Motor Generator Systems

For motor or generator work, primary feeder breaker must be opened, tagged, and locked out if possible.

For generator-load work, motor-start permissive key must be removed by person doing work and restored when work is complete.

High Voltage

To work on high voltage power supplies and enclosures use Class B or Class C hazard procedure specified in the safety requirements.

Access should always be by permissive key that interrupts input power when key is removed from control panel. Grounding of power supply output must occur either automatically when key is removed from control panel or manually before access door can be opened.

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Working On or Near Live Circuits

Working on live circuits means actually touching energized parts. Working near live circuits means working close enough to energized parts to pose a risk even though you make be working on de-energized parts. Common tasks where you need to work on or near live circuits include:

• Taking voltage measurements
• Opening and closing disconnects and breakers
• Removing panels and dead fronts
• Opening electric equipment doors for inspection.

For other situations where you might need to work on or near live circuits, Grace Consulting Inc. may institute a written live work permit system which must be authorized by a qualified supervisor.

Live-work permit system (opt.)
A live work permit should, at a minimum, contain this information:

• A description of the circuit and equipment to be worked on and location
• The date and time covered by the permit
• Why live work will be done
• Results of shock hazard analysis and determination of shock protection boundaries
• Results of flash hazard analysis and determination of flash protection boundary
• PPE to be worn and description of safe work practices to be used

• Who will do the work and how unqualified persons will be kept away
• Evidence of completion of job briefing, including description of job-specific hazards.

Proper Personal Protective Equipment

When working on or around live circuits, be sure to wear the right PPE to protect against electric shock and arc flash. Never wear clothing made from synthetic materials, such as acetate, nylon, polyester, or rayon – alone or combined with cotton. Such clothing is dangerous because it can burn and melt into your skin.

The type of PPE worn depends on the type of electric work being done. Once the hazard/risk category has been identified, check requirements for clothing and other PPE when working on or near energized equipment within the flash protection boundary *(see* NFPA tables). These PPE requirements protect against electric shock and incurable arc-flash burns. They do not protect against physical injuries from arc blasts.

The **minimum** PPE required would be an untreated natural fiber long-sleeve shirt and long pants with safety glasses with side shields (hazard/risk category 0). Higher categories require FR rated clothing (typically 4Cal for 300V & less - category 1) and an Arc Blast faceshield for Category 2 (typically 8Cal

clothing for 600V & less). Categories 3 & 4 require even higher rated coveralls with FR rated hood and gloves.

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

-Lockout/Tagout devices. Any equipment requiring Lockout/Tagout will be completed by a non-employee certified electrician.

-All circuits and equipment to be worked on shall be disconnected from all electric energy sources.

-Stored electric energy which might endanger personnel shall be released.

-Non-electrical energy that could reenergize electric circuit parts shall be blocked or relieved to the extent that the circuit parts could not be accidentally energized by the device.

-Lock and tag shall be placed on each disconnecting means to de-energize circuits and equipment on which work is to be performed. Each tag shall contain a statement prohibiting unauthorized operation of the disconnecting means and removal of the tag.

-Certified electrician shall verify that the equipment cannot be restarted.

-Certified electrician shall test and verify that the circuit elements and equipment part(s) are de-energized.

-Certified electrician shall conduct tests and visual inspections to verify all tools, shorts, grounds, etc. have been removed so that circuits and equipment can be safely energized.

Lockout or Tagout application as provided:

1) Lockout or Tagout devices shall be affixed to each energy isolating device by authorized employees.

2) Lockout devices, where used, shall be affixed in a manner that will hold the energy isolating devices in a safe or off position.

3) Tagout devices, where used, 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.

4) Where Tagout devices are used with energy isolating devices designed with the capability of being locked, the tag attachment shall be fastened at the same point at which the lock would have been attached.

5) Where a tag cannot be affixed directly to the energy isolating device, the tag shall be located as close as safely as possible to the device in a position that will be immediately obvious to anyone attempting to operate the device.

-Training requirements for employees in safety related work practices that pertain to their respective job assignments as detailed in the additional comments:

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A) Employees who face a risk of electrical shock but are NOT qualified persons shall be trained and familiar with electrically related practices.

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

C) Clearance distances and the corresponding voltages to which the qualified person will be exposed.

-Employees are prohibited from working on or near exposed de-energized parts.

-Employees are prohibited from working on or near exposed energized parts.

-Only non-employee certified electricians may work on energized parts.

-Employees are prohibited from working under overhead lines within 10 feet, unless a non employee certified electrician has ensured that lines are de-energized and grounded.

Clearance Distances

UNQUALIFIED: 1) For voltages to ground 50kV or below: 10 feet.

2) For voltages to ground over 50 kV: 10 feet plus 4 inches for every 10kV over 50kV.

QUALIFIED: See Table S-5 (29 CFR 1910.333(c)(3)(ii)(C)) for more information.

A) Any vehicle or equipment capable of having parts of its structure elevated near energized overhead lines shall be operated so that a clearance of 10 ft. If the voltage is higher than 50kV, the clearance shall be increased 4 inches for every 10kV over that voltage.

B) If the vehicle is in transit with its structure lowered, the clearance may be reduced to 4 ft. If the voltage is higher than 50kV, the clearance shall be increased 4 inches for every 10 kV over that voltage.

-Protective shields, protective barriers or insulating materials as necessary shall be used when working in confined or enclosed work spaces where electrical hazards may exist.

-Conductive materials and equipment such as long dimensional conductor objects (ducts or pipes) and address safe work practices for each material and/or equipment.

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

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Chapter 6

LOCKOUT/TAGOUT PROCEDURE

POLICY

It is the policy of Grace Consulting Inc. that any individual engaging in the maintenance, repairing, cleaning, servicing, of energy-stored equipment will abide by the procedures outlined in this document and other safety measures outlined in the Grace Consulting Inc. Safety & Health Manual. These procedures are designed to meet or exceed applicable OSHA standards for safe work practices.

Lockout is a first means of protection; warning tags only supplement the use of locks. Tags alone may be used only when the application of a lock is not practically feasible and with approval of the RSO, Aaron Conner or the appropriate supervisor.

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PURPOSE

To ensure that all individuals are protected from accidental or unexpected activation of steam, gas, chemical, kinetic, mechanical and/or electrical equipment during maintenance, repairing, cleaning, servicing, or adjusting of prime movers, machinery, or equipment.

DEFINITIONS

LOCKOUT

The practice of using keyed or combination security devices ("locks") to prevent the unwanted activation of steam, gas, chemical, kinetic, mechanical or electrical equipment.

TAGOUT

The practice of using tags in conjunction with locks to increase the visibility and awareness that equipment is not to be energized or activated until such devices are removed. Tagout devices will be of the non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds.

TRYOUT

The practice of attempting to set machinery into motion by starting, switching, pushing, moving, or otherwise engaging power sources for such equipment. There is typically local rules which may only allow authorized persons to make such attempts. Check first before trying out any equipment yourself.

ACTIVATION/ENERGIZATION

To set machinery into motion by starting, switching, pushing, moving, or otherwise engaging power sources for such equipment. To provide a flow of electricity or complete a circuit that is the main power source for the machinery/equipment.

3.5 HAZARDOUS MOTION

Motion of equipment under mechanical stress or gravity that may abruptly release and cause injury. Hazardous motion may result even after power sources are disconnected. Examples are coiled springs, raised hydraulic equipment, and any sources of potential energy that may cause injury.

RESPONSIBILITIES

a. Ensure that the lockout/tagout procedures are in compliance with OSHA requirements.

b. Provide training to employees affected by lockout/tagout procedures.

c. Inspect energy control procedures and practices to ensure that general and specific lockout/tagout procedures are being followed.

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i. Inspections must be carried out by persons other than those employees directly utilizing energy control procedures.

ii. Inspections will include a review between the inspector and each authorized employee, of that employee's responsibilities under the energy control procedure being inspected.

iii. Certify that periodic inspections have been performed

SUPERVISORS

a. Ensure that each employee engaging in work requiring locking/tagging out of energy sources understands and adheres to adopted procedures.

b. Assure that employees have received training in energy control procedures prior to operating the machinery or equipment.

c. Provide and maintain necessary equipment and resources, including accident prevention signs, tags, padlocks, seals and/or other similarly effective means.

EMPLOYEES

a. Adhere to Specific Procedures as outlined in this document for all tasks that require the use of lockout/tagout procedures as defined.

b. Maintain lockout/tagout supplies in maintenance vehicles.

SPECIFIC PROCEDURES

PREPARATION FOR LOCKOUT/TAGOUT

a. Make a survey to locate and identify all isolating devices to be certain which switch(es), valve(s), or other energy isolating devices apply to the equipment to be locked or tagged out. More than one energy source (electrical, mechanical, stored energy, or others) may be involved.

SEQUENCE OF LOCKOUT OR TAGOUT SYSTEM PROCEDURE

a. Notify affected employees that a lockout or tagout system is going to be utilized and the reason therefore. The authorized employee shall know the type and magnitude of energy that the machine or equipment utilizes and shall understand the hazards thereof.

b. If the machine or equipment is operating, shut it down by the normal stopping procedure (depress stop button, open toggle switch, etc.).

c. Operate the switch, valve, or other energy isolating device(s) so that the equipment is isolated from it energy source(s). Stored energy (such as that in springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as repositioning, blocking, bleeding down, etc.

d. Lockout/Tagout the energy isolating devices with assigned individual lock(s) or tag(s).

e. After ensuring that no personnel are exposed, and as a check on having disconnected the energy sources, operate the push button or other normal operating controls to make certain the equipment will not operate. CAUTION: Return operating control(s) to neutral or off position after the test.

f. The equipment is now locked out or tagged out.

RESTORING MACHINES OR EQUIPMENT TO NORMAL OPERATIONS

a. After the servicing and/or maintenance is complete and equipment is ready for normal production operations, check the area around the machines or equipment to ensure that no one is exposed.

b. After all tools have been removed from the machine or equipment, guards have been reinstalled and employees are in the clear, remove all lockout or tagout devices. Operate the energy isolating devices to restore energy to the machine or equipment.

PROCEDURE INVOLVING MORE THAN ONE PERSON

a. In the preceding steps, if more than one individual is required to lockout or tagout equipment, each shall place his/her own personal lockout/tagout device on the energy isolating device(s). When an energy isolating device cannot accept multiple locks or tags, a multiple lockout or tagout device

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(hasp) may be used. If lockout is used, a single lock may be used to lockout the machine or equipment with the key being place in a lockout box or cabinet which allows the use of multiple locks to secure it. Each employee will then use his/her own lock to secure the box or cabinet. As each person no longer needs to maintain his or her lockout protection, that person will remove his/her lock from the box or cabinet.

TEMPORARY REMOVAL OF LOCKOUT/TAGOUT DEVICES

a. In situations where lockout/tagout devices must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine, equipment or component thereof, the following sequence of actions will be followed:

i. Remove non-essential items and ensure that machine or equipment components are operationally intact.

ii. Notify affected employees that lockout/tagout devices have been removed and ensure that all employees have been safely positioned or removed from the area.

iii. Have employees who applied the lockout/tagout devices remove the lockout/tagout devices.

iv. Energize and proceed with testing or positioning.

v. Deenergize all systems and reapply energy control measures.

MAINTENANCE REQUIRING UNDISRUPTED ENERGY SUPPLY

a. Where maintenance, repairing, cleaning, servicing, adjusting, or setting up operations cannot be accomplished with the prime mover or energy source disconnected, such operations may only be performed under the following conditions:

i. The operating station (e.g. external control panel) where the machine may be activated must at all times be under the control of a qualified operator.

ii. All participants must be in clear view of the operator or in positive communication with each other.

iii. All participants must be beyond the reach of machine elements which may move rapidly and present a hazard.

iv. Where machine configuration or size requires that the operator leave the control station to install tools, and where there are machine elements which may move rapidly, if activated, such elements must be separately locked out.

v. During repair procedures where mechanical components are being adjusted or replaced, the machine shall be de-energized or disconnected from its power source.

EMPLOYEE TRAINING

Employees of Grace Consulting Inc. will receive annual lockout/tagout training from the RSO, Aaron Conner or a designated representative. Note: Training requirements outlined in 29CFR [Specifically

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1910.147 (c)(7)(i),(ii), & (iii)].

RECORDKEEPING

INSPECTION RECORDS

a. The RSO, Aaron Conner or a designated representative will supply and instruct employees in the use of LOCKOUT/TAGOUT INSPECTION FORMS.

TRAINING RECORDS

a. Training records will be maintained by the RSO, Aaron Conner or a designated representative. Training records will include an outline of topics covered and a sign in sheet of those employees attending.

REFERENCE

Code of Federal Regulations, Title 29, Part 1910, Section 147.

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LOCKOUT/TAGOUT INSPECTION FORM

1. Inspection Date:_____

2. Inspector (Printed Name/Signature):_____/_____

3. Employee(s) Inspected (Printed/Signature):_____/_____

_____/_____

_____/_____

_____/_____

5. Machine/equipment on which the energy control procedure was being utilized:

_____

_____

_____

_____

_____

_____

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Item	Yes	No
Does employee have or have access to adequate lockout/tagout devices?		
Has employee tested the effectiveness of his/her lockout/tagout devices?		
Has employee received CPR and lockout/tagout training in the last year?		
Have all procedures been followed?		
Were tagouts legible and clearly displayed?		

6. Comments/Observations:_____

_____

_____

_____

Chapter 7

Employee Emergency Action Plan

Organization

Grace Consulting Inc. requires that during every emergency an organized effort be made to protect personnel from further injury and to minimize property damage.

All of Grace Consulting Inc. resources can be made available to respond to an emergency. Each supervisor must know what to do during an emergency in his or her area and must be certain that his or her employees understand their roles.

Emergency Action Plan

A responsible party must be designated by Safety Manager and oriented for each workplace or jobsite. Generally, the Responsible Safety Officer or designated representative is the person in charge of a workplace or jobsite. This person has specific responsibility for the preparation, updating, and implementation of the emergency plan. An EAP will be developed prior to the start of every job. This responsibility includes recommending personnel to attend indoctrination and training programs.

Specifically, each plan must contain the following information and procedures as appropriate for each workplace.

Emergency Escape Procedures

Floor plans showing evacuation routes, the location of shutoff switches and valves for the utility systems (water, gas, electricity), and the locations of emergency equipment and supplies (including medical) shall be determined prior to the start of work at each at each jobsite or workplace. Indications on the floor plans of areas where specific hazards (i.e., toxic, flammable, and/or radioactive materials) exist. The location and description of special hazards or hazardous devices should be included in the text together with shutdown procedures if applicable.

Emergency Operator Personnel

A list of people with specific duties during an emergency and a description of their duties shall be provided. For example, specific people should be assigned to supervise evacuation and to carry out a rapid search of the area (assuming this can be done safely).

Accounting For All Employees

Designation of a primary assembly point for evacuees that is well away from the building. An alternate site should also be designated in case the first choice cannot be used.

Reentry procedures

No one shall reenter an evacuated building or area without specific instructions from the RSO or other person in charge.

Rescue Medical Duties

Proceed with first aid or attempt to control the incident only if you can do so safely and have been trained in first aid or the emergency response necessary to control the incident.

Reporting Fires And Other Emergencies

Report the emergency immediately. State what happened, the specific location, whether anyone was injured, and your name and phone number in addition to any other applicable information.

Additional Contacts For More Information

Grace Consulting Inc. has designated personnel at the central office for additional information. If you have any questions, please contact the Safety Manager.

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Jobsite Alarm Systems

An employee alarm system shall be in accordance with CFR Part 1926.159. The RSO shall determine the particular alarm system to be utilized for each jobsite to alert all employees in the area of an emergency.

Types Of Evacuation

The RSO or designated person shall review each particular jobsite or workplace to determine the type of evacuation to be utilized in emergency circumstances.

Supervisors Responsibilities

During an emergency, the supervisor must:

Ensure that those under his or her supervision are familiar with the plan for the workplace, particularly the recommended exit routes and how to report an emergency.

Render assistance to the person in charge during an emergency, as required.

Maintain familiarity with the shutdown procedures for all equipment used by those under his or her supervision.

Know the location and use of all safety equipment.

Keep employees from reentering an evacuated area until reentry is safe.

No Loitering Policy

Employees not involved in the emergency must stay away from the scene and follow the instructions issued over the public address system or directly from the person in charge. The sounding of a fire bell or other alarm system as designated by the RSO means immediate evacuation by the nearest exit. Employees must not reenter an area that they have evacuated until notified that it is safe to return.

Employee Responsibilities

Employees, other than emergency-response groups, involved in any emergency greater than a minor incident are expected to act as follows:

Comply with all guidelines and procedures as outlined by the RSO or designated person regarding the Emergency Action Plan. In an emergency situation the employee may, if there is threat of further injury or further exposure to the hazard, remove all injured persons if possible and leave the immediate vicinity. If there is no threat of further injury or exposure, the employee should leave seriously injured personnel where they are.

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Show the ranking emergency-response officer where the incident occurred, inform him or her of the hazards associated with the area, provide any other information that will help avoid injuries, and do as he or she requests.

Training Requirements

Grace Consulting Inc. shall review the Employee Emergency Action Plan with each applicable employee; initially when the plan is developed, when the employee's responsibilities or designated duties change, whenever the plan is changed and annually. EAP mock drills will be performed every 6 months at all jobsites.

Chapter 8

Fire Protection Program/ Hot Work

Introduction

Policy and planning for fire safety at Grace Consulting Inc. takes into account the special fire hazards for specific operating areas, the protection of high-value property, and the safety of employees. These ends are met by:

* Non-combustible or fire-rated materials and construction practices suitable to the assigned uses of buildings and facilities.

* Alarm systems and automatic extinguishing systems.

* Availability of suitable hand extinguishers and local hose lines for use before firefighters arrive.

* Access to professional fire department, always staffed and trained in the control of emergencies that could occur. (The Fire Department makes the initial response to all requests for emergency aid received on the emergency telephone number 911).

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This chapter covers the fire safety responsibilities of employees and supervisors and sets forth the fire safety rules and procedures.

Fire Department

The Community Fire Department is responsible for protecting people and property from fires, explosions, and other hazards through prevention and expeditious control of such events. In addition, the Fire Department provides first-response rescue and transportation services in medical emergencies.

The Fire Department's inspection staff is responsible for ensuring company-wide compliance with fire safety and protection requirements and for reviewing all plans and procedures for compliance with these requirements; for inspecting and testing automatic fire protection and alarm systems and ensuring their maintenance and repair; for conducting fire safety and protection inspections; and for providing fire prevention recommendations. Other responsibilities may include training employees in fire safety equipment, practices, and procedures.

All these fire protection and response functions are performed in conformance with OSHA regulations, State law, Grace Consulting Inc. policies, and nationally recognized standards and guidelines for fire and life safety. The Fire Chief and the Fire Marshall have the authority to enforce applicable requirements of the Uniform Building Code; the Uniform Fire Code; National Fire Protection Association Codes including the Life Safety Code), Standards, and Recommended

Practices; and the fire protection provisions of OSHA Orders.

All employees must immediately report fires, smoke, or potential fire hazards to the Supervisor, Responsible Safety Officer and/or Fire Department (dial 911).

All employees must conduct their operations in such a way as to minimize the possibility of fire. This means applying rules such as keeping combustibles separated from ignition sources, being careful about smoking, and avoiding needless accumulations of combustible materials.

Supervisors are responsible for keeping their operating areas safe from fire. The Responsible Safety Officer and the Fire Department will provide guidance and construction criteria with respect to fire and life safety as well as inspections. The provision and maintenance of fire detection systems and both automatic and manual fire extinguishing equipment is the responsibility of the Responsible Safety Officer. But the supervisor, who best knows the day-to-day nature of his/her operations, is responsible for notifying the Responsible Safety Officer of operations that change the degree of fire risk and will therefore require a change in the planned fire protection provisions.

Supervisor Responsibilities

Supervisors must ensure that their personnel are properly instructed regarding potential fire hazards involved in their work and around their workplaces, the proper precautions to minimize fires, and the procedures in case of fire. The local Fire Department and the Responsible Safety Officer also offer formal courses or training and materials on fire prevention and response for:

* Fire Safety

* Fire-Extinguisher Operation

* Self-Contained Breathing Apparatus

* Emergency Evacuation

Class A Combustibles

Class A combustibles are common materials such as wood, paper, cloth, rubber, plastics, etc. Fires in any of these fuels can be extinguished with water as well as other agents specified for Class A fires. They are the most common fuels to be found in non-specialized operating areas of the work place such as offices.

Safe handling of Class A combustibles means:

Disposing of waste daily.

Keeping work area clean and free of fuel paths, which can spread a fire once started.

Keeping combustibles away from accidental ignition sources such as hot plates, soldering irons, or other heat or spark-producing devices.

Keeping all rubbish, trash, or other waste in metal or metal-lined receptacles with tight-fitting covers when in or adjacent to buildings. (Exception: wastebaskets of metal or of other material and design approved for such use, which are emptied each day, need not be covered.)

Using safe ash trays for disposal of smoking materials and making sure that the contents are extinguished and cold to the touch before emptying them into a safe receptacle.

Planning the use of combustibles in any operation so that excessive amounts need not be stored.

Storing paper stock in metal cabinets and rags in metal bins with automatically closing lids.

Making frequent inspections and checks for noncompliance with these rules in order to catch fires in the potential stage.

Class B Combustibles

Class B combustibles are flammable and combustible liquids (including oils, greases, tars, oil-base paints, lacquers) and flammable gases. Flammable aerosols (spray cans) are treated here. Cryogenic and pressurized flammable gases are treated elsewhere in this manual.

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The use of water to extinguish Class B fires (by other than trained firefighters) can cause the burning liquid to spread carrying the fire with it. Flammable-liquid fires are usually best extinguished by excluding the air around the burning liquid. Generally, this is accomplished by using one of several approved types of fire-extinguishing agents, such as the following:

Carbon dioxide

ABC multipurpose dry chemical

Halon 1301 (used in built-in, total-flood systems)

Halon 1211 (used in portable extinguishers)

Fires involving flammable gases are usually controlled by eliminating the source of fuel, i.e., closing a valve.

Technically, flammable and combustible liquids do not burn. However, under appropriate conditions, they generate sufficient quantities of vapors to form ignitable vapor-air mixtures. As a general rule, the lower the flash point of a liquid, the greater the fire and explosion hazard. It should be noted that many flammable and combustible liquids also pose health hazards.

NOTE: The flash point of a liquid is the minimum temperature at which it gives off sufficient vapor

to form an ignitable mixture with the air near the surface of the liquid or within the vessel used.

It is the responsibility of the user to ensure that all Class B combustibles are properly identified, labeled, handled, and stored. If assistance is required, contact the Responsible Safety Officer. Safe handling of Class B combustibles means:

Using only approved containers, tanks, equipment, and apparatus for the storage, handling, and use of Class B combustibles.

Making sure that all containers are conspicuously and accurately labeled as to their contents.

Dispensing liquids from tanks, drums, barrels, or similar containers only through approved pumps taking suction from the top or through approved self-closing valves or faucets.

Storing, handling, and using Class B combustibles only in approved locations, where vapors cannot reach any source of ignition, including heating equipment, electrical equipment, oven flame, mechanical or electrical sparks, etc.

Never storing, handling, or using Class B combustibles in or near exists, stairways, or other areas normally used for egress.

In rooms or buildings, storing flammable liquids in excess of 10 gallons in approved storage cabinets or special rooms approved for the purpose.

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Knowing the locations of the nearest portable fire extinguishers rated for Class B fires and how to use them.

Never smoking, welding, cutting, grinding, using an open flame or unsafe electrical appliances or equipment, or otherwise creating heat that could ignite vapors near any Class B combustibles.

Electrical Fires

There are many combustible materials, including electrical equipment, oxidizing chemicals, fast-reacting or explosive compounds, and flammable metals, which present specialized fire safety and extinguishing problems.

Refer to other appropriate chapters of this manual for safe handling advice. If in doubt, request advice from the Responsible Safety Officer.

Welding and Other Permits

As part of the local Fire Department's program to control and reduce fire hazards, a permit system is in effect to cover welding, burning, or other operations with a high fire hazard. Typically, operations that require a permit are:

Welding (arc, oxyacetylene, or heliarc)

Soldering (which requires an open flame)

Use of a torch (for cutting, bending, forming, etc.)

Use of tar pots (for road work or roofing, etc.)

Open fires for any purpose

HOT WORK PERMIT PROGRAM

Hot Work is any construction or maintenance procedure which requires heat or open flame to complete. This includes, but is not limited to: cutting, grinding, brazing, welding, soldering, thawing pipes, sweating pipes or applying roofing materials with torches.
This policy applies to any Grace Consulting Inc. employee or any contractor who is performing new construction, repair, renovations and/or alterations that require hot work. Sparks, in the presence of flammable vapors, may cause immediate fires or explosions.
Smoldering material hidden from sight can suddenly burst into flame long after work has been completed and personnel have left the area. Heat produced by hot work on one side of a wall can actually ignite combustible material on the other side. Due to the high fire potential, most hot work will require a HOT WORK PERMIT.

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Supervisors, Project Managers, and Contractors will determine if welding, cutting, soldering and heating must be done as part of the project or work order. Then determine if the hot work can be performed outside the building, if so a permit is not required. If hot work is performed inside of a building then a hot work permit is required. Hot Work Permits will be requested at least 24 hours in advance of needed work.

Hot Work Permits may be issued for a period of two weeks and may be renewed at the end of two weeks if needed. Employees and contractors will comply with all requirements as outlined on the permit form and the RSO, or designated representative will inspect each hot work site to ensure compliance.

Upon completion of hot work the original copy of the Hot Work Permit will be sent to the main office.

Any area of a building (other than a work shop) that is determined to be a “hot work safe area” will require an initial inspection by the RSO, or designated representative to ensure that it meets all criteria. These “hot work safe areas” shall have no fuel loading or very low fuel loading, in addition to other requirements. Examples of this type of area would be a non-occupied cement basement or crawl space under a building.

Hot Work Permit Form

(Hot Work is not permitted unless this form is completed and signed by the Responsible Safety Officer, or designated representative and site owner notified of hot works location.)

Name of person/company performing Hot Work:

Date of Work: _____

Permit No:_____
(Work Order Number)

Location of Work: _____
(be specific including building and room number)

Description of Work:
This permit is valid from am/pm on ___/___/___ to am/pm on ___/___/___

Special Precautions:
The work site has been inspected by me, I have arranged for the fire panel to be isolated and all other necessary precautions taken.
Name:_____

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Signed: _____

Date:_____

(Person performing the work)
The fire alarm and panel has been isolated and the work site has been inspected by me, and declared safe for hot-work to proceed.

Name:_____

Signed:_____

Date:_____
(RSO or designated representative)

FIRE WATCH (if required)
Work site and all adjacent areas where sparks may have spread were inspected by me during, and or at least thirty (30) minutes after the work was completed and no fire conditions were noted. The fire panel has been de-isolated.

Name: _____ (Fire Watcher)

Signed:_____

Date:_____
The fire alarms and thermal/smoke detectors must be isolated before hot work commences. This is done by informing the site owner of location of hot works
and requesting a fire alarm isolation.

Hot work commenced at am/pm _____

Hot work completed at am/pm_____

PRECAUTIONS CHECKLIST/ GENERAL PRECAUTIONS

	Yes	No	N/A
Are flammable and combustibles removed or protected?			
Are available sprinklers, hose streams and extinguishers operable?			
Is floor swept clean and wet down where necessary?			
Is arc flash shielding in place?			
Is ventilation adequate?			
Is hot-work equipment in good repair?			
Is fire watch required?			
Is fire panel isolated? (Checked with Site Owner)			
Are smoke/thermal detectors isolated? (Checked with Site Owner)			
Are combustible liquid, vapor, gasses removed or protected?			
Are combustible floors protected?			
Are flammable liquids, dust, lint removed or protected?			
Is explosive atmosphere in area eliminated?			
Are all wall and floor openings covered?			
Is construction non-combustible and without combustible materials?			
Are combustibles on the other side of wall or ceiling moved away?			
Are fire resistant coverings under works to collect sparks?			
Is enclosed equipment cleaned of all combustibles?			
Are containers purged of flammable liquids/vapors?			
Is Fire Watcher required?			
If required, has Fire Watcher been briefed?			
Is Fire Watcher trained in use of this equipment and sounding alarm?			
Is Fire Watcher supplied with appropriate fire extinguisher?			

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Spray painting

To obtain additional information or to request a permit for these operations, contact the Responsible Safety Officer or Fire Department on it business line, not the emergency 911 number.

Portable Heaters

The use of these devices, whether privately or company owned, is allowed only where there is no chance of causing injury to personnel or of creating a fire hazard. This provision obviously requires common sense in safely locating such devices and ensuring that they do not operate when they are unattended. These devices may not be used in locations where:

Flammable or explosive vapors or dusts may be present.

Smoking, eating, or drinking are prohibited because toxic or radioactive materials may be present.

The area has been designated as unsafe for such devices.

The following practices should be carried out when operating portable heating appliances:

* Do not place the appliance on unstable or readily combustible materials.

* Maintain a clearance of at least 12 inches between the appliance and combustible materials.

* Ensure that the appliance is approved by either Underwriters Laboratories, Inc., or Factory Mutual Research Corporation.

* Connect the appliance directly to a proper electrical outlet using only the cord with which it was originally equipped. Do not use extension cords in lieu of permanent wiring.

* Do not operate appliances during off hours if they are unattended unless they are controlled by a timer installed by an Grace Consulting Inc. electrician. The timer will automatically de-energize the appliance during off hours and energize it not more than 30 minutes before the arrival of personnel. If 24 hour operation is desirable, the proposed operation and arrangement must be reviewed by the local Fire Department and a permit obtained. This permit must be posted near the operating appliance for the information of off-shift personnel who may be checking the area.

Fire Fighting Equipment

This section describes the fixed and portable equipment that is provided in working areas for fire protection. The fixed equipment may include automatic sprinklers, detectors and alarms, fire doors, etc. The portable equipment consists of fire extinguishers and hoses to be operated by employees before the arrival of the local Fire Department.

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Fire Detectors

Several types of automatic fire detectors may be used throughout Grace Consulting Inc., according to particular needs and purposes. All of them will detect fire (by one of several means) and transmit an alarm to the fire station. In the many buildings equipped with evacuation alarm bells, the automatic detectors activate those alarms, as do the manual pull boxes. In some cases, automatic extinguishing systems are activated by automatic detectors. The Fire Department always dispatches firefighters and apparatus to the scene of any automatically actuated alarm.

Sprinkler Systems

Many buildings are provided with automatic sprinkler systems. The sprinkler heads contain a fusible element (most commonly fused at 212 degrees F) which, on melting, opens the head and starts a spray of water. The resulting flow of water in the piping activates an alarm at the fire station, and firefighters are dispatched.

Automatic sprinkler heads can be damaged if they are subjected to mechanical abuse. A protective cage should be installed where such damage is possible. Heat inadvertently applied to the sprinkler head can also activate the sprinkler when no actual fire is present. Normal heat sources should therefore be kept away from sprinkler heads. To avoid decreasing the flow or spread of water or altering the spray pattern, do not allow material or furniture to be located too near the sprinkler head.

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Allow at least 18 inches of clearance around sprinkler heads.

Sprinkler system control valves must be kept accessible for Fire Department use.
Allow at least 3 feet of clearance (enough for a man to pass through easily) around such valves.

Alarm System

In most buildings, evacuation alarm bells are automatically activated when fire is detected. They can also be activated manually at strategically located pull boxes. The emergency actions of personnel and the evacuation procedures for each building or operating area are usually set forth in the Operational Safety Procedures for each building and posted near the main entrance or fire exit or elevator. Never use the elevator in case of a fire.

Fire Doors

Automatic fire doors and dampers are provided at strategic points to close and block the spread of smoke and fire when these are sensed by automatic detectors. Automatic fire doors must never be blocked or left in disrepair so that they cannot close and latch automatically as intended in the event of a fire.

Self-closing fire doors are those doors designed and installed to close each time after being opened. They too must never be blocked, wedged, or tied open. If such doors must be kept open, the self-closers must be replaced with approved automatic smoke-activated release hold-open devices.

Fire Exits

Exit corridors must not be used for storage. The Life Safety Code, NFPA 101, requires that buildings designed for human occupancy must have continuous and unobstructed exits to permit prompt evacuation of the occupants and allow necessary access for responding emergency personnel. The intent of the Code is to keep exits free from obstructions and clear of combustible materials. Attention to housekeeping, therefore, is very important. "Temporary" storage of furniture, equipment, supplies, or anything else is not permitted in exit ways. Combustibles, including recyclable waste paper, are not permitted in exit ways.

Metal lockers with ends and tops ferried to the walls and that do not interfere with minimum exit width requirements may be installed in exit corridors when approved by the Fire Department and the Responsible Safety Officer. The following requirements must be met for storage locker/cabinets:

Cabinets will be permitted on one side of the corridor only.

Cabinets must end at least 6 ft from the corridor exit door.

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Cabinet ends must be at least 12 in. from the edge of the doorway on the latch side and from the edge of the door leaf when fully opened into the corridor.

The cabinets must not be more than 20 in. deep, by 37 in. wide, by 72-3/4 in. high.

The cabinets must be all metal construction with positive latches to prevent spillage of contents in the event of an earthquake.

All doors must return automatically to the closed position when not held open manually.

A 45 degree-angle fairing must be provided from the wall to the corridor corner of the cabinet. Fairing must be provided at both ends of cabinet or bank of cabinets. * A 45 degree-angle fairing must be provided at the top of the cabinets from the outside corridor edge of cabinet to the wall.

All cabinets must be anchored to the wall firmly enough to withstand 0.5g of lateral acceleration (or a lateral load equal to 1/2 the total dead weight of the cabinet and its contents) in the event of an earthquake.

Liquids and chemicals are not to be stored in corridor lockers.

All cabinets must be kept locked, with one key being retained by the Building Manager.

All cabinets must be labeled with the contents and the name, address, and telephone number of the assigned user.

Any deviation from the above requirements must be approved by the Responsible Safety Officer.

Mechanical Equipment Rooms

Mechanical equipment rooms contain boilers, blowers, compressors, filters, electrical equipment, etc. Such rooms must be separated from other areas of a building by fire-resistant walls and doors. To maintain the integrity of these separations, the fire doors must never be left open.

Fan rooms house ventilation equipment which often includes automatic shut down and dampers activated by interlocking with the building smoke and fire detectors. Fire dampers and other automatic shut-down provisions must not be disabled without Fire Department or Responsible Safety Officer approval (as for temporary maintenance procedures).

Mechanical equipment rooms and fan rooms must not be used for storage of any kind.

Construction Areas

Construction areas under control of either Grace Consulting Inc. or outside contractors must be maintained in a fire-safe condition and accessible to emergency response forces.

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Life Safety Code

The Life Safety Code of the National Fire Protection Association, NFPA 101, requires that emergency lighting be provided for means of egress in certain areas.

The Code states emergency lighting is required in exit corridors in any office-type building where the building is two or more stories in height above the level of exit discharge.

In industrial occupancies such as laboratories and shops, the Code requires emergency lighting in all exit aisles, corridors, and passageways. Emergency lighting may be installed in areas where not required by the Code when such areas present an egress hazard during a power failure.

Several types of emergency lights that satisfy the specifications of the Life Safety Code are:

Battery Type - Only rechargeable batteries may be used. The rating of the battery must be such that it provides power for illumination for one and one-half hours in the event of a failure of normal lighting.

Generator Type - When emergency lighting is provided by an electric generator, a delay of not more than 10 seconds is permitted.

Exit sign lights, when burned out, should be reported to Maintenance for service.

Exit Corridors

Exit corridors must not be used for storage. The Life Safety Code, NFPA 101, requires that buildings designed for human occupancy must have continuous and unobstructed exits to permit prompt evacuation of the occupants and allow necessary access for responding emergency personnel. The intent of the Code is to keep exits free from obstructions and clear of combustible materials. Attention to housekeeping, therefore, is very important. "Temporary" storage of furniture, equipment, supplies, or anything else is not permitted in exit ways. Combustibles, including recyclable waste paper, are not permitted in exit ways.

Metal lockers with ends and tops ferried to the walls and that do not interfere with minimum exit width requirements may be installed in exit corridors when approved by the Fire Department and the Responsible Safety Officer.

The following requirements must be met for storage locker/cabinets:

Cabinets will be permitted on one side of the corridor only.

Cabinets must end at least 6 ft from the corridor exit door.

Cabinet ends must be at least 12 in. from the edge of the doorway on the latch side and from the edge of the door leaf when fully opened into the corridor.

The cabinets must not be more than 20 in. deep by 37 in. wide by 72-3/4 in. high.

The cabinets must be all metal construction with positive latches to prevent spillage of contents in the event of an earthquake.

All doors must return automatically to the closed position when not held open manually.

A 45 degree-angle fairing must be provided from the wall to the corridor corner of the cabinet. Fairing must be provided at both ends of cabinet or bank of cabinets. * A 45 degree-angle fairing must be provided at the top of the cabinets from the outside corridor edge of cabinet to the wall.

All cabinets must be anchored to the wall firmly enough to withstand 0.5g of lateral acceleration (or a lateral load equal to 1/2 the total dead weight of the cabinet and its contents) in the event of an earthquake.

Liquids and chemicals are not to be stored in corridor lockers.

All cabinets must be kept locked, with one key being retained by the Building Manager.

All cabinets must be labeled with the contents and the name, address, and telephone number of

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the assigned user.

Any deviation from the above requirements must be approved by Responsible Safety Officer.

No Smoking

Smoking is forbidden in certain areas for fire safety reasons. Such areas include the following:

*Inside buildings

*Where flammable gases or liquids are stored, handled, or used.

*Where significant quantities of combustible materials, such as paper, wood, cardboard, or plastics are stored, handled, or used.

*Where liquid- or gaseous-oxygen is stored, handled, or used.

*Within 20 ft. of a smoke detector.

Areas that are designated as "No Smoking" areas for fire safety reasons are indicated by large rectangular signs consisting of white backgrounds with red letters stating "NO SMOKING."

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Chapter 9

Hand & Power Tools

Grinders

1. Do not use grinding wheels that have chips, cracks or grooves.
2. Do not use the grinding wheel if it wobbles. Tag it "Out of Service."
3. Adjust the tongue guard so that it is no more than 1/4 inch from the grinding wheel.
4. Do not try to stop the wheel with your hand, even if you are wearing gloves.

Drills

1. Do not use dull, cracked or bent drill bits.

Hydraulic/Pneumatic Tools

1. Do not point a compressed air hose at bystanders or use it to clean your clothing.
2. Tag defective or damaged tools "Out of Service" to prevent usage of the tool.
3. Do not use tools that have handles with burrs or cracks.
4. Do not use compressors if their belt guards are missing. Replace belt guards before use.
5. Turn the tool "off" and let it come to a complete stop before leaving it unattended.
6. Disconnect the tool from the air line before making any adjustments or repairs to the tool.

General Hand Tool Safety

1. Tag worn, damaged or defective tools "Out of Service" and do not use them.
2. Do not use a tool if its handle has splinters, burrs, cracks, splits or if the head of the tool is loose.
3. Do not use impact tools such as hammers, chisels, punches or steel stakes that have mushroomed heads.
4. When handing a tool to another person, direct sharp points and cutting edges away from yourself and the other person.
5. When using knives, shears or other cutting tools, cut in a direction away from your body.
6. Do not carry sharp or pointed hand tools such as screwdrivers, scribes, snips, scrapers, chisels or files in your pocket unless the tool or pocket is sheathed.
7. Do not perform "make-shift" repairs to tools.
8. Do not throw tools from one location to another or from one employee to another.
9. Transport hand tools only in tool boxes or tool belts. Do not carry tools in your clothing.

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Chapter 10

Material Handling

Introduction

Grace Consulting Inc. requires that safety planning and practices for commonplace tasks be as thorough as for operations with unusual hazards. Commonplace tasks make up the greater part of the daily activities of most employees and, not unexpectedly, offer more potential sources of accidents with injuries and property damage. Every operation or work assignment begins and ends with handling of materials. Whether the material is a sheet of paper (paper cuts are painful) or a cylinder of toxic gas, accident risks can be reduced with thorough planning. Identifying obvious and hidden hazards should be the first step in planning work methods and job practices. Thorough planning should include all the steps associated with good management from job conception through crew and equipment decommissioning.

Most of the material presented in this chapter is related to the commonplace and obvious. Nevertheless, a majority of the incidents leading to injury, occupational illness, and property damage stem from failure to observe the principles associated with safe materials handling and storage.

A less obvious hazard is potential failure of used or excessive motorized handling or lifting equipment. The Responsible Safety Officer must be notified whenever it is desired to acquire a crane, forklift truck, or other motorized handling or lifting equipment.

Lifting and Moving

Lifting and moving of objects must be done by mechanical devices rather than by manual effort whenever this is practical. The equipment used must be appropriate for the lifting or moving task. Lifting and moving devices must be operated only by personnel trained and authorized to operate them. Employees must not be required to lift heavy or bulky objects that overtax their physical condition or capability.

Manual Lifting Rules

Manual lifting and handling of material must be done by methods that ensure the safety of both the employee and the material. It is Grace Consulting Inc. policy that employees whose work assignments require heavy lifting be properly trained and physically qualified, by medical examination if deemed necessary.

The following are rules for manual lifting:

*Inspect the load to be lifted for sharp edges, slivers, and wet or greasy spots.

*Wear gloves when lifting or handling objects with sharp or splintered edges. These gloves must be free of oil, grease, or other agents that may cause a poor grip.

*Inspect the route over which the load is to be carried. It should be in plain view and free of obstructions or spillage that could cause tripping or slipping.

*Consider the distance the load is to be carried. Recognize the fact your gripping power may weaken over long distances.

*Size up the load and make a preliminary "heft" to be sure the load is easily within your lifting capacity. If it is not, get help.

*If team lifting is required, personnel should be similar in size and physique. One person should act as leader and give the commands to lift, lower, etc.

*Two persons carrying a long piece of pipe or lumber should carry it on the same shoulder and walk in step. Shoulder pads should be used to prevent cutting shoulders and help reduce fatigue.

To lift an object off the ground, the following are manual lifting steps:

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*Make sure of good footing and set your feet about 10 to 15 inches apart. It may help to set one foot forward of the other.

*Assume a knee-bend or squatting position, keeping your back straight and upright. Get a firm grip and lift the object by straightening your knees - not your back.

*Carry the load close to your body (not on extended arms). To turn or change your position, shift your feet - don't twist your back.

*The steps for setting an object on the ground are the same as above, but in reverse.

Mechanical Lifting

Mechanical devices must be used for lifting and moving objects that are too heavy or bulky for safe manual handling by employees. Employees who have not been trained must not operate power-driven mechanical devices to lift or move objects of any weight. Heavy objects that require special handling or rigging must be moved only by riggers or under the guidance of employees specifically trained and certified to move heavy objects.

Inspections

Each mechanical lifting or moving device must be inspected periodically. Each lifting device must

also be inspected before lifting a load near its rated capacity. Defective equipment must be repaired before it is used. The rated load capacity of lifting equipment must not be exceeded.

Material moving equipment must be driven forward going up a ramp and driven backward going down a ramp.

Traffic must not be allowed to pass under a raised load.

The floor-loading limit must be checked before mobile lifting equipment enters an area. Passengers must not be carried on lifting equipment unless it is specifically equipped to carry passengers.

Load Path Safety

Loads moved with any material handling equipment must not pass over any personnel. The load path must be selected and controlled to eliminate the possibility of injury to employees should the material handling equipment fail.

Equipment worked on while supported by material handling equipment must have a redundant supporting system capable of supporting all loads that could be imposed by failure of the mechanical handling equipment. A suspended load must never be left unattended but must be lowered to the working surface and the material handling equipment secured before leaving the load unattended.

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Truck Loading

All objects loaded on trucks must be secured to the truck to prevent any shifting of the load in transit. The wheels of trucks being loaded or unloaded at a loading dock must be chocked to prevent movement.

Clean Work Areas

All areas controlled by Grace Consulting Inc. must be kept in orderly and clean condition and used only for activities or operations for which they have been approved. The following specific rules must also be followed:

Keep stairs, corridors, and aisles clear. Traffic lanes and loading areas must be kept clear and marked appropriately.

Store materials in workrooms or designated storage areas only. Do not use hallways, fan lofts, or boiler and equipment rooms as storage areas.

Do not allow exits, passageways, or access to equipment to become obstructed by either stored materials or materials and equipment that is being used.

Arrange stored materials safely to prevent tipping, falling, collapsing, rolling, or spreading - that is,

any undesired and unsafe motion.

Do not exceed the rated floor capacity of stored material for the area. The load limit and the maximum height to which material may be stacked must be posted.

Place materials such as cartons, boxes, drums, lumber, pipe, and bar stock in racks or in stable piles as appropriate for the type of material.

Store materials that are radioactive, fissile, flammable, explosive, oxidizing, corrosive, or pyrophoric only under conditions approved for the specific use by the Responsible Safety Officer.

Segregate and store incompatible materials in separate locations.

Remove items that will not be required for extended periods from work areas and put them in warehouse storage. Call for assistance.

Temporary equipment required for special projects or support activities must be installed so that it will not constitute a hazard. A minimum clearance of 36 inches must be maintained around electrical power panels. Wiring and cables must be installed in a safe and orderly manner, preferably in cable trays. Machinery and possible contact points with electrical power must have appropriate guarding. The controls for temporary equipment must be located to prevent inadvertent actuation or awkward manipulation. When heat-producing equipment must be installed, avoid accidental ignition of combustible materials or touching of surfaces above 60 degrees C (140 F). Every work location must be provided with illumination that meets OSHA requirements. Evaluation of illumination quality and requirements is made by the Responsible Safety Officer, but the supervisor of an area is responsible for obtaining and maintaining suitable illumination.

Areas without natural lighting and areas where hazardous operations are conducted must be provided with enough automatically activated emergency lighting to permit exit or entry of personnel if the primary lighting fails.

Forklift Operators

The Responsible Safety Officer must be notified whenever it is desired to acquire a crane from excess sources.

OSHA Standards for Forklifts

Forklift users must familiarize themselves with and comply with OSHA Standard 29 CFR 1910.178 and ANSI B56.1.

Modifications and additions must not be performed by the customer or user without manufacturer's prior authorization or qualified engineering analysis. Where such authorization is granted, capacity, operation and maintenance instruction plates, tags, or decals must be changed accordingly.

If the forklift truck is equipped with front end attachments other than factory installed attachments, the user must ensure that the truck is marked with a card or plate that identifies the current attachments, shows the approximate weight of the truck with current attachments and shows the lifting capacity of the truck with current attachments at maximum lift elevation with load laterally centered.

The user must see that all nameplates and caution and instruction markings are in place and legible.

The user must consider that changes in load dimension may affect truck capacities.

Forklift Maintenance

Because forklift trucks may become hazardous if maintenance is neglected or incomplete, procedures for maintenance must comply with ANSI B56.1 Section 7 and OSHA Standard 29 CFR 1919.178 (g).

Forklift Extension

Maximum efficiency, reliability, and safety require that the use of fork extensions be guided by principles of proper application, design, fabrication, use, inspection, and maintenance. The user must notify the Responsible Safety Officer before purchasing extensions or having them fabricated.

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Fork extensions are only appropriate for occasional use. When longer forks are needed on a regular basis, the truck should be equipped with standard forks of a longer length.

Routine on-the-job inspections of the fork extension must be made by the fork lift operator before each use unless, in the judgment of the supervisor, less frequent inspections are reasonable because of his or her knowledge of its use since the last inspection. Extensions must be inspected for evidence of bending, overload, excess corrosion, cracks, and any other deterioration likely to affect their safe use.

All fork extensions must be proof load tested to establish or verify their rated capacities, whether they were supplied commercially or fabricated at Grace Consulting Inc.. A load equal to the rated capacity of the pair at a particular load center multiplied by 1.15, must be placed on each fork extension pair and fork assembly and supported for a period of five minutes without any significant deformation. Rated capacity must be determined at significant load centers, including the midpoint of the extension and at the tip. Once determined, the rated capacity and load center information must be shown by stamping or tagging the extensions in a protected location of low stress. The proof load test must be witnessed by a mechanical engineer or designer.

Whenever evidence of deterioration is detected or whenever the extensions have been overloaded, magnetic particle inspection must be performed.

Chapter 11

Hearing Conservation Program

Introduction

This chapter contains information on the effects, evaluation, and control of noise. For assistance in evaluating a noise problem, contact the Responsible Safety Officer.

Danger of Noise

Exposing the ear to high levels of noise may cause hearing loss. This loss can be temporary or permanent. Temporary hearing loss or auditory fatigue occurs after a few minutes exposure to an intense noise but is recoverable following a period of time away from the noise. If the noise exposure is repeated, there may be only a partial hearing recovery and the loss becomes permanent. Typically, significant hearing losses occur first in the frequency range of 3,000 to 6,000 hertz (Hz). Losses in this frequency range are not critical to speech perception, and the individual usually is completely unaware of this initial symptom. With longer exposures, the hearing loss spreads to lower frequencies, which will affect speech perception. Workers' Compensation laws regard hearing losses in the speech frequency range of 500 to 3,000 Hz as being compensable.

The evaluation of hearing loss due to noise is complicated by the fact that hearing acuity normally decreases with increasing age. Further, the losses associated with age are quite similar to those caused by excessive noise since the hearing for high frequency sounds is most affected in both instances. Hearing impairment may also result from infections, tumors, and degenerative diseases.

ACGIH Standards

OSHA has prescribed the limits established by the American Conference of Governmental Industrial Hygienists as a standard for occupational noise exposure. Both the sound pressure level of the noise and the total duration of the noise exposure are considered to determine if these limits are exceeded. The sound pressure levels are expressed as dBA or decibels A-weighted. A-weighting filters are used when measuring sound levels to more accurately predict the response of the human ear to different frequencies.

When the daily noise exposure is composed of two or more periods of noise of different levels, their combined effect must be considered rather than the individual effect of each.

Permissible Noise Exposure

Duration per day (hours) vs. Sound level dBA (slow response)

8 Hours - 85 dBA

6 Hours - 92 dBA

4 Hours - 95 dBA

3 Hours - 97 dBA

2 Hours - 100 dBA

1.5 Hours - 102 dBA

1 Hour - 105 dBA

.5 Hour - 110 dBA

.25 Hour or less - 115 dBA

Levels in excess of the permissible exposure limit as outlined in this section require use of the appropriate personal protective equipment- (hearing protection).

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Reducing Noise Exposure

Noise exposure can be reduced by using engineering controls, administrative procedures, or personal protective devices.

Engineering Controls

Reduction of noise production at the source:

Proper design of new machines

Modification of present machines

Proper repair and upkeep of equipment

Use of appropriate mufflers

Use of vibration dampeners on machines

Reduction of noise transmission:

Increase distance between noise and personnel exposed

Construction of barriers between noise source and personnel

Sound treatment of ceilings and walls

Administrative Procedures:

Job schedule changes

Personnel rotation

Personnel Protective Devices:

Ear plugs

Earmuffs

Federal and state occupational safety and health regulations require that whenever employees are exposed to excessive noise levels, feasible engineering or administrative controls must be used to reduce these levels. When these control measures cannot be completely accomplished and/or while such controls are being initiated, personnel must be protected from the effects of excessive noise levels. Such protection can, in most cases, be provided by wearing suitable protective hearing devices.

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The appropriate Medical Services provider and/or the supervisor of the Department will supply ear plugs for employees upon request or before going into a high noise area. There is a need for medical supervision when ear plugs are used because their effectiveness depends on proper fitting. Only approved plugs should be used. Ear plugs should be cleaned daily to prevent ear infections.

Protection greater than that provided by a single device can be obtained by wearing ear plugs under an earmuff. While the reduction provided by wearing both devices simultaneously is considerably less than the sum of the individual attenuations, it is still greater than when either device is worn separately.

Chapter 12

Personal Protective Equipment

Introduction

Grace Consulting Inc. will provide suitable equipment to protect employees from hazards in the workplace. The Safety Manager will be responsible for this program and advise on what protective equipment is required for the task, but the supervisor of the operation must obtain this equipment and see that it is used. New safety equipment purchased will be tested by the Safety Manager or Safety Coordinators prior to being used in the field. This program will be audited annually for effectiveness.

Personal protective equipment shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazard due to processes or environment. Activities involving specialized operations may present hazards that are difficult or impossible to completely eliminate, or adequately safeguard against, by using engineering controls. When a hazard still exists after all practical engineering control measures have been taken, personnel must be provided with adequate protection through the use of personal protective equipment. The type of personal protective equipment required for any hazardous operation depends upon the nature and severity of the hazards involved. The Supervisor shall conduct a Hazard Assessment at all jobsites so that proper PPE can be selected and employees will be required to wear at all times.

The Hazard Assessment shall be documented in writing and shall include, at a minimum, identification of the area(s) assessed, the date of the assessment, the name of the person(s) conducting the assessment, identification of the hazards present *(or likely to be present),* and identification of the specific PPE required to be used to mitigate the hazard(s). The Hazard Assessment shall be maintained on file. Additional assessments shall be conducted whenever new hazards become present, or become likely to be present. Ultimately, it is the responsibility of the supervisor to ensure a safe work environment, and provide proper personal safety protection, for their employees.

Based on the results of the supervisor's hazard assessment, the supervisor shall select the type of PPE to be utilized. The rationale for the PPE selection shall be communicated to the employees by the supervisor and the supervisor shall ensure that the selected PPE is furnished to the employee and is properly used by the employees. Grace Consulting Inc. employees will be responsible for the adequacy, maintenance, and sanitation of any PPE provided or owned by employees for any reason. Regardless of origin, no PPE considered for use shall be defective or damaged.

The supervisor will ensure that all employees are properly trained in the following:

*When PPE is necessary

*What PPE is necessary
*How to properly don, doff, adjust and wear PPE
*The limitations of the PPE, and
*The proper care, maintenance, useful life and disposal of the PPE

The supervisor shall certify in writing that each employee has been properly trained in the above and that each employee has demonstrated an understanding of the training discussed above and the ability to use the selected PPE, before being allowed to perform work requiring the use of PPE. Employees shall be provided retraining as the supervisor deems necessary to ensure compliance with 29 CFR 1910.132.

When the supervisor has reason to believe that any affected employee who has already been trained does not have the understanding and skill required to properly use PPE, the supervisor shall provider additional training to each such employee. Other circumstances where retraining is necessary include, but are not limited to, situations where the workplace render previous training obsolete; or changes in the types of PPE to be used, render previous training obsolete.

PPE equipment will not be used as a substitute for the elimination of hazardous conditions, but as a supplemental safety measure that is required when engineering controls cannot successfully eliminate or satisfactorily control the hazard. Supervisory personnel shall ensure that the PPE is being used correctly. Equipment must be maintained in reliable condition at all times. The RSO Aaron Conner, or designated person will be responsible for ensuring that all contractor personnel, including subcontractors, comply with 29 CFR 1910.132. PPE worn in areas where chemicals or asbestos contaminants have been encountered shall not be taken to the wearer's residence for cleaning, care or maintenance without first being decontaminated.

Protection Issued

Protective clothing is not a substitute for adequate engineering controls. Protective clothing will be issued to employees who work with hazardous material for the purpose of protecting their health and safety.

The Responsible Safety Officer is available for consultation as needed.

Protective Shoes

Grace Consulting Inc. encourages the wearing of safety shoes. For certain types of work the wearing of safety shoes is required by Company policy or by federal regulations. Examples are when employees are exposed to foot injuries from hot, corrosive, or poisonous substances; in shops, in equipment handling, or in construction jobs where there is a danger of falling objects; or in abnormally wet locations.

Protective Gloves

Grace Consulting Inc. provides proper hand protection to employees exposed to known hand

hazards. The supervisor must obtain the suitable hand protection and ensure that it is used. The individual should maintain a supply of special or infrequently used hand protection.

Assistance in selecting the proper hand protection may be obtained by consulting the Responsible Safety Officer.

Head Protection

Grace Consulting Inc. provides appropriate head protection devices for employees to protect them from head or other injuries that could result from their working environment. Some head protection devices are available from stock. The supervisor must also maintain sufficient supply of head protection devices for visitors in the area.

Eye Protection

Grace Consulting Inc. provides appropriate eye protection devices for employees assigned to tasks in which an eye-injury hazard exists. The supervisor of the operation is responsible for determining the need for suitable eye-protection devices and for ensuring that the employees use them.

The Responsible Safety Officer will assist the supervisor and/or employee in defining eye-hazard operations and in selecting appropriate eye protection. A supervisor is available to issue, repair, adjust, fit, or dispose-of personal safety glasses and also for consultation regarding occupational eye protection. The standard sign:

CAUTION, EYE HAZARD AREA, DO NOT ENTER WITHOUT EYE PROTECTION,

must be posted in every area where eye protection is mandatory. All employees who work in such an area must wear the eye protection issued to them. Every visitor to the area must also be provided with suitable eye protection.

Electrical PPE

-Employees exposed to electrical hazards will ensure PPE is fitted to each affected employee.

-Employees working in areas where there are potential electrical hazards shall be provided with, and shall use, electrical protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed.

-Equipment shall be maintained in a safe, reliable condition and shall be periodically inspected and/or tested.

-If the insulating capability of protective equipment may be subject to damage during use, the insulating material shall be protected. (An example might be an outer covering of leather used for the protection of rubber insulating material.)

-Employees shall wear nonconductive head protection wherever there is a danger of head injury from electric shock or burns due to contact with exposed energized parts.

-Employees shall wear protective equipment for the eyes or face wherever there is danger of injury to the eyes or face from electric arcs or flashes or from flying objects resulting from electrical explosion.

-Employee shall use insulated tools or handling equipment if they might make contact with conductors or parts. Program shall state that if the insulating capability of insulated tools or handling equipment is subject to damage, the insulating material shall be protected.

-Ropes and handlines used near exposed energized parts shall be nonconductive.

-Protective shields, protective barriers, or insulating materials shall be used to protect each employee from shock, burns, or other electrically related injuries while that employee is working near exposed energized parts. When normally enclosed live parts are exposed for maintenance or repair, they shall be guarded to protect unqualified persons from contact with the live parts.

-Supervisors will discuss alerting techniques used to warn and protect employees from hazards which could cause injury due to electric shock, burns or failure of electric equipment parts. (Alerting techniques can take the form of safety signs and tags, barricades & attendants.)

Failure to use required Personal Protective Equipment will result in disciplinary action or dismissal.

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Chapter 13

Respiratory Protection Program

Introduction

The Respiratory Protection Program has been established to protect the health of workers who wear respirators and assure compliance with State and Federal law. Every worker who uses a negative pressure cartridge or canister respirator must be included in the program. Medical monitoring, training, fit testing, maintenance and quality assurance components are basic parts of this program.

Any operation that generates harmful airborne levels of dusts, fumes, sprays, mists, fogs, smokes, vapors, or gases or that may involve oxygen-deficient atmospheres requires the use of effective safety controls. This must be accomplished, as much as feasible, by accepted engineering control measures *(for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials).* When effective engineering controls are not feasible, or while they are being instituted, appropriate respiratory protection must be used in accordance with Grace Consulting Inc.'s requirements as prescribed by OSHA & ANSI Standard Practices for Respiratory Protection. Every worker who uses a negative pressure cartridge or canister respirator must be included in the program. Workers using other types of respirators may be required to comply with some program requirements.

Lightweight single use respirators may sometimes be worn in situations where respiratory protection is required, such as to control exposure to airborne particles. However, workers must be fit tested with the make and model of respirator they will wear, instructed in its use, and meet the other maintenance and quality assurance components requirements of this program.

Responsibilities

To ensure that the respiratory protection program is conducted in accordance with OSHA & ANSI, certain responsibilities are required of each employee, supervisor, Responsible Safety Officer, and the employer medical services provider. An employee has the responsibility to use provided respiratory protection in accordance with this program. Male employees must remain clean shaven where an issued respirator touches their face; this is to assure proper fit of the respirator under conditions of use.

Employees are also responsible for:

*Wearing the respirator in accordance with the instructions and training received.

*Maintaining and storing the respirator in good condition.

*Returning the respirator at the end of the required use for overhaul, cleaning, and disinfection.

Supervisors are responsible for:

*Identifying those employees who may need to use respiratory protection *(The Responsible Safety Officer will provide assistance upon request in this determination).*

Note: Users of lightweight single-use respirators are not required to be included in this program if they work in situations where overexposure to chemical substances is not going to occur and respirator misuse is not likely. These exposures are generally described as nuisance situations where the worker is more comfortable with some respiratory protection. Workers may also use lightweight single-use respirators to control exposure to a non-occupational condition such as an allergy without being included in the program.

*Ensuring that their employees have been properly trained and fitted.

*Ensuring that their employees use the respirators as required.

Surveillance of the work area. Before the start of any project, as part of the Hazard Analysis, a careful determination shall be made as to present, or potential airborne hazards to which employees may be exposed.

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The Responsible Safety Officer is responsible for:

*Providing respiratory equipment.

*Maintaining the equipment in good condition.

*Fitting employees with proper respirators and providing training for their use.

*Evaluating employee exposures and work conditions, including inspection of respirator use.

Procedure

Respiratory protection devices will be chosen after considering the following factors:

*Health of the worker and ability to wear a respirator
*Nature of the hazard, e.g. toxicity, chemical and physical properties
*Extent of the hazard *(concentration)* and time of exposure
*Work requirements and conditions
*Characteristics and limitations of available respirators

Medical monitoring

Grace Consulting Inc. must make employees available and pay for medical monitoring. Grace Consulting Inc. may contract with a local health care provider. Medical status for workers who use respirators shall be reviewed annually.

Persons must not be assigned to tasks requiring the use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. The Examining Physician responsible for the employee's care will determine what diagnostic method is necessary to determine whether medical conditions exist which would prohibit or limit respirator use. Pulmonary function tests, including forced vital capacity (FVC) and forced expiratory volume at one second (FEV1.0), and a medical questionnaire may be given to employees. The Respiratory Medical Evaluation Form may be used by the Examining Physician to evaluate any person, except asbestos workers, who may use a respirator.

Asbestos workers must be asked to fill out a Respirator Program Medical Evaluation Form for Asbestos Workers. Asbestos workers are individuals who routinely work in areas where exposure might exceed the OSHA action level for asbestos. Presently, the action level means an airborne concentration of asbestos, tremolite, anthophyllite, actinolite, or a combination of these minerals of 0.1 fibers/cc of air as calculated on an 8-hour time weighted average. However, if an employee requests a respirator because of a belief that exposure to asbestos will exceed the action level for asbestos, then the employee must meet all requirements of the program for asbestos.

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Medical certification

Pertinent health factors, conditions on the job site, and the employee's health status will be considered by the Examining Physician. The Examining Physician will certify whether the employee is capable of wearing a respirator and describe any physical limitation.

Fit testing

Fit testing must be done whenever something happens which could affect the fit of a respirator such as when an employee's facial characteristics change or the respirator design changes. Fit testing is required annually for workers exposed to benzene and semi-annually for workers exposed to asbestos, arsenic, lead, and acrylonitrile. Workmen with facial hair in the respirator area will not be issued respirators requiring a fit test because it cannot be determined that the respirator will fit under conditions of use. Fit testing shall include face-to-seal fit, wearing in normal air for a long familiarity period, and testing in a test atmosphere. Fit testing will be done after the employee's annual medical evaluation, if one is required.

Monitoring of Air Contaminants

Air contaminant levels during routine operations will be monitored by Grace Consulting Inc. before the type of respiratory protection is selected. Existing operations undergoing a change that might significantly alter the concentration of air contaminants should be evaluated by Grace Consulting Inc. to determine if another method of protection is appropriate.

Categories of respiratory hazard

Oxygen deficient atmospheres require the use of an independent respirable atmosphere. Employees who work in areas where "emergency use only" SCBA pressure-demand respirators are available shall be trained in SCBA use, but medical monitoring is not required.

Immediately dangerous conditions are defined as: Conditions that pose an immediate threat to life or health and/or conditions that pose an immediate threat of severe exposure to contaminants that are likely to have delayed adverse affects on health.

The Confined Space Entry Program must be followed. An attendant must be present in a safe location at the entrance to oxygen deficient or immediately dangerous areas in order to maintain communication and to provide proper rescue equipment in case of emergency.

Selection of Respirators

Once a respiratory hazard is identified, the RSO or designated personnel will select the proper respiratory protection based on the nature of the hazard. Selection will be made in compliance of OSHA Respiratory Protection Standard. Only NIOSH/MSHA approved respirators will be assigned to personnel. Respirators will be selected based on the exposure hazard. Any choice of respirator will be based on American National Standard Practices for Respiratory Protection Z88.2.

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Particulate Respirator Protection

To select the correct respirator for protection against particulates, the following conditions must be known:

*The identity and concentration of the particulates in the workplace air

*The OSHA or MSHA permissible exposure limit *(PEL),* the NIOSH recommended exposure limit *(REL),* or other occupational exposure limit for the contaminant

*The hazard ratio *(HR) (i.e., the airborne particulate concentration divided by the exposure limit)*

*The APF for the class of respirator *(the APF should be greater than the HR)*

*The immediately dangerous to life or health *(IDLH)* concentration, including oxygen deficiency [NIOSH 1994]

*Any service life information available for combination cartridges or canisters

Multiplying the occupational exposure limit by the APF for a respirator gives the maximum workplace concentration in which that respirator can be used. For example, if the commonly accepted APF for a half-mask respirator is 10 and the PEL is 5 mg/m3, then 50 mg/m3 is the highest workplace concentration in which a half-mask respirator can be used against that contaminant. If the workplace

concentration is greater than 50 mg/m3, a more protective respirator *(with a higher APF)* should be used. In no case should an air-purifying respirator be used in IDLH concentrations.

Any required air quality monitoring of the workplace will be done by Grace Consulting Inc., which will maintain records. Monitoring results will also be provided to affected individuals.

Respirator Distribution

Whenever possible, reusable respirators should be assigned to individual workers for their exclusive use. Permanently assigned respirators must be durably marked with the name of that person and the date issued. When disposable respirators are issued, the same models that were fit tested must be kept in stock.

Grace Consulting Inc. will issue a respirator from its stock when an employee is first fit tested or when a new type of respirator is issued on a subsequent fit. Grace Consulting Inc. shall maintain a stock of replacement respirators and/or cartridges and issue them to the employee as necessary.

Those who issue canisters-cartridges must see that they are properly labeled and colored before they are put into service. The labels and colors must be maintained until they are disposed.

If it is necessary to replace a reusable respirator because of loss or damage, the newly issued respirator must be fit tested before it is used. This is to ensure that the respirator is not defective.

Training

Employees who will use respirators will be given training on a yearly basis. Training may be performed after fit testing is done or other arrangements may be made. Grace Consulting Inc. will maintain records of training. Training certificates shall include at a minimum, employee name, date of training, and type of training. In areas where job tasks and materials change, Grace Consulting Inc. must be contacted to provide an updated training.

Inspection

Each respirator must be inspected routinely before and after each use by the employee using it. Respirators for emergency use must be inspected after each use, or at least once each month, by the employees to whom they are assigned. Inspections of emergency respirators should be done according to manufacturers' instructions.

Cleaning and Disinfecting

Respirators issued for exclusive use must be cleaned and disinfected after eight hours of use, or as necessary to ensure protection for the wearer. Respirators used by more than one person and emergency respirators must be cleaned and disinfected after each use. During cleaning, an

inspection shall be made, and any worn or deteriorated parts or components shall be repaired or replaced. Respirators for emergency use *(such as SCBA's)* shall be inspected at least once a month, and after every use.

Maintenance

Employees shall arrange for replacement or repairs by experienced persons with parts designed for the respirator. Do not attempt to replace components or make adjustments or make repairs beyond the manufacturer's recommendations. Self-contained breathing apparatus or air line respirators must be returned to a professional repair service or the manufacturer when it is required for repair or testing.

Storage

After inspection, cleaning and necessary repair, store respirators to protect them against dust, sunlight, heat, extreme cold, excessive moisture, or damaging chemicals.

Program Evaluation

Grace Consulting Inc. will evaluate this program through periodic and random inspections to assure that respirators are properly used, cleaned and maintained. Periodically, Grace Consulting Inc. will survey to determine whether anyone is using a respirator who is not included within the program. Program evaluation reports will be kept by the RSO, Aaron Conner.

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Record keeping

Grace Consulting Inc. will maintain the following records:

*Operations requiring respiratory protection, specific respiratory protection used, and names of employees who wear the respirators.

*Number and types of respirators in use. These records must be maintained for 30 years.

*A record of employee training programs. Records will be maintained for five years past the date of employment of that employee.

*Fit tests performed on employees. The records will be maintained for 30 years.

*Records on respirator inspection and maintenance activities. These records will be maintained for five years

*The Examining Physician will maintain medical records according to State law.

Grace Consulting Inc. will maintain asbestos exposure measurements for thirty years. Monitoring records will include the following information.

Date of any measurements, operations involving exposure, sample and analytic measure, number, duration and results, and type of respiratory protection worn.
Records shall include the name, social security number and exposure of employees whose exposures are represented.

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Chapter 14

Employee Environmental Protection

Protective Clothing

Workers in the normal course of their duties are required to perform work in adverse weather conditions. Precautions and continuing measure shall be taken by each worker to minimize health risks and discomfort from working in these conditions.

Hot Weather

Employees who work in outdoor places of employment or on job tasks in other areas at those times when the environmental risk factors for heat illness are present, are at risk for developing heat illnesses if they do not protect themselves appropriately. The objective of this program is employee awareness regarding heat illness symptoms, ways to prevent illness, and what to do if symptoms occur.

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POLICY

It is the policy of Grace Consulting Inc. that any employee participating in job tasks when environmental risk factors for heat illness are present will comply with the procedures in this document.

PURPOSE

To ensure that all employees of Grace Consulting Inc. are protected from heat illness while working on job tasks where environmental risk factors for heat illness are present and to establish the minimum requirements for working in this environment.

DEFINITIONS

The term "acclimatization" means temporary adaptation of the body to work in the heat that occurs gradually when a person is exposed to it. Acclimatization peaks in most people within four to fourteen days of regular work for about two hours per day in the heat.

“Environmental risk factors for heat illness” means working conditions that create the possibility that heat illness could occur, including air temperature, relative humidity, radiant heat from the sun and other sources, conductive heat sources such as the ground, air movement, workload severity and duration, protective clothing and personnel protective equipment worn by employees.

The term “heat illness” means a serious medical condition resulting from the body’s inability to cope with a particular heat load, and includes heat cramps, heat exhaustion, heat syncope, and heat stroke.

“Personal risk factors for heat illness” means factors such as an individual’s age, degree of acclimatization, health, water consumption, alcohol consumption, caffeine consumption, and use of prescription medications that affect the body’s water retention or other physiological responses to heat.

“Preventative recovery period” means a period of time to recover from the heat in order to prevent heat illness.

The term “shade” means blockage of direct sunlight. Canopies, umbrellas, and other temporary structures or devices may be used to provide shade. One indicator that blockage is sufficient is when objects do not cast a shadow in the area of blocked sunlight. Shade is not adequate when heat in the area of shade defeats the purpose of shade, which is to allow the body to cool. For example, a car sitting in the sun does not provide acceptable shade to a person inside it, unless the car is running with air conditioning.

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RESPONSIBILITIES

The RSO. or designated representative is responsible for:

Assisting with providing training to all potentially impacted employees and their supervisors on the risks and prevention of heat illness, including how to recognize symptoms and respond when they appear.

Directors, Managers, and Supervisors are responsible for:

*Identifying all employees who are required to work outdoors where potential heat illness could occur and identifying the supervisor of the employees.

*Assuring that adequate water and shade are available at a job site when the environmental risk factors for heat illness are present.

*Ensuring that all affected employees have received proper training on heat illness prevention.

*Ensuring that the requirements in this document are followed.

*Contacting EMS to request emergency medical services in the event medical assistance is required.

Affected employees are responsible for:

*Complying with the provisions of this Heat Illness Prevention Program, as described in this document and in the training sessions they attend.

*Ensuring they have drinking water available at all times when the environmental risk factors for heat illness are present.

*Ensuring they have access to a shaded area to prevent or recover from heat related symptoms.

*Reporting heat related illness symptoms to your supervisor.

BASIC REQUIREMENTS

The following basic requirements apply to all employees while working where environmental risk factors for heat illness are present.

All employees shall be identified who are required to work where environmental factors for heat illness are present.

Training shall be provided for all potentially impacted employees working where environmental risk factors for heat illness are present and their supervisors. Training information shall include but not be limited to the topics listed in the training section of this written program. All potentially impacted employees and supervisors who supervise these employees must be trained on the risks and prevention of heat illness, including how to recognize symptoms and respond when they appear.

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Drinking water in the quantity of 1 quart per hour shall be available at all times for each employee for the duration of the entire shift while working outdoors in the heat. Supervisors shall remind employees to drink frequently and this topic will be addressed at tailgate meetings.

Employees shall have access to a shaded area to prevent or recover from heat illness symptoms and where they can take their rest breaks. The importance of taking rest breaks and recognizing when a preventative recovery period is needed allowing employees to cool shall be addressed at tailgate meetings.

In the event an employee feels discomfort from the heat, a preventative recovery period is needed to allow the employee to cool down and prevent the onset of heat illness.

Supervisors and employees shall carry radios or other means of communication to ensure that emergency services can be called. Verification that the radios or other means of communication are functional at the worksite shall be carried out prior to each shift.

TRAINING

Training shall be provided for employees working on job tasks where environmental risk factors for heat illness are present, and training for their respective supervisors.

All employees working on job tasks where environmental risk factors for heat illness are present shall receive instruction before being assigned to work tasks.

Training topics shall include the following:

*Environmental and personal risk factors for heat illness.

*Procedures for identifying, evaluating, and controlling exposures to the environmental and personal risk factors for heat illness.

*Employees who experience excessive sweating require frequent consumption of small quantities of water, up to 4 cups per hour when working in extreme conditions of heat.

*Importance of acclimatization.

*Different types, signs, and symptoms of heat illness.

*Importance of immediately reporting symptoms or signs of heat illness in themselves or in coworkers to their supervisor.

*Procedures for responding to symptoms of possible heat illness, including how emergency medical services will be contacted and provided, should they become necessary.

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SUPERVISORS OF AFFECTED EMPLOYEES

Supervisors or their designees shall receive training on the following topics prior to being assigned to supervise outdoor employees:

*Information as detailed above in employee training requirements.

*Procedures the supervisor shall follow to implement the provisions of this program.

*Procedures the supervisor shall follow when an employee exhibits symptoms consistent with possible heat illness, including emergency response procedures.

Cold Weather

Workers should prepare for cold weather by wearing several layers of clothing. This allows the

worker to remove or add layers as necessary throughout the work shift as temperature, and the worker's heat changes. Coffees, teas, and other hot drinks may help the worker maintain body temperature. Under no circumstances shall any alcoholic beverages be used. Hoods, facemasks, insulated boots, gloves and glove liners should all be considered in extreme weather conditions. Certain combinations of temperature, wind, and jobsite location may make it impractical to work. In those extreme cases, workers should check with their supervisor, or the responsible safety officer, Aaron Conner for direction.

Wet or Inclement Weather

Workers exposed to rain, sleet, snow, or other wet conditions shall wear protective, waterproof clothing. Careful assessment of the jobsite under inclement weather conditions must be made. Slips and falls may happen in the general jobsite area of work, in addition to slips from ladders, scaffold, or other work surfaces. Any electrically- operated tools shall not be used in wet conditions due to the risk of electrical shock.

Windy Conditions

Workers in windy conditions are at great risk. Handling large, lightweight materials, working on ladders, or elevated work surfaces, and working with small lightweight materials are all examples of job duties, which pose special hazards in windy conditions. Therefore, each jobsite and work assignments shall be assessed for dangers from high winds.

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Chapter 15

Ladders

Ladders

Ladders must be in good condition, made of suitable material, of proper length, and of the correct type for the use intended. Ladders shall not be altered, modified, or attached to other ladders to extend their reach. Damaged ladders must never be used; they should be repaired by a qualified person or destroyed. Ladders used near electrical equipment must be made of a nonconducting material (fiberglass or equivalent). For construction activities, ladders must be class 1 rated (heavy Duty) or higher.

A portable ladder must not be used in a horizontal position as a platform or runway or by more than one person at a time, unless designed for such use. A portable ladder must not be placed in front of doors that open toward the ladder, unless locked or blocked to prevent use. Never set ladders on boxes, barrels, or other unstable bases. Ladders must not be used as guys, braces, or skids. The height of a stepladder should be sufficient to reach the work station without using the top or next to the top steps. Bracing on the back legs of stepladders must not be used for climbing.

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The proper angle (75-1/2 degrees) for a portable straight ladder can be obtained by placing the base of the ladder a distance from the vertical wall equal to one quarter of the vertical distance from base to top of ladder's resting point. Ladders must be ascended or descended facing the ladder with both hands free to grasp the ladder. Tools must be carried in a tool belt or sling or raised with a hand line attached at the top of the ladder. Extension ladders should be tied at or near the top to prevent side slip. In some cases where ground conditions are slippery or unstable, the bottom of the ladder shall also be secured by some means. Ladders used to gain access to another level needs to extend at least three feet above the landing area.

Remember to always “Look up, and Live” by checking the area for any exposed electrical devices or powerlines. Never use a ladder when any part of your body or materials will be within three feet (3ft.) of any exposed electrical devices or insulated powerlines 300 Volts or below, and ten feet (10ft.) for any other uninsulated powerlines or any powerlines or electrical devices from 300 Volts to 50,000 Volts. Higher voltages may require greater distances - check with the local utility for recommended clearances.

Ladder rungs, cleats, and steps shall be parallel, level and uniformly spaced when the ladder is in position for use. Ladders shall be used only on stable and level surfaces and only used for the purposes intended. All ladders shall be visually inspected prior to each use and should be removed from service if any deficiencies are noted.

Some Ladder Do's and Don'ts

General

1. Read and follow the manufacturer's instructions label affixed to the ladder if you are unsure how to use the ladder.
2. Do not use ladders that have loose rungs, cracked or split side rails, missing rubber foot pads, or are otherwise visibly damaged.
3. Keep ladder rungs clean of grease. Remove buildup of material such as dirt or mud.
4. When performing work from a ladder, face the ladder and do not lean backward or sideways from the ladder.
5. Do not stand on the top two rungs of any ladder.
6. Do not stand on a ladder that wobbles, or that leans to the left or right.
7. Do not try to "walk" a ladder by rocking it. Climb down the ladder, and then move it.
8. Allow only one person on the ladder at a time, unless the ladder is designed for such use.
9. Do not allow your center of gravity (usually your belt buckle) outside of the two siderails. Leaning any farther may cause the ladder to slide or tip sideways.
10. Only use ladders with sufficient load rating for the anticipated weight of the worker, tools, and materials (minimum of class 1).
11. Maintain a three-point contact by keeping both hands and one foot or both feet and one hand on the ladder at all times when climbing up or down.
12. Do not carry items in your hands while climbing up or down a ladder.
13. Do not climb up or down an extension ladder that is not secured unless another person is holding the bottom of the ladder.
14. If you are afraid of heights - DO NOT climb a ladder!

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Chapter 16

Scaffolds/ Aerial Lifts

PROCEDURE

1. GENERAL: This procedure applies to all scaffold and aerial platform/lift operations for Grace Consulting Inc..

2. CAPACITY: Taking into account the OSHA rules that must apply and the engineering/manufacturing requirements of our scaffolds, the following rules apply. NOTE: The manufacturer's safety requirements for particular scaffold assemblies are to be followed over and above any OSHA regulation.

1. Each scaffold and scaffold component used will support, without failure, its own weight and at least four times the maximum intended load applied or transmitted to it.

2. When non-adjustable suspension scaffolds are used, each suspension rope, including connecting hardware, will support, without failure, at least six times the maximum intended load applied or transmitted to that rope.

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3. Capacity - each scaffold and scaffold component shall be capable of supporting, without failure, its own weight and at least four times the maximum intended load applied or transmitted to it.

SUPPORTED SCAFFOLDS

1. Direct connections to roofs and floors, and counterweights used to balance adjustable suspension scaffolds, shall be capable of resisting at least 4 times the tipping moment imposed by the scaffold operating at the rated load of the hoist, or 1.5 (minimum) times the tipping moment imposed by the scaffold operating at the stall load of the hoist, whichever is greater.

2. Each suspension rope, including connecting hardware, used on non- adjustable suspension scaffolds shall be capable of supporting, without failure, at least 6 times the maximum intended load applied or transmitted to that rope.

3. Each suspension rope, including connecting hardware, used on adjustable suspension scaffolds shall be capable of supporting, without failure, at least 6 times the maximum intended load applied or transmitted to that rope with the scaffold operating at either the rated load of the hoist, or 2 (minimum) times the stall load of the hoist, whichever is greater.

4. The stall load of any scaffold hoist shall not exceed 3 times its rated load.

PLATFORM CONSTRUCTION

This section documents the procedures and safety requirements to construct scaffold platforms. The following safety rules apply for scaffold construction:

*Each scaffold plank will be installed so that the space between adjacent planks and the space between the platform and uprights is no more than one inch wide. If, in certain situations, it is required to make this space wider, the demonstration of this situation(s) will be in the appendix to this plan.

*Except for outrigger scaffolds (3 inches) and plastering and lathing operations (18 inches), the front edge of all platforms will not be more than 14 inches from the face of the work, unless we have a guardrail or personal fall arrest system in place that meets regulations.

*[1926.451(b) Scaffold platform construction.

*Each platform on all working levels of scaffolds shall be fully planked or decked between the front uprights and the guardrail supports as follows:

*Each platform unit (e.g., scaffold plank, fabricated plank, or fabricated platform) shall be installed so that the space between adjacent units and the space between the platform and the uprights is no more than 1 inch wide, except where Grace Consulting Inc. can demonstrate that a wider space is necessary (for example, to fit around uprights when side brackets are used to extend the width of the platform).

*Where Grace Consulting Inc. makes the demonstration provided for in paragraph (b)(1)(i) of this section, the platform shall be planked or decked as fully as possible and the remaining open space between the platform and the uprights shall not exceed 9 ½ inches.

Exception to paragraph (b)(1): The requirement in paragraph (b)(1) to provide full planking or decking does not apply to platforms used solely as walkways or solely by employees performing platform erection or dismantling. In these situations, only the planking that Grace Consulting Inc. establishes is necessary to provide safe working conditions is required.

*Except as provided in paragraphs (b)(2)(i) and (b)(2)(ii) of this section, each scaffold platform and walkway shall be at least 18 inches wide.

*Each ladder jack scaffold, top plate bracket scaffold, roof bracket scaffold, and pump jack scaffold shall be at least 12 inches wide. There is no minimum width required for boatswains' chairs.

*Where scaffolds must be used in areas that the employer can demonstrate are so narrow that platforms and walkways cannot be at least 18 inches wide, such platforms and walkways shall be as wide as feasible, and employees on those platforms and walkways shall be protected from fall

hazards by the use of guardrails and/or personal fall arrest systems.

*Except as provided in paragraphs (b)(3)(i) and (ii) of this section, the front edge of all platforms shall not be more than 14 inches from the face of the work, unless guardrails are erected along the front edge and/or personal fall arrest systems are used in accordance with paragraph (g) of this section to protect employees from falling.

*The maximum distance from the face for outrigger scaffolds shall be 3 inches (8 cm);

* The maximum distance from the face for plastering and lathing operations shall be 18 inches.

*Each end of a platform, unless cleated or otherwise restrained by hooks or other equivalent means, shall extend over the centerline of its support at least 6 inches.

*Each end of a platform 10 feet or less in length shall not extend over its support more than 12 inches unless the platform is designed and installed so that the cantilever portion of the platform is able to support employees and/or materials without tipping, or has guardrails which block employee access to the cantilevered end.

*Each platform greater than 10 feet in length shall not extend over its support more than 18 inches unless it is designed and installed so that the cantilevered portion of the platform is able to support employees without tipping, or has guardrails which block employee access to the cantilevered end.

*On scaffolds where scaffold planks are abutted to create a long platform, each abutted end shall rest on a separate support surface. This provision does not include the use of common support members, such as “T” sections, to support abutting planks, or hook on platforms designed to rest on common supports.

*On platforms where scaffolds are overlapped to create a long platform, the overlap shall occur only over supports, and shall not be less than 12 inches unless the platforms are nailed together or otherwise restrained to prevent movement.

*At all points on the scaffold where the platform changes direction, such as turning a corner, any platform that rests on a bearer at an angle other than a right angle shall be laid first, and platforms which rest at right angles over the same bearer shall be laid second, on top of the first platform.

*Wood platforms shall not be covered with opaque finishes, except that platform edges may be covered or marked for identification. Platforms may be coated periodically with wood preservatives, fire retardant finishes, and slip resistant finishes; however, the coating may not obscure the top or bottom wood surfaces.

*Scaffold components manufactured by different manufacturers shall not be intermixed

unless the components fit together without force and the scaffolds' structural integrity is maintained by the user. Scaffold components manufactured by different manufacturers shall not be modified in order to intermix them unless a competent person determines the resulting scaffold is structurally sound.

*Scaffold components made of dissimilar metals shall not be used unless a competent person has determined that galvanic action will not reduce the strength of any component to a level below that required by paragraph (a)(1) of this section.]

SUPPORTED SCAFFOLDS

*Supported scaffolds with a height to base width of more than four to one (4:1) must be restrained from tipping by guying, tying, bracing, or equivalent means.

*Supported scaffold poles, legs, posts, frames, and uprights will always bear on base plates and mud sills or other adequate firm foundations.

*[1926.451(c) Criteria for supported scaffolds.

*Supported scaffolds with a height to base width (including outrigger supports, if used) ratio of more than four to one (4:1) shall be restrained from tipping by guying, tying, bracing, or equivalent means, as follows:

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*Guys, ties, and braces shall be installed at locations where horizontal members support both inner and outer legs.

*Guys, ties, and braces shall be installed according to the scaffold manufacturer's recommendations or at the closest horizontal member to the 4:1 height and be repeated vertically at locations of horizontal members every 20 feet or less thereafter for scaffolds 3 feet wide or less, and every 26 feet or less thereafter for scaffolds greater than 3 feet wide. The top guy, tie or brace of completed scaffolds shall be placed no further than the 4:1 height from the top. Such guys, ties and braces shall be installed at each end of the scaffold and at horizontal intervals not to exceed 30 feet (measured from one end [not both] towards the other).

*Ties, guys, braces, or outriggers shall be used to prevent the tipping of supported scaffolds in all circumstances where an eccentric load, such as a cantilevered work platform, is applied or is transmitted to the scaffold.

*Supported scaffold poles, legs, posts, frames, and uprights shall bear on base plates and mud sills or other adequate firm foundation.

*Footings shall be level, sound, rigid, and capable of supporting the loaded scaffold without settling or displacement.

*Unstable objects shall not be used to support scaffolds or platform units.

*Unstable objects shall not be used as working platforms.

*Front-end loaders and similar pieces of equipment shall not be used to support scaffold platforms unless they have been specifically designed by the manufacturer for such use.

*Fork-lifts shall not be used to support scaffold platforms unless the entire platform is attached to the fork and the fork-lift is not moved horizontally while the platform is occupied.

*Supported scaffold poles, legs, posts, frames, and uprights shall be plumb and braced to prevent swaying and displacement.]

FALL PROTECTION

*All workers shall be physically protected from falling from a scaffold or platform where the fall distance is 10 ft. or greater. Physical protection includes guardrails, Personal Fall Protection Systems (including a minimum 5,000# attachment point overhead), fall restraint- where the worker is tied off to where he/she cannot fall over the platform edge.

*In addition, when building, or taking down scaffolds greater than 10 ft. in platform height, fall protection must be considered by the onsite Competent Person. This requirement will be judged on a case-by-case basis. The RSO shall be contacted and apprised of the situation if the Competent Person determines fall protection cannot be used (for instance if it's unfeasible, or causes a greater danger to the worker(s)).

*Narrow scaffolds (30 inches or less in width) typically have manufacturer's requirements for fall protection at 6ft. or less. Check with the manufacturer of the scaffold you're using for fall protection height requirements.

FALLING OBJECT PROTECTION

*All workers shall wear hardhats when working on, assembling, or dismantling scaffolds. This is our primary protection from falling objects. Additionally, we shall:

*Install guardrail systems with openings small enough to prevent passage of potential falling objects.

*Prevent tools, materials, or equipment that inadvertently falls from our scaffolds from striking any person(s) by barricading the area below the scaffold.

*[1926.451(h) Falling object protection.

*In addition to wearing hardhats each worker 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 through the erection of debris nets, catch platforms, or canopy structures that contain or deflect the falling objects. When falling objects are too large, heavy or massive to be contained or deflected by any of the above-listed measurers, Grace Consulting Inc. shall place such potential falling objects away from the edge of the surface from which they could fall and shall secure those materials as necessary to prevent their falling.

*Where there is a danger of tools, materials, or equipment falling from a scaffold and striking employees below, the following provisions apply:

*The area below the scaffold to which objects can fall shall be barricaded, and employees shall not be permitted to enter the hazard area

*A toe board shall be erected along the edge of the platforms more than 10 feet above lower levels for a distance sufficient to protect employees below, except on float (ship) scaffolds where an edging of ¾ x 1½ inch wood or equivalent may be used in lieu of toeboards.

*Where tools, materials, or equipment are piled to a height higher than the top edge of the toe board, paneling or screening extending from the toe board or platform to the top of the guardrail shall be erected for a distance sufficient to protect employees below.

*A guardrail system shall be installed with openings small enough to prevent passage of potential falling objects.

*A canopy structure, debris net, or catch platform strong enough to withstand the impact forces of the potential falling objects shall be erected over the employees below.

*Canopies, when used for falling object protection, shall comply with the following criteria:

*Capable of withstanding, without failure, a force of at least 50 pounds applied in any downward or horizontal direction at any point along the toeboard (toeboards built in accordance with Appendix A to this subpart will be deemed to meet this requirement); and

*At least three and one-half inches high from the top edge of the toeboard to the level of the walking/working surface. Toeboards shall be securely fastened in place at the outermost edge of the platform and have not more than ¼ inch clearance above the walking/working surface. Toeboards shall be solid or with openings not over one inch in the greatest dimension.]

Grace Consulting Inc. will have a Competent Person inspect scaffolding prior to each shift and employees will use mandatory tags for defects found. Employees are instructed to comply with tags and instructions.

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Aerial Lifts

Manlifts and scissor lifts are two pieces of equipment that many workers can't imagine working without. This equipment, if used correctly, provides quick and safe access to work areas that at one time could only be reached from scaffolding or a crane's manbasket. These lifts, collectively called Aerial Work Platforms, are important tools. But as with any tool, there are right and wrong ways to use them safely.

The most important tip to remember before operating any aerial lift platform, is *always read and follow* the manufacturer's safety and operation manual! This information must be kept on the rig, and can usually be found in a PVC tube that's tied to the machine's frame or rails.

Safe Operating Procedures for Both Manlifts and Scissor Lifts:

- Only trained and authorized people should operate the lift. A qualified instructor must make sure that every operator reads and\or understands the equipment's safety and operating instructions. This includes all of the warning decals and labels mounted on the machine.
- Always check for overhead obstructions before driving or elevating the platform.
- Refuel tanks only when the unit is turned off. If battery powered, the batteries should be charged only in a well ventilated area, away from any open flame.
- Prior to each shift a safety inspection should be completed by the operator; this includes both a visual inspection and a function test. If a problem is found, get the lift repaired.
- Elevate the platform only when it is on a firm, level surface. Although many lifts look like a rough terrain piece of equipment, they are not. Their large tires do allow the equipment to access somewhat difficult areas, but once in position they are designed to be out of level only 5^{o} while in operation. This amounts to 10 inches in a 10 foot wheel span. In addition, the lift must have an tilt alarm that activates when the machine is more than 5^{o} out of level.

Scissor lifts are efficient one-direction lifts. They provide a solid surface to work from, but always remember:

- Guardrail, midrails and toeboards must be in place. The toe board can be omitted at the door.
- The platform must be equipped with a mechanical parking brake that will hold the unit securely on any slope it is capable of climbing. The brake should be tested periodically.
- Never use the lift's rails, planks across the rails, or a ladder, to gain additional height.

Unique hazards for man lifts: Man lifts can move in more than a single direction, increasing the risk of mishaps, so it's important to remember the following:

- When working out of a man lift, a full body harness must be worn, and properly attached to the basket. A sudden jolt has thrown people from manlifts, before they could react.
- Always maintain a safe distance from debris piles, drop-offs, floor openings, etc.

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- Never drive the man lift when it is elevated above the limit the manufacturer considers safe. Each piece of equipment will state what the maximum extension can be while being driven.

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Chapter 17

Fall Protection

Company Policy

Injuries from falls are a leading occupational injury. It is the intent of Grace Consulting Inc. to provide maximum protection to its staff in the prevention of falls. Known fall hazards will be identified, inspected and fall protection provided to ensure the safety of personnel. Engineering controls, administrative procedures and the use of personal protective equipment will be utilized. The Fall Protection Standard must be followed where personnel can possibly fall six feet or more, but does not apply *"when personnel are making an inspection, investigation, or assessment of workplace conditions prior to the actual start of construction work or after all construction work has been completed."* This exemption does not apply when inspections are carried out six feet or less from an unprotected edge. Under OSHA's interpretation, work conducted within six feet of an unprotected edge (i.e. roof line) must comply with the Fall Protection Standard. In the event an employee falls or some other serious incident occurs, the GCI will investigate the circumstances of the fall or other incident to determine if the fall protection plan needs to be changed and shall implement those changes to prevent similar types of falls or incidents.

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Training

Training in fall protection must be obtained prior to working where potential for a fall exists. This training will be conducted by an authorized training resource. Training will consist of learning to identify fall hazards, minimize fall hazards, and the function, use, inspection, and maintenance of personal fall arrest systems (PFAS) and other restraint equipment. Trainees will also be taught how to identify and inspect anchor points, substantial members of the building structure, or securely rigged lines, which will safely suspend the worker in case of fall. Only attendees of the fall hazard training classes will be allowed to conduct work where potential for a fall exists. Training shall be provided by Grace Consulting Inc. to all affected workers before they are exposed to fall hazards. Retraining shall occur when any of the following are noted:

*Deficiencies in training
*Workplace changes
*Fall Protection Systems or equipment changes that render previous training obsolete.

Workers who complete fall protection training will have written training certification showing at a minimum the following:

*Employee's Name, Date of training
*Signature of trainer and Date

*Employer Date when determined adequate training was performed

The RSO, Aaron Conner will maintain written records of employee training.

Applicable Federal Regulations

The policies in the Grace Consulting Inc. Fall Protection Program are derived from OSHA standards as found in 29 CFR 1910: Occupational Safety and Health Standards and in 29 CFR 1926: Safety and Health Regulations for Construction. Any questions or comments about the interpretation of the OSHA standards or the company policy should be directed to the job superintendent, project manager, or the Responsible Safety Officer, Aaron Conner.

All jobsites with a potential for falls shall be inspected for fall hazards. Grace Consulting Inc.'s RSO, or another competent person will evaluate each potential fall hazard, and for any fall protection plan(s). In the event an employee falls or some other serious incident occurs, GCI shall investigate the circumstances of the fall or other incident to determine if the fall protection plan needs to be changed and shall implement those changes to prevent similar types of falls or incidents.

Engineering controls *(handrails, etc.)* will be constructed where possible, and safe work practices and personal protective equipment will be used. Fall hazards include, but are not limited to, unprotected sides and edges of roofs, excavations, overhead construction and maintenance, roof work, floor holes, wall openings, and all other walking or working surfaces where personnel can possibly fall six feet or more to a lower level. At Grace Consulting Inc., fall hazards specifically include work on building roofs, transferring materials through the floor opening of an air handling room, maintenance work conducted where a fall of six feet or more from the floor is possible *(this does not apply to work on scaffolds or ladders),* including work on overhead cranes, lighting, or rafters. Protection from falling hazards must be provided. The placement of toe boards and the use of hard hats will be strictly enforced. Equipment shall not be stored within six feet of an unprotected edge.

ENGINEERING CONTROLS

The first step in minimizing work hazards is to determine if engineering controls can eliminate or lessen the hazard of the job. Engineering controls of fall hazards consist of guardrails, toe boards, covers, and other rails or barriers that prevent falls. Grace Consulting Inc. will provide engineering controls where possible to minimize fall hazards. Personnel should alert Grace Consulting Inc.'s RSO or supervisor to potential fall hazards not already identified and controlled. Additionally anchor points (if necessary) will be installed at locations where personal fall arrest systems (PFAS) will be used.

ADMINISTRATIVE PROCEDURES (Work Practices)

In all cases, safe work practices must be followed where potential for a fall exists. Evaluate the work and potential hazards. Prepare for hazards. Contact Grace Consulting Inc.'s RSO or supervisor for implementation of engineering controls. Personnel must work in pairs at all times while conducting

work where a potential for a fall exists. All work conducted within six feet of an unprotected edge where a fall exists or elevated above four feet must wear fall protection equipment. Only properly maintained and inspected equipment shall be used for fall protection. Equipment must be in compliance with the OSHA Fall Protection Standard. Workers shall inspect all equipment before use; if any equipment exhibits signs of wear, it must immediately be removed from service. Equipment must be maintained, and stored where it will it will not be subject to wear. In case of emergency, follow Grace Consulting Inc.'s Emergency Procedures.

Body harnesses must be worn, lanyard attached to harness securely with locking snap hook, lifeline (if used) attached securely to lanyard, deceleration device attached correctly and securely to lifeline and lanyard, and lifeline or lanyard must be securely connected, by locking snap hook, to the anchor point before any work shall be conducted. Inspections are exempted from this requirement per OSHA guidelines. However OSHA does require fall protection when inspections occur two feet or less from an unprotected edge or side.

Inclement weather, including but not limited to snow, ice, high winds or rain, pose even greater hazards during work where a potential for a fall exists, i.e. roof work. Personnel shall take additional precautions during such weather. Personnel should contact their supervisor to review additional precautions before beginning affected work. Work shall not be conducted on roofs during lightning storms.

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SAFETY MONITORS

Safety monitors shall be employed where no other alternate methods have been implemented, or as part of an overall fall protection program. The safety monitor shall be a competent person, able to properly assess fall hazards that exist in the type of work being performed. The safety monitor shall:

*Be within sight, and at the same working level as the workers being monitored.
*Be close enough for oral communication.
*Warn monitored workers if they are unaware of a fall hazard, or is acting in an unsafe manner.
*Be able to recognize fall hazards.
*Not have other duties, which would take attention away from the monitoring duties.

PERSONAL PROTECTIVE EQUIPMENT

The use of personal protective equipment to minimized fall hazards shall be strictly enforced. The optimal solution is to use engineering controls, but if engineering controls do not eliminate the hazard, work practices and personal protective equipment must be used. The use of personal fall arrest systems (PFAS) are the allowed personal protective equipment for fall hazards at Grace Consulting Inc.. A PFAS consists of a full-body harness, lanyard, and anchor point. A second option is to use a full-body harness, lanyard, lifeline, anchor point, and deceleration (grabbing) device. Only full-body harnesses shall be used, the use of a body belt is prohibited. Non-locking snap hooks are unacceptable for personal fall arrest systems.

Requirements(from OSHA 1926.502) of a personal fall arrest system(PFAS) include:

*D-rings and snap hooks shall have a minimum tensile strength of 5000 pounds. A proof test of 3600 pounds is required.

*Lanyards and lifelines shall have a minimum breaking strength of 5000 pounds.

*Lanyards shall not exceed six feet in length.

*Self-retracting lifelines and lanyards shall have a strength of at least 3000 pounds and limit free fall to two feet or less.

*Anchor points for fall arrest systems shall be capable of supporting at least 5000 pounds per employee when the system is designed, installed (temporarily or permanently), and used under the supervision of a qualified person.

*Personal fall arrest systems shall limit the maximum arresting forces to 1800 pounds with a full body harness.

*The maximum free fall distance is six feet for systems.

*The maximum deceleration distance is 3.5 feet.

*Personal fall arrest systems shall have sufficient strength to withstand twice the potential impact energy of the falling employee.

*Impacted components shall be removed from service.

*Prompt rescue shall be provided for personnel who have fallen.

*Personal fall arrest systems shall be inspected prior to each use.

*Lifelines subject to cutting or abrasion shall be a minimum of 7/8 inch wire core manila rope. All other lifeline applications shall use a minimum of 3/4 inch manila rope or its equivalent.

Any other personal protective equipment deemed necessary for the task under the Personal Protective Equipment Standard must be worn. This includes but is not limited to hardhats, gloves, safety glasses, and steel toed boots. Hard hats must be worn within an area beneath elevated work where objects could fall from a height and strike a worker.

EQUIPMENT INSPECTIONS

Equipment inspections will be conducted by personnel prior to use. If, upon inspection, a piece of equipment shows any of the following signs of wear it must immediately be removed from service. Consult an approved state vendor for intensive maintenance or inspection of equipment.

- Cuts or frayed edges
- Abrasions
- Mildew or mold
- Undue stretching
- Chemical burns
- Dryness
- Corrosion or charring
- Broken stitches
- Inner fiber fuzziness
- Rivets that are loose or distorted
- Substances that have penetrated and hardened in the fibers
- Deformed thimbles or enlarged buckle tongue holes or grommets

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- Damaged or distorted snap hooks or faulty springs
- Cracks or distortions in fall protection hardware

DEFINITIONS

Anchor point-A secure point of attachment for lifelines, lanyards or deceleration (grabbing) devices.

Body belt-A strap with means both for securing it about the waist and for attaching it to a lanyard, lifeline, or deceleration (grabbing) device. Body belts are prohibited at Grace Consulting Inc.

Body harness-An interconnected set of straps that may be secured about a person in a manner that distributes the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders with a means for attaching the harness to other components of a personal fall arrest system.

Connector-A device that is used to connect parts of a personal fall arrest system together (i.e. D-rings, and snap hooks).

Deceleration device-Any mechanism, such as a rope, grabbing device, ripstitch lanyard, specially woven lanyard or automatic self-retracting lifeline/lanyard, which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limits the energy imposed on an employee during fall arrest.

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Deceleration distance-The additional vertical distance a falling person travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which a deceleration device begins to operate.

Guard rail- A barrier erected to prevent personnel from falling to lower levels.

Hole- A void or gap in a floor, roof, or other walking/working surface.

Lanyard- A flexible line of rope or strap that generally has a connector at each end for connecting the body harness to a deceleration device, lifeline or anchor point.

Lifeline- A component consisting of a flexible line for connection to an anchor point at one end to hang vertically and that serves as a means for connecting other components of a personal fall arrest system to the anchor point.

Opening- A gap or void in a wall or partition through which personnel can fall to a lower level.

Personal fall arrest system (PFAS)-A system including but not limited to an anchor point, connectors, and a body harness used to arrest a worker in a fall from a working level.

Rope grab (grabbing device)-A deceleration device that travels on a lifeline and automatically, by friction, engages the lifeline and locks to arrest a fall.

Self-retracting lifeline/lanyard-A deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under minimal tension during normal movement and which, after onset of a fall, automatically locks the drum and arrests the fall (usually within two feet or less).

Snap hook-A connector consisting of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released automatically closes to retain the object. Only locking snap hooks are permitted at Grace Consulting Inc..

Toe board-A low protective barrier that prevents material and equipment from falling to lower levels and which protects personnel from falling.

Unprotected sides and edges-Any side or edge of a walking/working surface where there is no wall or guardrail system at least 1 meter high (i.e. roof lines).

Walking/working surface-Any surface, whether horizontal or vertical, on which personnel walk or work, including but not limited to floors, roofs, or ramps. It does not include ladders or vehicles on which personnel must be located to perform their work duties.

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Components of a Fall Protection System

There are three components to a personal fall protection system. These are A) anchor point, B) belt and/or harness, and C) connecting device. Each component is explained below:

A) Anchor Point - An anchor point is a secure point of attachment for lifelines, lanyards or deceleration devices and is independent from the means supporting the worker. Examples of OSHA approved anchor points are eye bolts, bolt holes, or any other structures capable of supporting 5000 pounds per attached person.

B) Belt or Harness - Fall protection safety belts and harnesses are the second component of a personal fall protection system. A qualified person must evaluate the type of falling hazards and choose the appropriate belt or harness. Safety belts are only allowed for positioning devices after January 1, 1998. Therefore, a full body harness will be used by employees. The type of anchor point and available connecting devices will also be a factor in choosing a belt or harness.

C) Connecting Device - Lanyards, rope grabs, and deceleration devices are all examples of connecting devices. As with belt and harnesses, the proper choice of a connecting device is dictated by the other system components and the jobsite requirements.

Categories of Fall Protection

OSHA requires that a personal fall protection device be used when an employee is working at an unprotected elevation 6 ft. and above and are at risk of a fall, or need both hands free to work. Three categories of fall protection systems have been identified based on the different situations faced by the employee. Personal fall protection equipment is designed for use with one or more or the categories of fall protection. Do not ever use fall protection safety equipment for a purpose it was not designed for. Severe injury or death could result from the improper use of fall protection equipment. It is important that all employees understand the nature of the falling hazards facing them. The three categories of fall protection systems are:

1) Fall Arrest - Fall arrest safety equipment protects against accidental falls while at or moving between work areas.

2) Positioning - Positioning equipment primarily secures the worker so that both hands are free to work. A positioning device can be used as a fall protection if only it is attached such that the worker would be limited to only a 2 ft. free fall.

3) Climbing Protection - Climbing protection equipment provides fall protection while ascending or descending a structure.

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Fall Protection Policies

Note: Instructions in the use and inspection of fall protection safety equipment provided herein are meant to supplement the manufacturer's safety instructions. Employees are required to read and obtain a full understanding of the manufacturer's instructions in addition to this safety plan. In the event of a contradiction between the manufacturer's instruction and this safety plan, the manufacturer's instructions take precedence. Bring any contradictions to the attention of the Responsible Safety Officer, Aaron Conner as soon as possible. All Personal Fall Protection System equipment shall be ANSI and AST rated equipment.

Rescue

In the event there is a fall, do not try to move the injured person, contact your supervisor or anyone in the area immediately to send for Emergency Medical Technicians.

Site Safety Issues

The lead inspector is a competent person and is responsible for evaluating the safety implications of any deficiency identified in the site safety inspection. If any structure is deemed unsafe to climb by the lead inspector, the responsible safety officer, Aaron Conner and the project manager should be immediately notified. ***Do Not*** climb any structure deemed unsafe by the lead inspector. If the unsafe condition is not corrected prior to leaving the site, the tower should be posted with a sign reading

"**Safety Hazard: Do Not Climb**".

Proper Use of Fall Protection Equipment

Grace Consulting Inc. has determined that a full body harness with D-ring in the center of the back (for fall arrest protection), a D-ring in the center of the chest (for use with ladder safety climb devices), and two (2) D-rings at the waist (for positioning and/or fall protection) will be used. A 6 ft. or shorter lanyard with integral deceleration device (for fall protection) and a 6 ft. or shorter lanyard (for positioning and/or fall protection) will be used for connecting devices. Note only self-locking hooks or self-locking carbines will be used in fall protection safety equipment. It has been determined by Grace Consulting Inc. that this equipment best meets the requirements of the type of work to be performed by its employees.

Positioning for Work or Inspection Activities

Fall protection while at or moving between work areas is provided by connecting a lanyard with integral deceleration device to the D-ring in the center of the back of the harness. The other end of the lanyard strap will be connected to an anchor point. The lanyard will have a maximum length of 6 ft. When no anchor point is readily available for use with a snap-lock hook, than the lanyard can be wrapped around a member and connected back to itself. This may only be done if the lanyard has a locking hook and has been specifically designed for this application.

When performing work or inspection activities at a specific area only, not moving around, and the use of the back D-ring and lanyard is not feasible, then the rope lanyard connected to the waist D-rings (positioning device) must be used. A positioning device must be rigged so that a climber can never free fall more than 2 ft. Never connect both locking hooks to the same D-ring. Never wrap a rope lanyard around sharp edges. Tie off of a rope lanyard around an "H" or "I" beam can significantly reduce its strength due to the cutting action of the beam edges. Minimizing the potential fall distance reduces the possible force a lanyard would be subject to. Therefore, unless the rope lanyard is adequately protected and the potential free fall distance is limited to 2 ft., a nylon webbing strap lanyard or a wire core lanyard should be use.

Guardrails

Guardrail systems will be erected at unprotected edges, ramps, runways, or holes where it is determined by Aaron Conner that erecting such systems will not cause an increased hazard to employees. Guardrails will be made from steel, wood, and wire rope for all worksites. When necessary and feasible on the basis of job location or requirements, they will be placed:

- On all open sided floors
- On leading edges of roofs

When guardrail systems are used to protect workers from falls, the systems will be capable of withstanding a force of at least 200 pounds applied within 2 inches of the top edge in any outward or

downward direction. When the 200 pounds test is applied in a downward direction, the top edge of the guardrail will not deflect to a height less than 39 inches above the walking/working level. Midrails, screens, mesh, intermediate vertical members, solid panels, and equivalent structural members will be capable of withstanding a force of at least 150 pounds applied in any downward or outward direction at any point along the mid rail or other member.

The top edge height of top rails, or (equivalent) guardrails will be 42 inches plus or minus 3 inches, above the walking/working level. When workers are using stilts, the top edge height of the top rail will be increased an amount equal to the height of the stilts. If wire rope is used for toprails, it will be flagged at not more 6 feet intervals with high-visibility material.

Screens, mid rails, mesh, intermediate vertical members, or equivalent intermediate structural members will be installed between the top edge of the guardrail system and the walking/ working surface when there are no walls or parapet walls at least 21 inches high. When mid rails are used, they will be installed at a height midway between the top edge of the guardrail system and the walking/working level. When screens and mesh are used, they will extend from the top rail to the walking/working level and along the entire opening between top rail supports. Intermediate members, such as balusters, when used between posts, will not be more than 19 inches apart.

Other structural members, such as additional mid rails and architectural panels, will be installed so that there are no openings in the guardrail system more than 19 inches.

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Guardrail systems will be surfaced to protect workers from punctures or lacerations and to prevent clothing from snagging. In order to prevent cuts and lacerations, top rails and mid rails of guardrail systems will be at least one-quarter inch nominal thickness or diameter. The ends of top rails and mid rails will not overhang terminal posts, except where such an overhang does not constitute a projection hazard.

Guardrail Inspections:

Temporary guardrail systems will be visually inspected daily by a competent person, and a complete structural inspection will be completed weekly by a competent person.

Guarding Hoist Areas:

When guardrail systems are used at hoisting areas, a chain, gate, or removable guardrail section will be placed across the access opening between guardrail sections when hoisting operations are not taking place.

Guarding Holes:

Holes greater than 2 inches in either dimension are to be covered or guarded. When a hole is not in use, it will be covered or provided with guardrails along all unprotected sides or edges. Uncovered holes will be protected by guardrail systems set up on all unprotected sides or edges. When holes are

used for the passage of materials, the hole will have not more than two sides with removable guardrail sections.

If guardrail systems are used around holes that are used as access points (such as ladderways), gates will be used or the point of access will be offset to prevent accidental walking into the hole.

If guardrails are used at unprotected sides or edges of ramps and runways, they will be erected on each unprotected side or edge.

Fall Restraint

Fall restraint systems keep employees from reaching the fall hazard and require employees to be trained to recognize hazards and to know how to correctly establish and use the system. This is a type of work restraint for employees who may be working on the tops of round structures such as tanks, or, on roofs adjacent to unprotected edges or openings.

Personal Fall Protection Safety Equipment

Check In/Out Procedures

Every employee of Grace Consulting Inc. that is required to periodically work at elevations will be provided with all necessary fall protection safety equipment. This equipment will be assigned to the employee for the duration of his/her employment and shall be returned upon termination of that employment. It is the employees' responsibility to report any damaged safety equipment so that it can be replaced.

Safety Equipment Inspection and Maintenance Procedures

General Inspection

Before each use carefully inspect the harness and associated equipment for signs of wear and deterioration, or evidence of impact loading per the manufacturer's inspections. Visually inspect for loose threads, pulled rivets, burns, cuts, abrasions, or evidence of chemical or physical deterioration that may have weakened the material or assembly. Inspect all hardware for malfunctions or cracks. ***Immediately destroy any component that does not pass inspection***.

Harness Inspection Procedure

1) Tongue and billet end - Inspect the tongue and billet end first. They are subject to the most wear as a result of repeated opening and closing. If your harness is equipped with grommets be sure to check that none are loose or distorted.

2) Stitching and webbing - Stitching should be checked for broken, burned, cut and pulled stitches. Broken strands of webbing appear as tufts on the surface. To inspect, hold the harness

with your hands 6-8 inches apart. Bend the webbing in an inverted "U" fashion which will cause surface tension, exposing problem areas. Inspect the entire length of webbing. Damage caused by cuts, abrasions, corrosives, heat or chemicals should be apparent.

3) D-rings - All D-rings should be checked for distortion. D-ring attachment points should be checked for unusual wear or damaged fibers. Badly pitted D-rings may indicate chemical corrosion, and the equipment should be destroyed and replaced immediately.

4) Stitching or rivets at hardware points - For stitched attachment points, check that stitching is not broken, burned, cut or pulled. For riveted attachment points, check all rivets for tightness, especially those at D-ring wear pads. Badly pitted rivets indicate chemical corrosion, and the equipment should be destroyed and replaced immediately.

5) Tongue buckles - All tongue buckles should be checked for distortion, sharp edges and cracks. The tongue should move freely and overlap the frame. Rollers should not be distorted and should roll freely.

6) Friction buckles - All friction buckles should be checked for sharp edges, cracks, distortion and to see that outer bars and center bars are straight. Especially check corners and attachment points for wear and cracks.

7) ***Destroy and replace all worn or damaged fall protection safety equipment***. If excessive wear, deterioration or mechanical malfunction is observed, replace the harness immediately. ***Never work with worn or damaged fall protection safety equipment. Using damaged or worn equipment can cause serious injury or death***.

8) The inspector is the most important part of any inspection procedure. Check all equipment thoroughly and follow all safety procedures and guidelines. Do not take any shortcuts.

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Safety Equipment Maintenance

1) Clean and maintain equipment in accordance with the manufacturers' recommended practice. Wash nylon harnesses only in warm water and mild cleanser. Avoid harsh chemicals agents such as degreasing compounds, turpentine, paint thinner, gasoline, and other solvents.

2) Allow nylon objects to dry naturally. Do not use heat to speed up the process. Inspect and lubricate (light motor oil or equivalent) snap hooks after cleaning to make sure they operate properly and close securely.

Fall Arrestor Systems Required

When workers are required to work from surfaces that are 6 foot or greater above an adjacent safe workplace (surface) and are unprotected by railings, warning line systems, or safety net systems, the following procedures and guidelines must be applied:

Before selecting personnel for work at elevated workstations, supervisors must consider the worker's physical condition, such as medical problems, fear of heights, coordination, etc. All employees who engage in work involving fall arrest systems must be thoroughly trained and understand the selection, usage, and operational characteristics of such systems as well as the state and federal regulations governing such, as found in: The Code of Federal Regulations 29 - Part 1926, Subpart M - Fall Protection.

Approved fall-arrestor systems are required for work at heights of 6 or more feet. A fall-arrestor system consists of a full body-harness & a lanyard made of synthetic fibers, with a minimum break strength of 5000 lbs. Lifelines/lanyards (self-retracting type) shall limit free fall distance to 2 feet or less. When the lifeline/lanyard does not limit free fall distance to 2 feet or less, ripstitch lanyards, and tearing and deforming lanyards shall be applied to the lifeline/lanyard in the fully extended position.

Anchorage points used for attachment of personal fall arrest systems shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5000 lbs.

The attachment point of a body harness shall be located in the center of the wearer's back near shoulder level, or above the wearer's head.

Personal fall arrest systems components subjected to impact loading shall be removed from service until inspected and determined by a competent person to be suitable for reuse.

Personal fall arrest systems and their components shall be inspected prior to each use for wear, damage, etc. and removed from service if found defective.

Personal fall arrest systems shall not be attached to guardrail systems, nor shall they be attached to hoists.

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Lifelines/lanyards shall be designed, installed, and used under the supervision of a qualified person.

The responsible safety officer will advise, on request, regarding usage and procedures.

It is the responsibility of the supervisor to plan the intended work sufficiently to ensure that job planning and proper precautions have been taken.

Special Circumstances

Grace Consulting Inc. recognizes that, due to the unique nature of the work performed, there will be times when exceptions to the above policies will have to be made. Approval for any exceptions to the fall protection policies can be granted by the Director of Safety. Any exception will be made by a competent person knowledgeable in fall protection. ***Under no circumstances will any safety equipment ever be altered***.

Chapter 18

Safety Training

Safety Training

Grace Consulting Inc. policy and federal law require that Grace Consulting Inc. staff, participating guests, and visitors receive appropriate health and safety training. Managers are responsible for ensuring that employees and guests under their supervision receive this training so they are fully informed about possible occupational health hazards and know how to work safely.

Training must include Grace Consulting Inc.'s health and safety orientation for new employees plus any additional training specific to the nature of hazards on the job; employees must complete this training before they can work unsupervised. All new employees must attend the new employee orientation within the first month of employment. Grace Consulting Inc. will evaluate safety performances and responsibilities of all employees annually, in the performance review process. Safety responsibilities are specifically out lined by your supervisor.

OSHA and other federal regulations spell out several specific health and safety training requirements for special hazards. These include, but are not limited to, radiation safety, hazard communication for exposure to hazardous substances, asbestos exposure, respirator use, hearing conservation, laser safety, confined space hazards, and certification for using material in moving equipment such as forklifts and overhead cranes. Employees who do hazardous work, such as working with high-voltage power supplies, or who are members of building emergency teams are required to have CPR and First Aid certification.

Managers should identify training needs for the job classifications for which they are responsible. Please refer to specific chapters in this manual for further information on training requirements. Consult with the Responsible Safety Officer about other training needs and requirements.

Training not provided by Responsible Safety Officer, such as on-the-job training, is the responsibility of the Crew Chief. This includes information on procedural changes or system modifications that impact safety. Responsible Safety Officer provides several health and safety training courses, technical assistance on training needs, and resources to help supervisors fulfill their training responsibilities. All employees beginning work are prohibited to begin unless properly trained in the safe work practices of that task. If at any time an employee is asked to perform a task in which they feel unsafe or not properly trained, the employee is to request for additional clarification and not continue work until they feel confident they understand fully the safe work practices or training needed. When this arises the employee shall contact their Safety Coordinator or Safety Manager.

Educational resources such as fact sheets, hazard summaries, and other written materials, as well

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as videos or slide shows, are available from Responsible Safety Officer. Supervisors can get a catalog from Responsible Safety Officer describing audio-visual materials that may be used to supplement safety training programs.

ALL health and safety training must be documented. Supervisors must note the participants' names and employee numbers, topics discussed, instructor(s), and date. Supervisors are responsible for maintaining training records. A copy of this information should be sent to the Responsible Safety Officer for inclusion in Grace Consulting Inc.'s training data base.

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Chapter 19

Hazard Communication Program

I. CORPORATE OVERVIEW

A. CORPORATE SAFETY & HEALTH POLICY

The GCI Safety and Health Policy states that the Company will "comply with applicable safety and health laws and regulations and implement prudent standards where none exists." In its effort to comply with the regulations pertaining to the requirement for Hazard Communication, GCI has established certain rules associated with Hazard Communication, and has established certain measures to ensure compliance with those rules.

B. APPLICABLE REGULATIONS

29 CFR 1910.1200, HAZARD COMMUNICATION

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C. MEASURES TO ENFORCE COMPLIANCE

In an effort to ensure compliance with the OSHA regulations and the policies and procedures described in this program, Grace Consulting established various enforcement measures, including assignment of GCI has responsibilities, processes and procedures, and disciplinary policies. Failure to comply with the policies and procedures described in this program could result in disciplinary measures, up to and including termination.

Working safe is a condition of employment.

A. PURPOSE

The purpose of this hazard communication program is to effectively inform employees of all potential or existing chemical hazards and of the necessary precautions to take relative to working with or around hazardous chemicals.

B. SCOPE

This hazard communication program has been developed for compliance with the federal Occupational Safety and Health Administration (OSHA) regulations and to ensure that the employees of GCI are effectively informed concerning potential and existing chemical hazards.

This program contains provisions for:

- developing and maintaining a written hazard communication program for the work place
- labeling of containers of chemicals in the workplace
- distribution of material safety data sheets to employees
- development and implementation of employee training programs regarding hazards of chemicals and protective measures
- providing a list of the hazardous chemicals known to be present on site
- methods used to inform employees of the hazards of non-routine tasks, and the hazards associated with chemicals contained in unlabeled pipes provisions for informing contractors of hazard communication requirements

This program applies to all chemicals that are known to be present in the workplace in such a manner that employees may be exposed under normal conditions or in a foreseeable emergency. In general, a hazardous chemical or product is any chemical/product that can create a physical hazard (i.e., combustible, flammable, explosive) or health hazard (e.g., irritant, toxin, etc.).

This document does not apply to hazardous waste, consumer products brought on-site by personnel for personal use (e.g., shaving cream, hair spray, etc.) or consumer products whose use will not exceed the frequency and duration experienced by a consumer under normal conditions.

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C. DEFINITIONS

Acute Effects - effects that occur rapidly usually as the result of a short-term exposure.

Article - a manufactured item other than a fluid or particle: (i) which is formed to a specific shape or design during manufacture; (ii) which has end-use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g., minute or trace amounts of a hazardous chemical, and does not pose a physical hazard or health risk to employees.

Carcinogen - A chemical is considered to be a carcinogen if:

- It has been evaluated by the International Agency for Research on Cancer (IARC), and found to be a carcinogen or potential carcinogen; or
- It is listed as a carcinogen or potential carcinogen in the "Annual Report on Carcinogens" published by the National Toxicology Program (NTP) (latest edition); or
- It is regulated by OSHA as a carcinogen.

Chemical - any element, chemical compound or mixture of elements and/or compounds.

Chronic Effects - effects that generally occur as a result of long-term exposure and are of a long- duration.

Combustible Liquid - any liquid having a flashpoint at or above 100°F (37.8°C), but below 200°F (93.3°C), except any mixture having components with flashpoints of 200°F or higher, the total volume

of which makes up 99 percent or more of the total volume of the mixture.

Compressed Gas - either of the following:

- a gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70°F (21.1°C); or
- a gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130°F (54.4°C) regardless of the pressure at 70°F; or
- a liquid having a vapor pressure exceeding 40 psi at 100°F (37.8°C) as determined by ASTM D-323-72.

Container - any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like that contains a hazardous chemical. Pipes, piping systems, engines, fuel tanks, or other operating systems in a vehicle are not considered containers.

Corrosive - a chemical that causes visible destruction of, or irreversible alterations in living tissue by chemical action at the site of contact.

Cutaneous - of, relating to, or affecting the skin.

Explosive - a chemical that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.

Flammable - a chemical that falls into one of the following categories:

- ***flammable aerosol*** - an aerosol that when tested by the test method described in 16 CFR 1500.45 yields a flame projection exceeding 18 inches at full valve opening, or a flashback (a flame extending back to the valve) at any degree of valve opening;
- ***flammable gas*** - a gas that, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of thirteen (13) percent volume or less; or at ambient temperature and pressure forms a range of flammable mixtures with air wider than twelve (12) percent by volume, regardless of the lower limit; ***flammable liquid*** - any liquid having a flashpoint below 100°F, except any mixture having components with flashpoints of 100°F or higher, the total of which make up 99 percent or more of the total volume of the mixture;
- ***flammable solid*** - a solid other than a blasting agent or explosive that is liable to cause a fire through friction, absorption of moisture, spontaneous chemical change, retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard.

Flashpoint - the minimum temperature at which a liquid gives off a vapor in sufficient concentration to ignite.

Foreseeable Emergency - any potential occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which could result in an uncontrolled release of a hazardous chemical into the workplace.

Hazardous Chemical - any chemical that is a physical or a health hazard.

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Hazard Warning - any words, pictures, symbols, or combination thereof appearing on a label or other appropriate form of warning which convey the hazard(s), including target organ effects, of the chemical(s) in the container(s).

Health Hazard - chemical for which there has been statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term includes carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes.

Hematopoietic System - the blood and blood forming system.

Hepatotoxin - chemicals which produce damage to the liver.

Highly toxic - a chemical falling into one of the following categories:

- Median lethal dose (LD50) of 50 milligrams or less per kilogram of body weight when administered to albino rats orally;
- Median lethal dose (LD50) of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours or less with the bare skin of albino rabbits;
- Median lethal concentration (LC50) of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of a mist, fume or dust, when administered by continuous inhalation for one hour to albino rats.

Immediate Use - that the hazardous chemical will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.

Irritant - a chemical, which is not a corrosive, but causes a reversible inflammatory effect on living tissue by chemical action at the site of contact.

Label - any written, printed, or graphic material displayed on or affixed to containers of hazardous chemicals.

Safety Data Sheet (SDS) - written or printed material concerning a hazardous chemical that is prepared in accordance with 29 CFR 1910.1200 (g).

Mixture - any combination of two or more chemicals if the combination is not, in whole or in part, the result of a chemical reaction.

Mutagen - a chemical which is capable of producing change or mutation in the chromosomal material of an individual.

Nephrotoxin - chemicals which damage the kidneys.

Neurotoxin - chemicals which produce their primary toxic effects on the nervous system.

Organic peroxide - an organic compound that contains the bivalent-O-O-structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms has been replaced by an organic radical.

Oxidizer - a chemical other than an explosive or blasting agent that initiates or promotes combustion in other materials, thereby causing fire either of itself or through release of oxygen or other gases.

Physical Hazard - a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, and organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

Pyrophoric - a chemical that will ignite spontaneously in air at a temperature of 130°F or below.

Sensitizer - a chemical that causes a substantial proportion of exposed people or animals to develop an allergic reaction in normal tissue after repeated exposure.

Target Organ Effects - effects on particular organs or systems.

Teratogen - a chemical that has a deleterious effect on the fetus.

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Trade Secret - any confidential formula, pattern, process, device, information or compilation of information that is used in an employer's business, and that gives the employer an opportunity to obtain an advantage over competitors who do not know or use it.

Unstable (reactive) - a chemical which in the pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shock, pressure, or temperature.

Water-reactive - a chemical that reacts with water to release a gas that is either flammable or presents a health hazard.

Work area - a room or defined space in a workplace where hazardous chemicals are produced or used, and where employees are present.

Workplace - an establishment, job site or project, at one geographical location containing one or more work areas.

D. RESPONSIBILITIES

1. SAFETY AND HEALTH STAFF

It is the responsibility of the corporate safety and health staff to develop the Corporate Overview

Standard Procedures of this program to ensure compliance with the referenced regulatory and industry standards. In addition, the corporate safety and health staff shall have the following responsibilities under this program:

- Revising the corporate standard program when necessary
- Maintaining document control of the corporate standard program
- Supporting the plant management staff in fulfilling their responsibilities under this program

2. MANAGEMENT STAFF

It is the responsibility of the management staff at each GCI owned and operated facility to GCI support, and enforce the policies described in the Corporate Overview and Corporate Standard Procedures as well as to develop, support, and enforce the associated site-specific sections of this program for their facility. In addition, the plant management staff shall have the following responsibilities under this program:

- Providing employees with the information, training, and equipment necessary to comply with the requirements of this program
- Taking corrective action in the enforcement of this procedure according to plant disciplinary policy
- Performing periodic inspections to verify employee compliance with and the overall effectiveness of this program
- Maintain document control of the associated site-specific sections following the document control policies stated in this program

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3. EMPLOYEES

All employees are responsible for understanding and complying with the contents of the Hazard Communication Program, including the policies and procedures contained in it.

4. CONTRACTORS

Contractors shall have the following responsibilities under this program:

- for complying with OSHA Hazard Communication regulations as part of the contractual arrangement between any outside contractor .and GCI.
- for obtaining prior approval for all chemicals brought on GCI property and maintaining GCI SDSs for those chemicals.
- for coordinating with their GCI Contract Supervisor to identify conditions within the GCI workplace or assigned task that may prevent the contract employees from safely performing their work and communicating these conditions to their employees through the use of safety orientations and job briefings.

E. WRITTEN SITE-SPECIFIC PROGRAM

GCI is required to develop, implement and maintain at each workplace a written hazard communication

GCI program containing site-specific information that is readily available to employees, their representatives and regulatory inspectors upon their request. This document, along with the completed *Hazard Communication Site-Specific Information* form will serve as each site's written hazard communication program. The written program must be an accurate representation of what is actually in place. Therefore, it must be updated whenever changes are made. The site-specific information shall be kept current, and the overall program should be reviewed periodically.

F. LABELING AND OTHER FORMS OF WARNING

Chemical manufacturers, importers, and distributors must provide labels, tags, or other markings for containers of hazardous chemicals. Containers of hazardous chemicals must be inspected upon receipt and if an appropriate label is not present, the chemical must not be accepted. The information must include at least the following:

- Identity of the hazardous chemical
- Appropriate hazard warnings; and
- Name and address of the manufacturer, distributor or other responsible party

If OSHA regulates the hazardous chemical in a substance specific health standard, i.e., asbestos, This procedure(s) , the label used will secondary containers. arsenic, PCB' applies to original and be in accordance with the requirements of that standard.
In certain situations involving individual stationary process containers, the label may be replaced by a sign, placard, process sheet, batch ticket or other means to convey the identity of the hazardous chemical and the appropriate hazard warnings. If these other forms of warning are used, they will be readily accessible to employees in their work area during each work shift.

All containers of hazardous chemicals will be properly labeled at all times. No labels on original containers will be altered or defaced in any manner. If labels are removed, defaced or illegible, the container must be immediately marked with the required information.

Laboratory chemicals are exempted from labeling requirements so long as labels that are on the original containers are not removed or defaced and remain completely legible (only applies to lab chemicals stored and/or used in the laboratory).

G. SAFETY DATA SHEETS (SDS)

GCI locations must maintain copies of SDSs for each hazardous chemical and must ensure that they GCI are readily accessible during each work shift and/or emergencies to employees when they are in their work areas. SDSs are prepared and distributed by the manufacturers and distributors of hazardous chemicals. If an SDS is not provided with a hazardous chemical shipment, GCI must obtain an GCI SDS from the chemical manufacturer or distributor as soon as possible. SDSs can be kept in electronic or hard copy form, as long as they are available at all times to employees. SDSs must be provided to employees, their representatives and regulatory inspectors upon their request.

SDSs must be in English (although copies in other languages may be maintained as well) and contain

at least the following:

- The identity of the chemical (same as label)
- The physical and chemical characteristics
- Physical and health hazards
- Primary routes of entry
- Exposure limits
- Precautions for safe handling
- Controls recommended to limit exposure
- Emergency and first aid procedures
- Name, address, and telephone number of the manufacturer
- Date of preparation

H. EMPLOYEE INFORMATION AND TRAINING

The training element of the Hazard Communication Program is the key to an effective program at GCI sites.

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FREQUENCY

Employees must be provided with effective information and training on hazardous chemicals in their work area:

- at the time of their initial assignment, and
- whenever a new physical or health hazard the employees have not previously been trained about is introduced into their work area.
  GCI requires that hazard communication training be performed on at least an annual basis to GCI ensure that employees understand the hazard communication program.

CONTENT

- Information and training may be designed to cover categories of hazards (e.g., flammability, carcinogenicity) or specific chemicals. Chemical-specific information must always be available through labels and SDSs. Employees must be informed of the following:
  1. Any operations in their work area where hazardous chemicals are present
  2. The location and availability of the written hazard communication program, including the required list of hazardous chemicals, and the required SDSs.
- Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area
- The physical and health hazards of the chemicals in the work area
- The measures employees can take to protect themselves from the hazards, such as appropriate work practices, emergency procedures, and personal protective equipment (PPE) used

- The details of the hazard communication program including an explanation of the labeling system and SDSs, and how employees can obtain and use the appropriate hazard information.
- Training must be appropriately documented.

I. LIST OF HAZARDOUS CHEMICALS

A list of hazardous chemicals known to be present that are, or may be, stored or used on site must be available at all GCI locations. There must be consideration for chemicals that may not be present at a GCI given time but that are stored or used at some point in time. The list must be by product name as it appears on the SDS. Inventory verification must be done periodically to ensure that it remains current.

The following information should also be made available from the inventory:

- Any product reference number
- Manufacturer's and/or distributor's contact information
- Location stored and/or used
- Typical use description

J. NON-ROUTINE TASKS

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Employees must be properly informed of the potential hazards that may be associated with performing non-routine tasks. Non-routine tasks are those which employees may perform so infrequently that they are unaware of or may have forgotten the hazards involved with using the chemicals or chemical products required for the task.

Non-routine tasks must be identified in the *Hazard Communication Site Specific* form. In addition, the means by which employees will be informed of the potential hazards from the chemical or chemical products must also be explained in the site-specific plan.

K. UNLABELED PIPES

If the site has piping containing hazardous chemicals, GCI recommends that the piping be labeled or color-coded as to its contents. Regardless of the labeling or color-coding, the hazards associated with chemicals contained in the pipes must still be communicated to employees.

L. FEDERAL, STATE AND/OR JURISDICTIONAL REQUIREMENTS

GCI facilities shall determine if there are any federal, state, and/or jurisdictional hazard communication requirements that affect their locations. If requirements do exist, and if they are more restrictive than these guidelines, they shall be incorporated into GCI's hazard communication program.

Chapter 20

Hazardous Waste Operations and Emergency Response

The type and character of our testing activities are such that our employees should not be exposed to leaks or spills of hazardous materials, typically petroleum-based liquids. Any applicable cleanup activities shall be in accordance with the following section. Any questions regarding cleanup procedures shall be directed to the Responsible Safety Officer, Aaron Conner.

Definitions:

"Buddy system" means a system of organizing employees into work groups in such a manner that each employee of the work group is required to be observed by at least one other employee in the work group. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

"Clean-up operation" means an operation where hazardous substances are removed, contained, incinerated, neutralized stabilized, cleared-up, or in any other manner processed or handled with the ultimate goal of making the site safer for people or the environment.

"Decontamination" means the removal of hazardous substances from employees and their equipment to the extent necessary to preclude the occurrence of foreseeable adverse health effects.

"Emergency response" or "responding to emergencies" means a response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result, in an uncontrolled release of a hazardous substance. Responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area, or by maintenance personnel are not considered to be emergency responses. Responses to releases of hazardous substances where there is no potential safety or health hazard (i.e., fire, explosion, or chemical exposure) are not considered to be emergency responses.

"Facility" means (A) any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, storage container, motor vehicle, rolling stock, or aircraft, or (B) any site or area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located; but does not include any consumer product in consumer use or any water-borne vessel.

"Hazardous materials response (HAZMAT) team" means an organized group of employees, designated by the employer, who are expected to perform work to handle and control actual or potential leaks or spills of hazardous substances requiring possible close approach to the substance. The team members perform responses to releases or
potential releases of hazardous substances for the purpose of control or stabilization of the incident. A HAZMAT team is not a fire brigade nor is a typical fire brigade a HAZMAT team. A HAZMAT team, however, may be a separate component of a fire brigade or fire department.

"Hazardous substance" means any substance designated or listed under (A) through (D) of this definition, exposure to which results or may result in adverse effects on the health or safety of employees:

[A] Any substance defined under section 101(14) of CERCLA;

[B] Any biologic agent and other disease causing agent which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any person, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral, abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformations in such persons or their offspring.

[C] Any substance listed by the U.S. Department of Transportation as hazardous materials under 49 CFR 172.101

[D] Hazardous waste as herein defined.

"Hazardous waste" means -

[A] A waste or combination of wastes as defined in 40 CFR 261.3

[B] Those substances defined as hazardous wastes in 49 CFR 171.8.

"Hazardous waste operation" means any operation conducted within the scope of this standard.

"Hazardous waste site" or "Site" means any facility or location within the scope of this standard at which hazardous waste operations take place.

"Health hazard" means a chemical, mixture of chemicals or a pathogen for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes. It also includes stress due to temperature extremes. Further definition of the terms used above can be found in Appendix A to 29 CFR 1910.1200.

"IDLH" or "Immediately dangerous to life or health" means an atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would interfere with an individual's ability to escape from a dangerous atmosphere.

"Oxygen deficiency" means that concentration of oxygen by volume below which atmosphere supplying respiratory protection must be provided. It exists in atmospheres where the percentage of oxygen by volume is less than 19.5 percent oxygen.

"Permissible exposure limit" means the exposure, inhalation or dermal permissible exposure limit specified in 29 CFR Part 1910, Subparts G and Z.

"Published exposure level" means the exposure limits published in "NIOSH Recommendations for Occupational Health Standards" dated 1986, which is incorporated by reference as specified in Sec. 1910.6, or if none is specified, the exposure limits published in the standards specified by the American Conference
of Governmental Industrial Hygienists in their publication "Threshold Limit Values and Biological Exposure Indices for 1987 - 88" dated 1987, which is incorporated by reference as specified in Sec. 1910.6.

"Post emergency response" means that portion of an emergency response performed after the immediate threat of a release has been stabilized or eliminated and clean up of the site has begun. If post emergency response is performed by an employer's own employees who were part of the initial emergency response, it is considered to be part of the initial response and not post emergency

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response. However, if a group of an employer's own employees, separate from the group providing initial response, performs the clean-up operation, then the separate group of employees would be considered to be performing post-emergency response and subject to paragraph (q)(11) of this section.

"Qualified person" means a person with specific training, knowledge and experience in the area for which the person has the responsibility and the authority to control. "Site safety and health supervisor (or official" means the individual located on a hazardous waste site who is responsible to the employer and has the authority and knowledge necessary to implement the site safety and health plan and verify compliance with
applicable safety and health requirements.

"Small quantity generator" means a generator of hazardous wastes who in any calendar month generates no more than 1,000 kilograms (2,205) pounds of hazardous waste in that month.

"Uncontrolled hazardous waste site" means an area identified as an uncontrolled hazardous waste site by a governmental body, whether Federal, state, local or other where an accumulation of hazardous substances creates a threat to the health and safety of individuals or the environment or both. Some sites are found on public lands such as those created by former municipal, county or state landfills where illegal or poorly managed waste disposal has taken place. Other sites are found on private property, often belonging to generators or former generators of hazardous substance wastes. Examples of such sites include, but are not limited to, surface impoundments, landfills, dumps, and tank or drum farms. Normal operations at TSD sites are not covered by this definition.

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Employers shall develop and implement a written safety and health program for their employees involved in hazardous waste operations. The program shall be designed to identify, evaluate, and control safety and health hazards, and provide for emergency response for hazardous waste operations. The written safety and health program shall incorporate the following: An organizational structure; A comprehensive work plan; A site-specific safety and health plan which need not repeat the employer's standard operating procedures required. The safety and health training program; The medical surveillance program; The employer's standard operating procedures for safety and health; and Any necessary interface between general program and site specific activities.

Site Excavation

Site excavations created during initial site preparation or during hazardous waste operations shall be shored or sloped as appropriate to prevent accidental collapse in
accordance with Subpart P of 29 CFR Part 1926.

Contractors and Subcontractors.

An employer who retains contractor or sub-contractor services for work in hazardous waste operations shall inform those contractors, sub-contractors, or their representatives of the site emergency response procedures and any potential fire, explosion, health, safety or other hazards of the hazardous waste operation that have been identified by the employer's information program. Sub-contractors are required to perform a daily toolbox meeting.

Program Availability

The written safety and health program shall be made available to any contractor or subcontractor or their representative who will be involved with the hazardous waste operation; to employees; to employee designated representatives; to OSHA personnel, and to personnel of other Federal, state, or local agencies with regulatory authority over the site.

Organizational structure Part of the Site Program:

The organizational structure part of the program shall establish the specific chain of command and specify the overall responsibilities of supervisors and employees. It shall include, at a minimum, the following elements: (A) A general supervisor who has the responsibility and authority to direct all hazardous waste operations. (B) A site safety and health supervisor who has the responsibility and authority to develop and implement the site safety and health plan and verify compliance. (C) All other personnel needed for hazardous waste site operations and emergency response and their general functions and responsibilities. (D) Safety and Health supervisor must be at minimum 10 hour OSHA Safety Certification.

The lines of Authority, Responsibility, and Communication

The organizational structure shall be reviewed and updated as necessary to reflect the current status of waste site operations. The comprehensive work plan part of the program shall address the tasks and objectives of the site operations and the logistics and resources required to reach those tasks and objectives. The comprehensive work plan shall define anticipated clean-up activities as well as normal operating procedures which need not repeat the employer's procedures available elsewhere. The comprehensive work plan shall define work tasks and objectives and identify the methods for accomplishing those tasks and objectives. The comprehensive workplan shall establish personnel requirements for implementing the plan. The comprehensive workplan shall provide for the implementation of the training required. The comprehensive workplan shall provide for the implementation of the required informational programs required. The comprehensive workplan shall provide for the implementation of the medical surveillance program.

Site-specific Safety and Health Plan Part of the Program

General:

The site safety and health plan, which must be kept on site, shall address the safety and health hazards of each phase of site operation and include the requirements and procedures for employee protection.

Elements:

The site safety and health plan, as a minimum, shall address the following: (A) A safety and health risk or hazard analysis for each site task and operation found in the workplan. (B) Employee training assignments to assure compliance with paragraph (e) of this section. (C) Personal protective

equipment to be used by employees for each of the site tasks and operations being conducted as required by the personal protective equipment program in paragraph (g)(5) of this section. (D) Medical surveillance requirements in accordance with the program in paragraph (f) of this section. (E) Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment to be used. (F) Site control measures in accordance with the site control program required.

Decontamination Procedures:

An emergency response plan meeting the requirements for safe and effective responses to emergencies, including the necessary PPE and other equipment.

Confined Space Entry Procedures:

A spill containment program meeting the requirements.

Pre-entry Briefing:.

The site specific safety and health plan shall provide for pre-entry briefings to be held prior to initiating any site activity, and at such other times as necessary to ensure that employees are apprised of the site safety and health plan and that this plan is being followed. The information and data obtained from site characterization and analysis work required in paragraph (c) of this section shall be used to prepare and update the site safety and health plan. (iv) Effectiveness of site safety an health plan. Inspections shall be conducted by the site safety and health supervisor or, in the absence of that individual, another individual who is knowledgeable in occupational safety and health, acting on behalf of the employer as necessary to determine the effectiveness of the site safety and health plan. Any deficiencies in the effectiveness of the site safety and health plan shall be corrected by the employer.

Site Characterization and Analysis:

General:

Hazardous waste sites shall be evaluated in accordance with this paragraph to identify specific site hazards and to determine the appropriate safety and health control procedures needed to protect employees from the identified hazards.

Preliminary Evaluation:

A preliminary evaluation of a site's characteristics shall be performed prior to site entry by a qualified person in order to aid in the selection of appropriate employee protection methods prior to site entry. Immediately after initial site entry, a more detailed evaluation of the site's specific

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characteristics shall be performed by a qualified person in order to further identify existing site hazards and to further aid in the selection of the appropriate engineering controls and personal protective equipment for the tasks to be performed.

Hazard Identification:

All suspected conditions that may pose inhalation or skin absorption hazards that are immediately dangerous to life or health (IDLH) or other conditions that may cause death or serious harm shall be identified during the preliminary survey and evaluated during the detailed survey. Examples of such hazards include, but are not limited to, confined space entry, potentially explosive or flammable situations, visible vapor clouds, or areas where biological indicators such as dead animals or vegetation are located.

Required Information:

The following information to the extent available shall be obtained by the employer prior to allowing employees to enter a site:

(i) Location and approximate size of the site.

(ii) Description of the response activity and/or the job task to be performed.

(iii) Duration of the planned employee activity.

(iv) Site topography and accessibility by air and roads.

(v) Safety and health hazards expected at the site.

(vi) Pathways for hazardous substance dispersion.

(vii) Present status and capabilities of emergency response teams that would provide assistance to on-site employees at the time of an emergency.

(viii) Hazardous substances and health hazards involved or expected at the site and their chemical and physical properties.

Personal Protective Equipment (PPE):

PPE shall be provided and used during initial site entry in accordance with the following requirements: Based upon the results of the preliminary site evaluation, an ensemble of PPE shall be selected and used during initial site entry which will provide protection to a level of exposure below permissible exposure limits and published exposure levels for known or suspected hazardous substances and health hazards and which will provide protection against the known and suspected hazards identified during the preliminary site evaluation. If there s no permissible exposure limit or published exposure level, the employer may use other published studies and information as a guide to appropriate personal protective equipment. If positive-pressure self-contained breathing apparatus is not used as part of the entry ensemble, and if respiratory protection is warranted by the potential hazards identified during the preliminary site evaluation, an escape self-contained breathing apparatus of at least five minute's duration shall be carried by employees during initial site entry. If the preliminary site evaluation does not produce sufficient information to identify the hazards or suspected hazards of the site an ensemble providing equivalent to Level B PPE shall be provided as minimum protection, and direct reading instruments shall be used as appropriate for identifying IDLH

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conditions. Once the hazards of the site have been identified, the appropriate PPE shall be selected and used.

Monitoring:

The following monitoring shall be conducted during initial site entry when the site evaluation produces information which shows the potential for ionizing radiation or IDLH conditions, or when the site information is not sufficient reasonably to eliminate these possible conditions:

(i) Monitoring with direct reading instruments for hazardous levels of ionizing radiation.
(ii) Monitoring the air with appropriate direct reading test equipment for (i.e., combustible gas meters, detector tubes) for IDLH and other conditions that may cause death or serious harm (combustible or explosive atmospheres, oxygen deficiency, toxic substances.)
(iii) Visually observing for signs of actual or potential IDLH or other dangerous conditions.
(iv) An ongoing air monitoring program in accordance with paragraph (h) of this section shall be implemented after site characterization has determined the site is safe for the start-up of operations.

Risk Identification:

Once the presence and concentrations of specific hazardous substances and health hazards have been established, the risks associated with these substances shall be identified. Employees who will be working on the site shall be informed of any risks that have been identified. In situations covered by the Hazard Communication Standard, 29 CFR 1910.1200, training required by that standard need not be duplicated. Risks to consider include, but are not limited to:

[a] Exposures exceeding the permissible exposure limits and published exposure levels.
[b] IDLH Concentrations.
[c] Potential Skin Absorption and Irritation Sources.
[d] Potential Eye Irritation Sources.
[e] Explosion Sensitivity and Flammability Ranges.
[f] Oxygen deficiency

Employee Notification:

Any information concerning the chemical, physical, and toxicologic properties of each substance known or expected to be present on site that is available to the employer and relevant to the duties an employee is expected to perform shall be made available to the affected employees prior to the commencement of their work activities. The employer may utilize information developed for the hazard communication standard for this purpose.

Site Control

General:

Appropriate site control procedures shall be implemented to control employee exposure to hazardous substances before clean-up work begins.

Site control program:

A site control program for protecting employees which is part of the employer's site safety and health program required shall be developed during the planning stages of a hazardous waste clean-up operation and modified as necessary as new information becomes available. Elements of the site control program. The site control program shall, as a minimum, include: A site map; site work zones; the use of a "buddy system"; site communications including alerting means for emergencies; the standard operating procedures or safe work practices; and, identification of the nearest medical assistance. Where these requirements are covered elsewhere they need not be repeated.

Training

General: All employees working on site (such as but not limited to equipment operators, general laborers and others) exposed to hazardous substances, health hazards, or safety hazards and their supervisors and management responsible for the site shall receive training meeting the requirements of this paragraph before they are permitted to engage in hazardous waste operations that could expose them to hazardous substances, safety, or health hazards, and they shall receive review training as specified in this paragraph. Employees shall not be permitted to participate in or supervise field activities until they have been trained to a level required by their job function and responsibility.

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The training shall thoroughly cover the following:

(i) Names of personnel and alternates responsible for site safety and health;
(ii) Safety, health and other hazards present on the site;
(iii) Use of PPE;
(iv) Work practices by which the employee can minimize risks from hazards;
(v) Safe use of engineering controls and equipment on the site;
(vi) Medical surveillance requirements including recognition of symptoms and signs which might indicate over exposure to hazards;

Initial Training:

General site workers (such as equipment operators, general laborers and supervisory personnel) engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards shall receive a minimum of 40 hours of instruction off the site, and a minimum of three days actual field experience under the direct supervision of a trained experienced supervisor. (ii) Workers on site only occasionally for a specific limited task (such as, but not limited to, ground water monitoring, land surveying, or geophysical surveying) and who are unlikely to be exposed over permissible exposure limits and published exposure limits shall receive a minimum of 24 hours of instruction off the site, and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor. Workers regularly on site who work in areas, which have been monitored and fully characterized

indicating that exposures are under permissible exposure limits and published exposure limits where respirators are not necessary, and the characterization indicates that there are no health hazards or the possibility of an emergency developing, shall receive a minimum of 24 hours of instruction off the site, and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor. Workers with 24 hours of training who are covered, and who become general site workers or who are required to wear respirators, shall have the additional 16 hours and two days of training necessary to total the training specified.

Management and Supervisor Training:

On-site management and supervisors directly responsible for or who supervise employees engaged in hazardous waste operations shall receive 40 hours initial and three days of supervised field experience and at least eight additional hours of specialized training at the time of job assignment on such topics as, but no limited to, the employer's safety and health program, personal protective equipment program, spill containment program, and health hazard monitoring procedure and techniques.

Qualifications for Trainers:

Trainers shall be qualified to instruct employees about the subject matter that is being presented in training. Such trainers shall have satisfactorily completed a training program for teaching the subjects they are expected to teach, or they shall have the academic credentials and instructional experience necessary for teaching the subjects. Instructors shall demonstrate competent instructional skills and knowledge of the applicable subject matter.

Training Certification:

Employees and supervisors that have received and successfully completed the training and field experience shall be certified by their instructor or the head instructor and trained supervisor as having completed the necessary training. A written certificate shall be given to each person so certified. Any person who has not been so certified or who does not meet the requirements shall be prohibited from engaging in hazardous waste operations.

Chapter 21

Spill Prevention

All employees must be aware of the hazards involved when working with chemicals and the remedies that need to be used when a spill does occur. A training program will give instructions on how to handle the chemical being used and first aid to be applied to victims of chemical exposure. First aid and caution signs will be conspicuously posted so as to alert individuals on a constant basis. Charts identifying the chemicals utilized in the workplace, their symptoms and effects must also be posted. The workers must know what the acceptable level of exposure to a chemical is and what safety systems must be in place when working with a chemical. Staff should also be aware of new chemical products which may be available that are less harmful, and they must ensure that facilities are adequately ventilated when using chemicals on the premises.

Any water that is provided to an employee throughout the facility should be clearly identified as to whether it is for drinking, washing or cooking. All restrooms must be kept clean and sanitary.

Employees should be screened before taking positions that may expose them to hazards they are not physically capable of handling. An employee who takes an assignment which requires physical labor must be trained to lift heavy loads properly so as not to damage themselves physically, or cause a spill.

The following requirements must be met for storage locker/cabinets:

*Cabinets will be permitted on one side of a corridor only.
*Cabinets must end at least 6 ft from a corridor exit door.
*Cabinet ends must be at least 12 in. from the edge of a doorway on the latch side and from the edge of the door leaf when fully opened into a corridor.
*The cabinets must not be more than 20 in. deep by 37 in. wide by 72-3/4 in. high.
*The cabinets must be all metal construction with positive latches to prevent spillage of contents in the event of an earthquake.
*All doors must return automatically to the closed position when not held open manually.
*A 45 degree-angle fairing must be provided from the wall to the corridor corner of the cabinet. Fairing must be provided at both ends of cabinet or bank of cabinets. * A 45 degree-angle fairing must be provided at the top of the cabinets from the outside corridor edge of cabinet to the wall.
*All cabinets must be anchored to the wall firmly enough to withstand 0.5g of lateral acceleration (or a lateral load equal to 1/2 the total dead weight of the cabinet and its contents) in the event of an earthquake.
*Liquids and chemicals are not to be stored in corridor lockers.
Any deviation from the above requirements must be approved by the Responsible Safety Officer.

Hazardous Chemical Exposures:

In any company which utilizes chemical substances, a training program on the handling, hazards, storage, exposure risks, symptoms of chemical exposure, spills and first aid needs to be part of any new employees training. There must also be follow-up training sessions as to any new chemical or processes that may be initiated by the company. Follow-up training sessions act as a reinforcement of safety standards that need to be followed on a daily basis.

In a training program, employees will learn acceptable levels of chemical exposure, proper storage and labeling of chemicals, and usage of protective clothing and equipment for handling chemicals. They will also learn about potential fire and toxicity hazards, when not to have a chemical in a confined area, or to store in closed containers, usage of eye wash fountains and safety showers, and the necessary posting of open, and dangerous areas. It is important that an employee recognize the Threshold Limit Values or Permissible Exposure Limits of airborne contaminants and physical agents in the workplace. Employees must be instructed on the proper response procedures for spilled materials. The training should include materials available for use, proper waste disposal, and communication procedures.

A procedural manual or set of instructions must be part of the program, with periodic inspections that clearly indicate whether an employee may be mishandling a chemical or endangering himself or others. Part of the manual or procedures must establish a standard of when and how to deal with chemical spills, neutralizing, and disposing of spills or overflows. These procedures must also be posted in an area that is easily accessible for reference usage.

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In the event of a minor chemical spill, in addition to prompt corrective measures, the RSO or designated representative should be notified after the cleanup of the occurrence. In the event of a major spill, or any highly hazardous substance, notification to the above parties shall be made first before any cleanup is attempted.

First aid training and equipment will be routine in any facility where chemicals are used. Employees must know how to handle equipment in emergency situations, what equipment needs to be used and whether the equipment is adequate for the situation. A proper spill kit must be on hand, and contain the appropriate supplies for materials that may be spilled. Supplies must be easily accessible when required, and considerations must be made for both the type and quantity of materials.

Respirators may be used either as protective safety equipment or for emergency usage for spills. Therefore, the employee should recognize that respirators need to be stored in a clean, sanitary and convenient location and inspected on a regular basis. Also what respirators are approved by NIOSH for their particular applications.

With a first aid program an employee will recognize when a problem may be occurring by exposure to a chemical ranging from headaches, nausea, dermatitis problems to other factors of discomfort when they use solvents or chemicals.

In the design of a facility that transports chemicals from storage to vats, the content of pipes and

storage containers must be clearly marked. Within that facility design there must be an emergency shut off system in case of an accident or chemical spill. Each employee will be trained as to these emergency shut-off systems.

Ventilation is another major factor in the design of any facility. Whether by natural means or mechanical, the system must be designed to control dust, fumes, solvents, gases, smoke or vapors which may be generated in the workplace. It is also important that a medical or biological monitoring system be in operation as part of the safety standards. If internal combustion engines are used in the facility, or if there is a chance of leakage or mixture with a chemical that could create a toxic gas, atmospheric gas levels must be monitored. If toxic chemicals are used and stored in the facility they should be located in an isolated area to guarantee safety.

Clean Work Areas:

All areas controlled by Grace Consulting, Inc. must be kept in orderly and clean condition and used only for activities or operations for which they have been approved. Areas where chemicals may be used or stored must be maintained using good housekeeping best management practices. This includes, but is not limited to, clean and organized storage, labeling, and secondary containment where necessary.

Keep stairs, corridors, and aisles clear. Traffic lanes and loading areas must be kept clear and marked appropriately.

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Store materials in work rooms or designated storage areas only. Do not use hallways, fan lofts, or boiler and equipment rooms as storage areas. Chemical substances should be stored in proper containers to minimize the potential for a spill. Whenever possible, chemicals should be kept in closed containers and stored so they are not exposed to storm water.

Do not allow exits, passageways, or access to equipment to become obstructed by either stored materials or materials and equipment that is being used.

Arrange stored materials safely to prevent tipping, falling, collapsing, rolling, or spreading - that is, any undesired and unsafe motion.

Do not exceed the rated floor capacity of stored material for the area. The load limit and the maximum height to which material may be stacked must be posted.

Place materials such as cartons, boxes, drums, lumber, pipe, and bar stock in racks or in stable piles as appropriate for the type of material.

Store materials that are radioactive, fissile, flammable, explosive, oxidizing, corrosive, or pyrophoric only under conditions approved for the specific use by the Responsible Safety Officer.

Segregate and store incompatible materials in separate locations.

Remove items that will not be required for extended periods from work areas and put them in warehouse storage. Call for assistance.

Every work location must be provided with illumination that meets OSHA requirements. Evaluation of illumination quality and requirements is made by the Responsible Safety Officer, but the supervisor of an area is responsible for obtaining and maintaining suitable illumination.

Areas without natural lighting and areas where hazardous operations are conducted must be provided with enough automatically activated emergency lighting to permit exit or entry of personnel if the primary lighting fails.

Certain jobs require standard safety apparel and appliances for the protection of the employee. Your supervisor is aware of the requirements and will furnish you with the necessary approved protective appliances. These items shall be worn and effectively maintained as a condition of your continued employment and part of our mutual obligation to comply with the Occupational Safety and Health Act.

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Chapter 22

Process Safety Management of Highly Hazardous Chemicals

While these regulations primarily apply to plant personnel, as contractors we should be familiar with plant safety rules as it applies to our work in and around plant areas.

Definitions

"Atmospheric tank" means a storage tank which has been designed to operate at pressures from atmospheric through 0.5 p.s.i.g. (pounds per square inch gauge, 3.45 Kpa).

"Boiling point" means the boiling point of a liquid at a pressure of 14.7 pounds per square inch absolute (p.s.i.a.) (760 mm.). For the purposes of this section, where an accurate boiling point is unavailable for the material in question, or for mixtures which do not have a constant boiling point, the 10 percent point of a distillation performed in accordance with the Standard Method of Test for Distillation of Petroleum Product. ASTM D-86-62, which is incorporated by reference as specified in Sec. 1910.6, may be used as the boiling point of the liquid.

"Catastrophic release" means a major uncontrolled emission, fire, or explosion, involving one or more highly hazardous chemicals, that presents serious danger to employees in the workplace.

"Facility" means the buildings, containers or equipment which contain a process.

"Highly hazardous chemical" means a substance possessing toxic, reactive, flammable, or explosive properties and specified by paragraph (a)(1) of this section.

"Hot work" means work involving electric or gas welding, cutting, brazing, or similar flame or spark-producing operations.

"Normally unoccupied remote facility" means a facility which is operated, maintained or serviced by employees who visit the facility only periodically to check its operation and to perform necessary operating or maintenance tasks. No employees are permanently stationed at the facility. Facilities meeting this definition are not contiguous with, and must be geographically remote from all other buildings, processes or persons.

"Process" means any activity involving a highly hazardous chemical including any use, storage, manufacturing, handling, or the on-site movement of such chemicals, or combination of these activities. For purposes of this definition, any group of vessels which are interconnected and separate vessels which are located such that a highly hazardous chemical could be involved in a potential release shall be considered a single process.

"Replacement in kind" means a replacement which satisfies the design specification.

"Trade secret" means any confidential formula, pattern, process, device, information or compilation of information that is used in an employer's business, and that gives the employer an opportunity to obtain an advantage over competitors who do not know or use it.

Employee Participation

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Facility employers shall develop a written plan of action regarding the implementation of the employee participation required by this paragraph. Facility employers shall consult with employees and their representatives on the conduct and development of process hazards analyses and on the development of the other elements of process safety management in this standard. Facility employers shall provide to employees and their representatives access to process hazard analyses and to all other information required to be developed under this standard.

Process Safety Information

In accordance with the schedule set forth, the facility employer shall complete a compilation of written process safety information before conducting any process hazard analysis required by the standard. The compilation of written process safety information is to enable the employer and the employees involved in operating the process to identify and understand the hazards posed by those processes involving highly hazardous chemicals. This process safety information shall include information pertaining to the hazards of the highly hazardous chemicals used or produced by the process, information pertaining to the technology of the process, and information pertaining to the equipment in the process.

Information Pertaining to the Hazards of the Highly Hazardous Chemicals in the Process
This information shall consist of at least the following:

(i) Toxicity information;
(ii) Permissible exposure limits;
(iii) Physical data;
(iv) Reactivity data:
(v) Corrosivity data;
(vi) Thermal and chemical stability data;
(vii) Hazardous effects of inadvertent mixing of different materials that could foreseeably occur.

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Note: Material Safety Data Sheets meeting the requirements of 29 CFR 1910.1200(g) may be used to comply with this requirement to the extent they contain the information required by this subparagraph.

Information Pertaining to the Technology of the Process
Information concerning the technology of the process shall include at least the following: A block flow diagram or simplified process flow diagram; (B) Process chemistry; (C) Maximum intended inventory; (D) Safe upper and lower limits for such items as temperatures, pressures, flows or compositions; and, (E) An evaluation of the consequences of deviations, including those affecting the safety and health of employees. Where the original technical information no longer exists, such information may be developed in conjunction with the process hazard analysis in sufficient detail to support the analysis.

Information Pertaining to the Equipment in the Process
Information pertaining to the equipment in the process shall include: (A) Materials of construction; (B) Piping and instrument diagrams (P&ID's); (C) Electrical classification; (D) Relief system design and design basis; (E) Ventilation system design; (F) Design codes and standards employed; (G) Material and energy balances for processes built after May 26, 1992; and, (H) Safety systems (e.g.

interlocks, detection or suppression systems). Facility employers shall document that equipment complies with recognized and generally accepted good engineering practices. For existing equipment designed and constructed in accordance with codes, standards, or practices that are no longer in general use, the facility employers shall determine and document that the equipment is designed, maintained, inspected, tested, and operating in a safe manner.

Process Hazard Analysis

Facility employers shall perform an initial process hazard analysis (hazard evaluation) on processes covered by this standard. The process hazard analysis shall be appropriate to the complexity of the process and shall identify, evaluate, and control the hazards involved in the process. Facility employers shall determine and document the priority order for conducting process hazard analyses based on a rationale which includes such considerations as extent of the process hazards, number of potentially affected employees, age of the process, and operating history of the process. The process hazard analysis shall be conducted as soon as possible, but not later than the following schedule:

(i) No less than 25 percent of the initial process hazards analyses shall be completed by May 26, 1994;
(ii) No less than 50 percent of the initial process hazards analyses shall be completed by May 26, 1995;
(iii) No less than 75 percent of the initial process hazards analyses shall be completed by May 26, 1996;
(iv) All initial process hazards analyses shall be completed by May 26, 1997.
(v) Process hazards analyses completed after May 26, 1987 which meet the requirements of this paragraph are acceptable as initial process hazards analyses.

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These process hazard analyses shall be updated and revalidated, based on their completion date.

Facility employers shall use one or more of the following methodologies that are appropriate to determine and evaluate the hazards of the process being analyzed.

What-If; Checklist; What-If/Checklist; Hazard and Operability Study (HAZOP); Failure Mode and Effects Analysis (FMEA); Fault Tree Analysis; or An appropriate equivalent methodology. The process hazard analysis shall address: The hazards of the process; The identification of any previous incident which had a likely potential for catastrophic consequences in the workplace; Engineering and administrative controls applicable to the hazards and their interrelationships such as appropriate application of detection methodologies to provide early warning of releases. (Acceptable detection methods might include process monitoring and control instrumentation with alarms, and detection hardware such as hydrocarbon sensors.); Consequences of failure of engineering and administrative controls; Facility siting; Human factors; and A qualitative evaluation of a range of the possible safety and health effects of failure of controls on employees in the workplace.

The process hazard analysis shall be performed by a team with expertise in engineering and process operations, and the team shall include at least one employee who has experience and knowledge specific to the process being evaluated. Also, one member of the team must be

knowledgeable in the specific process hazard analysis methodology being used. Facility employers shall establish a system to promptly address the team's findings and recommendations; assure that the recommendations are resolved in a timely manner and that the resolution is documented; document what actions are to be taken; complete actions as soon as possible; develop a written schedule of when these actions are to be completed; communicate the actions to operating, maintenance and other employees whose work assignments are in the process and who may be affected by the recommendations or actions.

At least every five (5) years after the completion of the initial process hazard analysis, the process hazard analysis shall be updated and revalidated by a team meeting the requirements, to assure that the process hazard analysis is consistent with the current process. Facility employers shall retain process hazards analyses and updates or revalidations for each process covered by this section, as well as the documented resolution of recommendations described in paragraph of this section for the life of the process.

Operating procedures. Facility employers shall develop and implement written operating procedures that provide clear instructions for safely conducting activities involved in each covered process consistent with the process safety information and shall address at least the following elements. Steps for each operating phase: Initial startup; (B) Normal operations; (C) Temporary operations; Emergency shutdown including the conditions under which emergency shutdown is required, and the assignment of shutdown responsibility to qualified operators to ensure that emergency shutdown is executed in a safe and timely manner. (E) Emergency Operations; (F) Normal shutdown; and, (G) Startup following a turnaround, or after an emergency shutdown.

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Operating limits: (A) Consequences of deviation; and (B) Steps required to correct or avoid deviation.

Safety and Health Considerations

(A) Properties of, and hazards presented by, the chemicals used in the process; (B) Precautions necessary to prevent exposure, including engineering controls, administrative controls, and personal protective equipment; (C) Control measures to be taken if physical contact or airborne exposure occurs; Quality control for raw materials and control of hazardous chemical inventory levels; and, (E) Any special or unique hazards.

Safety Systems and Their Functions

Operating procedures shall be readily accessible to employees who work in or maintain a process. The operating procedures shall be reviewed as often as necessary to assure that they reflect current operating practice, including changes that result from changes in process chemicals, technology, and equipment, and changes to facilities. The employer shall certify annually that these operating procedures are current and accurate. The employer shall develop and implement safe work practices to provide for the control of hazards during operations such as lockout / tagout; confined space entry; opening process equipment or piping; and control over entrance into a facility by maintenance, contractor, laboratory, or other support personnel. These safe work practices shall apply to employees and contractor employees.

Initial Training

Each employee presently involved in operating a process, and each employee before being involved in operating a newly assigned process, shall be trained in an overview of the process and in the operating procedures. The training shall include emphasis on the specific safety and health hazards, emergency operations including shutdown, and safe work practices applicable to the employee's job tasks. In lieu of initial training for those employees already involved in operating a process on May 26, 1992, an employer may certify in writing that the employee has the required knowledge, skills, and abilities to safely carry out the duties and responsibilities as specified in the operating procedures.

Refresher Training

Refresher training shall be provided at least every year, and more often if necessary, to each employee involved in operating a process to assure that the employee understands and adheres to the current operating procedures of the process. The employer, in consultation with the employees involved in operating the process, shall determine the appropriate frequency of refresher training.

Training Documentation

The employer shall ascertain that each employee involved in operating a process has received and understood the training required by this paragraph. The employer shall prepare a record which contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training.

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Contractors

Application

This paragraph applies to Grace Consulting, Inc. workers performing maintenance or repair, turnaround, major renovation, or specialty work on or adjacent to a covered process. It does not apply to contractors providing incidental services which do not influence process safety, such as janitorial work, food and drink services, laundry, delivery or other supply services.

Employer Responsibilities

The facilities employer, may when using Grace Consulting, Inc., obtain and evaluate information regarding the contractor's safety performance and programs. The facilities employer shall inform contractors of the known potential fire, explosion, or toxic release hazards related to the contractors' work and the process.

The facilities employer shall explain to contract employers the applicable provisions of the emergency action plan. The facilities employer may develop and implement safe work practices, to control the entrance, presence and exit of Grace Consulting, Inc. and their employees in covered process areas. The facilities employer may periodically evaluate the performance of Grace Consulting, Inc. in fulfilling their obligations. The facilities employer shall maintain a contract employee injury and illness log related to any contractor's work in process areas.

Grace Consulting, Inc. Responsibilities

Grace Consulting, Inc. shall assure that each employee is trained in the work practices necessary to safely perform his/her job. Grace Consulting, Inc. 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. Grace Consulting, Inc. shall document that each employee has received and understood the training required. Grace Consulting, Inc. shall prepare a record which contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training. Grace Consulting, Inc. shall assure that each employee follows the safety rules of the facility including the safe work practices.

Grace Consulting, Inc. shall advise the employer of any unique hazards presented by our work, or of any hazards found by our work. Pre-startup safety review. The facilities employer shall perform a pre-startup safety review for new facilities and for modified facilities when the modification is significant enough to require a change in the process safety information. The pre-startup safety review shall confirm that prior to the introduction of highly hazardous chemicals to a process:

Construction and equipment is in accordance with design specifications; Safety, operating, maintenance, & emerg. procedures are adequate & in place. For new facilities, a process hazard analysis has been performed and recommendations have been resolved or implemented before startup; Modified facilities meet the requirements contained in management of change. Training of each employee involved in operating a process has been completed.

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Mechanical Integrity:

Application. Pressure vessels and storage tanks; piping systems (including piping components such as valves); Relief and vent systems and devices; Emergency shutdown systems; Controls (including monitoring devices and sensors, alarms, and interlocks) and, Pumps.

Written Procedures:

The facilities employer shall establish and implement written procedures to maintain the on-going integrity of process equipment. Training for process maintenance activities. The employer shall train each employee involved in maintaining the on-going integrity of process equipment in an overview of that process and its hazards and in the procedures applicable to the employee's job tasks to assure that the employee can perform the job tasks in a safe manner. Inspection and testing. Inspections and tests shall be performed on process equipment. Inspection and testing procedures shall follow recognized and generally accepted good engineering practices.

The frequency of inspections and tests of process equipment shall be consistent with applicable manufacturers' recommendations and good engineering practices, and more frequently if determined to be necessary by prior operating experience. The employer shall document each inspection and test that has been performed on process equipment. The documentation shall identify the date of the inspection or test, the name of the person who performed the inspection or test, the serial number or other identifier of the equipment on which the inspection or test was performed, a description of the inspection or test performed, and the results of the inspection or test.

Equipment Deficiencies:

The facilities employer shall correct deficiencies in equipment that are outside acceptable limits (defined by the process safety information in paragraph (d) of this section) before further use or in a safe and timely manner when necessary means are taken to assure safe operation.

Quality Assurance:

In the construction of new plants and equipment, the facilities employer shall assure that equipment as it is fabricated is suitable for the process application for which they will be used. Appropriate checks and inspections shall be performed to assure that equipment is installed properly and consistent with design specifications and the manufacturer's instructions. The facilities employer shall assure that maintenance materials, spare parts and equipment are suitable for the process application for which they will be used.

Hot Work Permit:

The facilities employer may issue a hot work permit for hot work operations conducted on or near a covered process. The permit shall document that the fire prevention and protection requirements in 29 CFR1910.252(a) have been implemented prior to beginning the hot work operations; it shall indicate the date(s) authorized for hot work; and identify the object on which hot work is to be performed. The permit shall be kept on file until completion of the hot work operations.

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Management of Change:

The facilities employer shall establish and implement written procedures to manage changes (except for "replacements in kind") to process chemicals, technology, equipment, and procedures; and, changes to facilities that affect a covered process. The procedures shall assure that the following considerations are addressed prior to any change: The technical basis for the proposed change; Impact of change on safety and health; Modifications to operating procedures; Necessary time period for the change; and, Authorization requirements for the proposed change. Employees involved in operating a process and maintenance and Grace Consulting, Inc. employees whose job tasks will be affected by a change in the process shall be informed of, and trained in, the change prior to start-up of the process or affected part of the process. If a change covered by this paragraph results in a change in the process safety information, such information shall be updated accordingly. If a change covered by this paragraph results in a change in the operating procedures or practices required, such procedures or practices shall be updated accordingly.

Incident Investigation:

The facilities employer may investigate incidents which resulted in, or could reasonably have resulted in a catastrophic release of highly hazardous chemical in the workplace. An incident investigation shall be initiated as promptly as possible, but not later than 48 hours following the incident. An incident investigation team shall be established and consist of at least one person

knowledgeable in the process involved, including a Grace Consulting, Inc. employee if the incident involved our work, and other persons with appropriate knowledge and experience to thoroughly investigate and analyze the incident.

A report shall be prepared at the conclusion of the investigation which includes at a minimum:

*Date of incident;
*Date investigation began;
*A description of the incident;
*The factors that contributed to the incident;
*Any recommendations resulting from the investigation.

The facilities employer shall establish a system to promptly address and resolve the incident report findings and recommendations. Resolutions and corrective actions shall be documented. The report shall be reviewed with all affected personnel whose job tasks are relevant to the incident findings including Grace Consulting, Inc. employees where applicable. Incident investigation reports shall be retained for five years.

Emergency Planning and Response:

The facilities employer shall establish and implement an emergency action plan for the entire plant in accordance with the provisions of 29 CFR 1910.38(a). In addition, the emergency action plan shall include procedures for handling small releases. Facilities employers covered under this standard may also be subject to the hazardous waste and emergency response provisions contained in 29 CFR 1910.120(a), (p) and (q). (o)

Compliance Audits:

Facilities employers shall certify that they have evaluated compliance with the provisions of this section at least every three years to verify that the procedures and practices developed under the standard are adequate and are being followed. The compliance audit shall be conducted by at least one person knowledgeable in the process. A report of the findings of the audit shall be developed. The facilities employer shall promptly determine and document an appropriate response to each of the findings of the compliance audit, and document that deficiencies have been corrected. Facilities employers shall retain the two (2) most recent compliance audit reports.

Trade Secrets:

Facilities employers shall make all information necessary to comply with the section available to those persons responsible for compiling the process safety information, those assisting in the development of the process hazard analysis, those responsible for developing the operating procedures, and those involved in incident investigations, emergency planning and response and compliance audits without regard to possible trade secret status of such information. Nothing in this paragraph shall preclude the employer from requiring the persons to whom the information is made available to enter into confidentiality agreements not to disclose the information as set forth in 29

CFR1910.1200. Subject to the rules and procedures set forth in 29 CFR 1910.1200(i)(1) through 1910.1200(i)(12), employees and their designated representatives shall have access to trade secret information contained within the process hazard analysis and other documents required to be developed by this standard.

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Chapter 23

Asbestos/ Lead/ Mold Awareness & Management

Grace Consulting Inc. is subject to the OSHA asbestos regulations because we have employees. Regardless of whether or not we work in an asbestos-containing building, we also have specific responsibilities to protect our employees from asbestos hazards which may be present at any site where they work. At no time is any employee to disturb Asbestos Containing Material.

Grace Consulting, Inc. has responsibilities to take specific actions to protect the health and safety of these workers whenever they are engaged in such activity, even though the work which resulted in the dust and debris was performed by other workers. Our obligations include the following items in all cases.

Asbestos Awareness

GCI, is subject to the OSHA asbestos regulations because we have employees. Regardless of whether or not we work in an asbestos-containing building, we also have specific responsibilities to protect our employees from asbestos hazards which may be present at any site where they work. Exposure to asbestos has been shown to cause lung cancer, asbestosis, mesothelioma, and cancer of the stomach and colon. Our workers are required to never come in contact with material that hasn't been proven asbestos free. There are many possible locations where employees may be exposed to Asbestos during their job functions. Asbestos materials are used in the manufacture of heat-resistant clothing, automotive brake and clutch linings, and a variety of building materials including insulation, soundproofing, floor tiles, roofing felts, ceiling tiles, asbestos-cement pipe and sheet, and fire-resistant drywall. Asbestos is also present in pipe and boiler insulation materials, pipeline wrap and in sprayed-on materials located on beams, in crawlspaces, and between walls.

GCI, provides training which focus' on the locations of suspect materials, work practices, job assessment, and methods of control. All asbestos awareness training will be documented, and the records available to employees, employees representatives, and site owners where employees are working.

Training records shall be kept by and obtained from the RSO, Aaron Conner. An exposure assessment must be conducted to determine whether or not airborne asbestos fibers in excess of the permissible exposure limits may be present. Air monitoring will be required unless a negative exposure assessment is obtained. Asbestos may be friable or non-friable. Friable means that the material can be crumbled with hand pressure and is therefore likely to emit fibers. The fibrous or fluffy sprayed-on materials used for fireproofing, insulation, or sound proofing are considered to be friable, and they readily release airborne fibers if disturbed. Materials such as vinyl-asbestos floor tile or roofing felts are considered non-friable and generally do not emit airborne fibers unless subjected to

sanding or sawing operations. Asbestos-cement pipe or sheet can emit airborne fibers if the materials are cut, abraded or sawed, or if they are broken during demolition operations.

GCI, will provide all employees whose work activities may contact Asbestos Containing Material (ACM) or Presumed Asbestos Containing Material (PACM) but do not disturb the ACM or PACM during their work activities with asbestos awareness training initially, and each year thereafter.

The following work practices are prohibited: use of high speed abrasive disk saws without HEPA filtered exhausts or point-of-cut ventilator, use of compressed air without capture device, dry sweeping/shoveling or other dry clean-up, and employee rotation to circumvent permissible exposure limits.

Signs and labels shall identify the material which is present, its location, and appropriate work practices which, if followed, will ensure that Asbestos Containing Material (ACM) and/or Presumed Asbestos Containing Material (PACM) will not be disturbed. GCI, will ensure that employees working in and adjacent to regulated areas comprehend the warning signs.

Periodic exposure monitoring: Employee exposure monitoring (which represents full-shift exposures) must be conducted at the work area to determine accurately the airborne asbestos fiber concentrations. Monitoring may be discontinued if it shows asbestos fiber concentrations less than the permissible exposure limits (PELs).

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Respirators: Negative-pressure air purifying respirators (quarter- or half-face types) or higher levels are required.

Protective clothing: we must provide appropriate protective work clothing and equipment at no cost to the employee. Decontamination procedures: Work clothing must be HEPA vacuumed and equipment decontaminated on a plastic drop cloth; if Class IV clean-up takes place in a regulated area, the clean-up must comply with the hygiene required in a higher classification of asbestos work.
A regulated area must be established. It must be demarcated in any manner that minimizes the number of persons in the area and protects persons outside the area from exposure to airborne asbestos. Signs must be provided and displayed. Medical surveillance is required for all workers doing Class IV work who are exposed to asbestos above the PELs for 30 or more days per year. The 30-day requirement excludes days in which less than one hour is spent in Class III work when required work practices are followed. When working on multi-contractor worksites, employees shall be protected from exposure.

Employees working immediately adjacent to a Class I asbestos jobs who may be exposed to asbestos due to the inadequate containment of such job, Grace Consulting Inc. shall either remove the employees from the area until the enclosure breach is repaired; or perform an initial exposure assessment pursuant to 1926.1101(f).

Our employees may be exposed to asbestos hazards under circumstances covered by the OSHA General Industry Asbestos Standard. This involves work that is not related to construction activities defined by the four classes of asbestos construction work described in 29 CFR1926.1101. The

General Industry Asbestos Standard is found in 29 CFR 1910.1001. Routine housekeeping activities during which employees contact or work in close proximity to accessible asbestos is an important example of work covered by the General Industry Standard. Accessible asbestos is any known or presumed asbestos containing material that is not sealed or enclosed or maintained in an intact condition that makes release of airborne asbestos fibers unlikely.

GCI, employees are not authorized to cleanup or disturb any asbestos containing material (ACM).

An exposure assessment must be conducted to determine whether or not airborne asbestos fibers in excess of the permissible exposure limits may be present. Air monitoring will be required unless a negative exposure assessment is obtained.

Custodial workers who do asbestos construction clean-up work must receive annual asbestos hazard awareness training. Smoking is not allowed in the work area. Wet methods or wetting agents (unless not feasible) and appropriate work practices must be followed. HEPA vacuums must be used. Prompt clean-up and disposal of debris in leak-proof containers is required.

The following work practices are prohibited: use of high speed abrasive disk saws without HEPA filtered exhausts or point-of-cut ventilator, use of compressed air without capture device, dry sweeping/shoveling or other dry clean-up, and employee rotation to circumvent permissible exposure limits.

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Medical surveillance is required for all workers doing Class IV work who are exposed to asbestos above the PEL's for 30 or more days per year. The 30-day requirement excludes days in which less than one hour is spent in Class III work when required work practices are followed.

In addition to these requirements (applicable to all Class IV work) Grace Consulting Inc. may have additional requirements for Class IV work (listed in the next section of this report) depending on whether or not an exposure assessment indicates the likelihood that airborne asbestos fiber concentrations will be above or below the permissible exposure limits. Pre-job planning will include a review of possible ACM.

Lead Management

Most lead over-exposures in the construction industry are found in the trades such as plumbing, welding and painting. In building construction, lead is frequently used for roofs, cornices, tank linings and electrical conduits. In plumbing, an alloy of lead/tin had been used extensively for soldering tin-plate and pipe joints. Use of lead solders in plumbing systems is now prohibited by law. Lead-based paint had also been used extensively for residential and commercial applications but has been banned for residential use by the Consumer Product Safety Commission. Lead-based paint may still be used on metal structures (bridges, railways, beams, etc.) to prevent corrosion, although substitute coatings are now available.

Significant lead exposures can arise during stripping or demolition of structures containing lead-

based paint. The types of work with the greatest potential for lead exposure include iron work, demolition, painting, plumbing, electrical, lead-based paint abatement, heating/air conditioning and carpentry/renovation activities.

This chapter covers Grace Consulting, Inc.'s policy regarding procedures and operations involving the use, maintenance, and disturbance of lead-containing materials. This document was developed to assure that lead and lead-containing materials are properly maintained and handled. The procedures outlined in this policy will promote the safe management of lead and lead-containing materials. They will also help assure compliance with regulations applicable to lead.

Scope

Occupationally, these exposures may include:

· Demolition or salvage of structures where lead-containing materials may be present.

· Removal or encapsulation of materials containing lead (e.g. lead paint abatement).

· New construction, alteration, repair or renovation of items containing lead.

· Installation of materials containing lead.

· Lead contamination or emergency cleanup.

· Maintenance operations involving the disturbance of lead or lead-containing materials.

· Firing range operations.

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Unless working in a relatively new building (built since 1980), all paint should be treated as lead containing unless sampling shows otherwise.

Disturbance is defined as scraping, washing, limited wet sanding, grinding, welding, drilling, small surface cutting for installation of equipment, repainting activities, cleaning activities, and minor surface modifications.

Summary

The following actions will be taken in order to comply with the OSHA Lead Standards (29 CFR 1910.1025 and 1926.62) and DHEC/EPA regulations:

Contractors performing lead abatement must be licensed by the appropriate State Department of Health and Environmental Control (DHEC).

· Prior to the performance of any demolition or renovation activities, materials must be assessed for the presence of lead.

· Representative and periodic air monitoring will be conducted for all employees with airborne (fume, dust) lead exposure.

· Employees with 8-hour time-weighted average (TWA) exposures over 30 µg/m3 (Action Limit) for

thirty days per year will be enrolled in a lead medical surveillance program.

· All employees with potential exposure to lead must receive training.

· Employees with lead exposure in excess of the Permissible Exposure Limit (PEL) of 50 µg/m3 as an 8-hour TWA will be provided appropriate protective clothing and respiratory protection.

· Engineering controls will be implemented, if feasible, to reduce lead exposures below the PEL.

· A written compliance plan will be implemented if airborne concentrations of lead exceed 50 µg/m3 as an 8-hour TWA.

· Surfaces will be maintained as free as possible from accumulation of lead dust.

· Signs will be posted outside areas where employees' lead exposures exceed the PEL.

· Certain work practices such as open flame burning, dry sanding and dry scraping of lead-containing substances are not permitted.

· Specific containment procedures are stipulated to control emissions from interior and exterior lead abatement sites.

· Surfaces in lead abatement sites must be cleaned.

· Lead-containing wastes may be handled by Grace Consulting, Inc. employees, and will be transported and disposed per DOT and EPA/DHEC regulations.

· Specific surface lead dust testing will be performed in residential properties following lead abatement to verify adequate cleanup.

Health Hazards

Health effects from lead exposure continue to be a concern both at the workplace and in the home. Since the ban on lead in gasoline, lead levels detected in areas near roadways have decreased dramatically; however, lead based paint used in buildings and housing prior to 1980 continue to serve as significant sources of exposure.

Lead poisoning can result from a single high level (acute) exposure or through a number of smaller repetitive (chronic) exposures. Most adults are exposed to lead through occupational sources, while children and infants are exposed primarily through surface dust and soil. Floors, chewable surfaces and soil contaminated with lead serve as primary exposure sources for children.

Lead has no beneficial effect on humans. Once it has been ingested into the body, lead is distributed in the bloodstream to red blood cells, soft tissues and bone. Lead in the body is eliminated very slowly, mainly by the kidneys and digestive tract. Irreversible kidney damage may have already developed by the time high blood lead levels are identified and treated, making avoidance to exposure and medical surveillance extremely important.

Acute lead poisoning symptoms usually include abdominal pain as in a gall bladder attack or

appendicitis. Other non-specific complaints include irritability, fatigue, weakness and muscle pain. In rare instances, damage to the brain and central nervous system also may occur. Chronic lead poisoning may result after lead has accumulated over time in the body and has been deposited mostly in the bone.

Stored lead in the bone may be released to the blood stream to produce health effects such as defective hemoglobin synthesis, nervous system abnormalities, hypertension, effects in the reproductive system (including impotency) and damage to a developing fetus.

The measurement of blood lead level is the most reliable method of evaluating lead exposure. It indicates the amount of lead in the bloodstream, which is often a measure of recent exposure to lead. The present "level of concern" in children is ten micrograms of lead per deciliter of blood (10 µg/dl). The level of concern for adult workers, as established by OSHA, is 40 µg/dl.

Training

All Grace Consulting, Inc. employees involved in the disturbance of lead-containing materials or lead based paint as part of regular work activities must have at least a lead awareness training class. Grace Consulting, Inc. may provide an introductory level lead awareness class for employees involved in non-abatement activities. Grace Consulting, Inc. may also choose to cover lead hazards during their Worker Right to Know training. Typical job classifications needing awareness training would include painters, carpenters, welders, electricians, plumbers and general maintenance personnel. Employees involved in lead abatement activities must receive more extensive EPA approved lead abatement worker and/or supervisor level training.

Medical Surveillance

All Grace Consulting, Inc. employees involved in the disturbance of lead-containing materials, working with lead compounds (glazes, solders, etc.), or lead based paint as part of regular work activities must be involved in Grace Consulting, Inc.'s Occupational Medicine Program. Employees will have blood lead levels checked initially, then at least annually thereafter. Blood lead levels should also be checked at the termination of employment. The ultimate frequency of blood screening will be dictated by the amount of lead related work each affected employee performs and on advice from the Occupational Medicine physician.

Grace Consulting, Inc. will fit test employees with proper respirators, provide respirator training and assist with the required paperwork. Occupational Medicine will perform all necessary medical tests and evaluations. The Occupational Medicine physician should include a written respirator approval as part of the medical surveillance.

Lead-Based Paint Defined

The definition of lead based paint as follows:

· 0.5% by weight as analyzed by a chemical laboratory, or

· 1.0 milligrams per square centimeter (mg/cm2) as measured by an X-ray fluorescence analyzer (XRF).

Sampling Any painted surfaces (including stained and varnished) in buildings constructed prior to 1980 must be sampled before any significant disturbance takes place. Any other materials (i.e. window glazing, putties, plumbing) that are suspected to contain lead must also be sampled before significant disturbance takes place.

To conduct a thorough investigation, each different surface should be sampled separately (examples include doors, windows, moldings, walls, ceilings, etc.). The primary lead paint sampling methods include:

Spot chemical testing: Spot chemical testing involves a process where a small amount of solution is placed on a sampling surface, and if lead is present, a colorimetric change will take place. This method involves a certain amount of paint destruction in order to test a complete cross section of paints and has proven to be the least reliable of the three listed methods.

X-Ray Fluorescence (XRF) XRF analysis is a direct field reading instrument that will provide immediate results - for example a Niton XRF spectrum analyzer. The Niton uses a non-destructive analysis method which automatically adjusts for the substrate. As with the other analyses, different surfaces should be sampled separately.

Because XRF instruments use a radioactive source to measure lead content, special precautions need to be taken. Equipment operators must receive special training. At the present time, there is no correlation between results from laboratory analysis and XRF measurement.

Laboratory Testing Laboratory analysis provides the most reliable information but it can take as long as three weeks to receive results. The steps listed below should be followed when collecting bulk samples:

All paint samples should be collected in a new plastic sample bag. Samples should be labeled with a sample number, the surface sampled, and the sample location.

For proper laboratory analysis, approximately 5 grams of paint chips must be collected. (For reference, a nickel weighs approximately 5 grams.)

Samples must represent a cross section of materials down to the substrate. Care should be taken to collect as little substrate as possible. (For example, a paint sample on a wood door should contain paint down to the bare wood surface, but should not contain a significant amount of the wood itself.)

Personal Protective Equipment (PPE) Personal protective equipment (PPE) is required when disturbing lead-containing materials. This equipment would include but not be limited to:

· Disposable or cleanable work gloves

· Coveralls (Tyvek or similar) with foot covering

· Goggles or face shields

· Properly fitted half-face respirators with HEPA cartridges

Once removed, any disposable materials must be gathered and disposed of as lead waste.

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Specific requirements are outlined in the waste disposal section.

Work procedures not previously monitored will require personal air sampling to determine airborne lead levels and the adequacy of respiratory protection. Air samples will be collected, then forwarded to an accredited laboratory for analysis. Employees should be trained in the use, fitting and limitations of their PPE as per OSHA's Personal Protective Equipment Standard (29CRF 1910.132-138).

Hygiene Facilities

Personal hygiene is critical in the control of lead exposure for employees working with lead containing materials. Hygiene facilities with soap, water and disposable towels must be provided for employees. If jobs are extensive or large in scope, or if the paint being disturbed has a high lead content, the waste water should be gathered and placed in drums for further analysis. Collection could take place until a correlation between the lead content of waste water, lead levels in paint and the activities performed could be established. Smoking, chewing tobacco, gum or food will not be allowed in the work area.

Employees must wash hands and face thoroughly before all breaks and at the end of the work shift.

Operations and Maintenance Activities

In many instances, routine painting and repair jobs will disturb materials that contain lead. Lead-containing paint and window glazing are just two types of materials that may be encountered. NIOSH has concluded that significant exposures can occur during work to repaint lead-containing materials or to repair windows that have leaded glazing.

A small amount of care can significantly decrease the potential for exposure to lead during maintenance activities that involve the disturbance of lead-containing materials.

The guidelines in this section should be used when the primary purpose of the work is not to remove lead-containing materials, but to conduct a repair or maintenance activity. As an example, these guidelines would be used when scraping loose paint in preparation for a repainting job, but would not be appropriate in an instance where all paint from a surface (loose and intact) would be removed.

The following procedures should be employed for operations and maintenance activities where prior sampling has confirmed the presence of lead. Employees conducting these types of activities must have attended a lead awareness training session concerning the potential hazards of working with lead and proper use of personal protective equipment.

Interior Work

a. Notify all occupants where work involving lead will take place.

b. Conduct work involving lead-containing materials at times when the area is unoccupied.

c. Place 6-mil polyethylene sheeting a minimum of 6 feet horizontally out in all directions from the

work area to cover any immovable objects.

d. Personal protective equipment (PPE) must be used, and at a minimum should include a half- face respirator with HEPA cartridges, disposable clothing and gloves. Shoe covers may be necessary to avoid tracking lead dust and waste outside the immediate work area.

e. HEPA vacuums, disposable towels and wash-up facilities must be available to employees at the work site. Clean-up materials should be kept away from the immediate work area, but must be close enough to allow quick clean-up of employees and equipment. All reusable equipment (HEPA vacuums, scrapers, screw drivers, etc.) must be properly cleaned, using wet methods, at the end of each day's work and before leaving the job site.

f. The work area itself must be demarcated and barricaded using disposable danger tape and "Lead Danger" warning signs bearing the following legend: "Warning: Lead Work Area - Poison - No Smoking or Eating".

g. Using a HEPA vacuum, vacuum any accumulated dust from the work area prior to beginning the maintenance activity. Do not sweep or brush potential lead containing dust.

h. Use care to minimize the production of dust from scraping or sanding. Use either wet sanding/scraping or HEPA filtration fitted equipment.

i. At break periods or when finished, workers must immediately proceed to assigned clean-up areas to decontaminate. The decontamination areas must be within the barricaded areas and must have polyethylene drop cloths or plastic tarpaulins as a floor. Upon completion of clean-up, discarded PPE will be gathered into 4-6 mil plastic bags or into drums for proper disposal. Waste PPE should be kept separate from paint chips, dusts and debris to allow appropriate disposal. Specific waste characterization and disposal information is outlined in the waste disposal section.

j. When activities are complete, clean up any debris using HEPA vacuums. Working surfaces and the immediate work area should then be wet wiped using disposable towels and a detergent solution. Gather and containerize paint chips, dust, and debris as lead-containing waste. Remove surface polyethylene and final clean the area again using wet methods and HEPA vacuuming. All used towels must be gathered and disposed of as contaminated waste. Surface polyethylene can then be HEPA vacuumed, rolled inwards and disposed of as general (non-hazardous) waste.

k. Waste generated in preparation activities (paint chips, glazing, etc.) should be collected and deposited in an appropriate container.

l. Monitoring (both area and personal) by Grace Consulting, Inc. may be necessary until exposure potentials can be determined.

Exterior Work

a. Notify the building supervisor and occupants where work involving lead will take place.

b. Building occupants should be notified to close windows and doors within 25 feet of the work area.

c. Pre-clean paint chips, dust and debris from existing surfaces (using HEPA vacuums and wet cleaning methods) before the job begins. Place plastic catch sheeting or tarpaulins to collect debris on the ground, floor or platform directly below the work area and at least 6 feet out in all directions from the working surfaces. When working on elevated surfaces, an additional 6 feet of catch sheeting is required per floor above the first to a maximum of 25 feet. Individual catch sheets or tarpaulins should be overlapped a minimum of 18 inches and secured to each other. Prepping should not take place on windy days. Catch sheets or tarps should be weighted or secured to the ground.

d. All windows, doors and other openings in the work area shall be sealed using polyethylene on the inside. Care should be taken not to disturb interior surfaces which may also contain lead. Barrier tape will be used to isolate the work area in such a way that no member of the public can get within 10 ft. of the work area. (This requirement may need to be adjusted for work on elevated surfaces.) The work area itself must be demarcated and barricaded using disposable danger tape and "Lead Danger" warning signs bearing the following legend: Warning: Lead Work Area - Poison - No Smoking or Eating".

e. Personal protective equipment (PPE) must be used, and at a minimum should include a 1/2 face respirator with HEPA cartridges, disposable clothing and gloves.

f. HEPA vacuums, disposable towels and wash-up facilities must be available to employees at the work site. Clean-up materials should be kept away from the immediate work area, but must be close enough to allow quick clean-up of employees and equipment. All reusable equipment (HEPA vacuums, scrapers, screw drivers, etc.) must be properly cleaned at the end of each day's work and before leaving the job site.

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g. When preparation activities are completed, working surfaces and the immediate work area should be wet wiped using disposable towels and a detergent solution. All used towels must be gathered and disposed of as contaminated waste. Surface polyethylene will then be HEPA vacuumed, wet wiped, and then rolled inwards and disposed of as general waste.

h. At break periods or when finished, workers must immediately proceed to assigned clean-up areas to decontaminate. The decontamination areas must be within the barricaded areas and must have polyethylene drop cloths or plastic tarpaulins as a floor. Upon completion of clean-up, discarded PPE will be gathered into 4-6 mil plastic bags or into drums for proper disposal. Waste PPE should be kept separate from paint chips, dust and debris to allow appropriate disposal (see the waste disposal section).

i. Waste generated in preparation activities (paint chips, glazing, etc.) should be collected and deposited in an appropriate container. Specific waste characterization and disposal information is outlined in the waste disposal section.

j. Monitoring (both area and personal) by Grace Consulting, Inc. may be necessary until exposure potentials can be determined.

Lead Removal Methods

Acceptable Methods

The removal methods listed below are acceptable for operations and maintenance or abatement activities by personnel that have had the proper training, medical surveillance, and have completed the appropriate work area set-up outlined earlier.

Operations and Maintenance Removal Methods:

· Manual scrapers and wire brushes

· Limited manual sanding (preferably wet sanding) with accompanied ventilation (e.g. HEPA vacuum)

Abatement Removal Methods:

· Chemical formulations (preferably methylene chloride-free solutions)

· Heat guns not exceeding 700 degrees Fahrenheit

· Manual scraping with the aid of chemical solvents (preferably not containing methylene chloride)

· Paste formulations containing potassium or sodium hydroxide

· Mechanized sanding equipment with dedicated HEPA filtered exhaust systems

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Prohibited methods: The following list of removal methods for either operations and maintenance or abatement activities are prohibited and will not be allowed.

· Use of a heat gun generating temperatures exceeding 700 degrees Fahrenheit

· Open flame torching

· Dry abrasive blasting using sand, grit or any other particulate

· Mechanized sanding without HEPA filtered collection systems

Routine Cleaning of Lead-Painted Surfaces

The following items apply to personnel involved in sweeping or wall cleaning in areas where paint chips or dusts are present. This would primarily apply to custodial personnel and any other University employees cleaning areas potentially contaminated with lead paint or dust.

a. Employees should attend a lead awareness training class or be trained on the hazards of lead as part of their Worker Right to Know training.

b. Report peeling paint or paint in poor condition to area coordinators or building contacts. Coordinators or contacts should then contact the appropriate personnel (Zone Maintenance, University Facilities, Housing Maintenance, etc.).

c. Assume paint is lead-containing unless testing shows otherwise.

d. Cleaning of lead painted surfaces should be performed using HEPA vacuums dedicated for lead, followed by wet methods (i.e. use wet towels, sponges or cloths). To specifically clean lead dusts from surfaces, a detergent such as Spic and Span is recommended.

e. Disposable gloves must be worn during cleaning. Respirators are not considered necessary for small cleaning jobs. Larger cleaning jobs may require respirators; contact Grace Consulting, Inc.'s RSO for assistance with respirators. HEPA vacuums should be used whenever possible to minimize exposure.

Gloves, sponges, disposable towels and other non-cleanable materials used in the cleaning of lead painted or contaminated surfaces must be placed in plastic bags, labeled as "HAZARDOUS WASTE PAINT MATERIALS" and dated.

Welding and cutting of metal surfaces

All painted metal surfaces (I-beams, pipes, etc.) shall be assumed to be lead-containing unless sampling or a manufacturer's specifications show otherwise. Industrial coatings often contain other hazardous ingredients in addition to or in place of lead. These might include, but are not be limited to, chromium, cadmium and mercury.

When welding and/or cutting lead painted surfaces, powered air purifying respirators (PAPR's) with HEPA filters are required. PAPR's are recommended for all welding and cutting operations unless ventilation is in place to control contaminants. If welding or cutting is done in an occupied building, proper exhaust ventilation must be supplied. Similar guidelines apply to soldering of sheet metal, tubing, piping, or sewer piping involving lead solder or other lead containing materials.

Training

Individuals performing certain lead-related functions may receive accredited initial and annual training. These functions include:

· Lead Paint Abatement Worker

· Lead Paint Abatement Contractor

· Lead Paint Abatement Supervisor

· Lead Abatement (Residential) Project Designer

· Lead Paint Inspector

· Lead Paint Risk Assessor

Disposal of Waste Materials

Unless otherwise determined, Grace Consulting, Inc. is responsible for the proper disposal of hazardous waste at sites. Lead paint chips, dust and debris will generally be classified as hazardous waste. Because of hazardous waste costs, efforts should be made to minimize the generation of lead contaminated waste.

Paint chips, dusts and contents from HEPA vacuums (including HEPA filters) should be collected and containerized to allow for testing and handling as a possible hazardous waste. Demolition materials painted with lead based paint will be disposed of as regular demolition waste.

Some items contaminated as part of the abatement process may be cleaned and classified as non-hazardous waste.

Polyethylene used to protect items may be cleaned using HEPA vacuuming and wet wiping, then disposed of as non-hazardous waste. All non-hazardous waste can be put in unlabeled bags and/or placed in dumpsters. .

Summary

The Guidelines for Working with Lead-Containing Materials applies to any work where Grace Consulting, Inc. personnel may be exposed to lead or lead-containing materials. Activities covered by this guideline include (but are not limited to) demolition, renovation, encapsulation, maintenance operations, paint-prepping and firing range clean-up.

All Grace Consulting, Inc. employees involved in the disturbance of lead-containing materials and lead based paint as part of regular work activities must have at least a lead awareness training class. Grace Consulting, Inc. employees exposed to lead above the action level (A.L.) of 30 µg/m3 must have medical surveillance.

Grace Consulting, Inc. will conduct necessary sampling, monitoring and inspections to ensure compliance with regulations as well as to protect employee health and safety. Any questions concerning lead or items specified in the guideline should be directed to the RSO.

Substance Identification

· Substance: Pure lead (Pb) is a heavy metal at room temperature and pressure and is a basic chemical element. It can combine with various other substances to form numerous lead compounds.

· Compounds Covered by the Standard: The word "lead" when used in this standard means elemental lead, all inorganic lead compounds and a class of organic lead compounds called lead soaps. This standard does not apply to other organic lead compounds.

· Uses: Exposure to lead occurs in at least 120 different occupations, including primary and secondary lead smelting, lead storage battery manufacturing, lead pigment manufacturing and use, solder manufacturing and use, shipbuilding and ship repairing, auto manufacturing, and printing.

· Permissible Exposure: The Permissible Exposure Limit (PEL) set by the standard is 50 micrograms of lead per cubic meter of air (50 µg/m(3)), averaged over an 8-hour workday.

· Action Level: The standard establishes an action level of 30 micrograms per cubic meter of air (30 µg/m(3)), time weighted average, based on an 8-hour work-day. The action level initiates several requirements of the standard, such as exposure monitoring, medical surveillance, and training and education.

Health Hazard Data

A. Ways in which lead enters your body.

When absorbed into your body in certain doses lead is a toxic substance. The object of the lead standard is to prevent absorption of harmful quantities of lead. The standard is intended to protect you not only from the immediate toxic effects of lead, but also from the serious toxic effects that may not become apparent until years of exposure have passed.

Lead can be absorbed into your body by inhalation (breathing) and ingestion (eating). Lead (except for certain organic lead compounds not covered by the standard, such as tetraethyl lead) is not absorbed through your skin. When lead is scattered in the air as a dust, fume or mist it can be inhaled and absorbed through you lungs and upper respiratory tract. Inhalation of airborne lead is generally the most important source of occupational lead absorption. You can also absorb lead through your digestive system if lead gets into your mouth and is swallowed. If you handle food, cigarettes, chewing tobacco, or make-up which have lead on them or handle them with hands contaminated with lead, this will contribute to ingestion.

A significant portion of the lead that you inhale or ingest gets into your blood stream. Once in your blood stream, lead is circulated throughout your body and stored in various organs and body tissues. Some of this lead is quickly filtered out of your body and excreted, but some remains in the blood and other tissues. As exposure to lead continues, the amount stored in your body will increase if you are absorbing more lead than your body is excreting. Even though you may not be aware of any immediate symptoms of disease, this lead stored in your tissues can be slowly causing irreversible damage, first to individual cells, then to your organs and whole body systems.

B. Effects of overexposure to lead

(1) Short term (acute) overexposure.

Lead is a potent, systemic poison that serves no known useful function once absorbed by your body. Taken in large enough doses, lead can kill you in a matter of days. A condition affecting the brain called acute encephalopathy may arise which develops quickly to seizures, coma, and death from cardiorespiratory arrest. A short term dose of lead can lead to acute encephalopathy. Short term occupational exposures of this magnitude are highly unusual, but not impossible. Similar forms of encephalopathy may, however, arise from extended, chronic exposure to lower doses of lead. There is no sharp dividing line between rapidly developing acute effects of lead, and chronic effects which take longer to acquire. Lead adversely affects numerous body systems, and causes forms of health impairment and disease which arise after periods of exposure as short as days or as long as several years.

(2) Long-term (chronic) overexposure.

Chronic overexposure to lead may result in severe damage to your blood-forming, nervous, urinary and reproductive systems. Some common symptoms of chronic overexposure include loss of appetite, metallic taste in the mouth, anxiety, constipation, nausea, pallor, excessive tiredness, weakness, insomnia, headache, nervous irritability, muscle and joint pain or soreness, fine tremors,

numbness, dizziness, hyperactivity and colic. In lead colic there may be severe abdominal pain.

Damage to the central nervous system in general and the brain (encephalopathy) in particular is one of the most severe forms of lead poisoning. The most severe, often fatal, form of encephalopathy may be preceded by vomiting, a feeling of dullness progressing to drowsiness and stupor, poor memory, restlessness, irritability, tremor, and convulsions. It may arise suddenly with the onset of seizures, followed by coma, and death. There is a tendency for muscular weakness to develop at the same time. This weakness may progress to paralysis often observed as a characteristic "wrist drop" or "foot drop" and is a manifestation of a disease to the nervous system called peripheral neuropathy.

Chronic overexposure to lead also results in kidney disease with few, if any, symptoms appearing until extensive and most likely permanent kidney damage has occurred. Routine laboratory tests reveal the presence of this kidney disease only after about two-thirds of kidney function is lost. When overt symptoms of urinary dysfunction arise, it is often too late to correct or prevent worsening conditions, and progression to kidney dialysis or death is possible.

Chronic overexposure to lead impairs the reproductive systems of both men and women. Overexposure to lead may result in decreased sex drive, impotence and sterility in men. Lead can alter the structure of sperm cells raising the risk of birth defects. There is evidence of miscarriage and stillbirth in women whose husbands were exposed to lead or who were exposed to lead themselves. Lead exposure also may result in decreased fertility, and abnormal menstrual cycles in women. The course of pregnancy may be adversely affected by exposure to lead since lead crosses the placental barrier and poses risks to developing fetuses. Children born of parents either one of whom were exposed to excess lead levels are more likely to have birth defects, mental retardation, behavioral disorders or die during the first year of childhood.

Overexposure to lead also disrupts the blood-forming system resulting in decreased hemoglobin (the substance in the blood that carries oxygen to the cells) and ultimately anemia. Anemia is characterized by weakness, pallor and fatigability as a result of decreased oxygen carrying capacity in the blood.

(3) Health protection goals of the standard.

Prevention of adverse health effects for most workers from exposure to lead throughout a working lifetime requires that worker blood lead (PbB) levels be maintained at or below forty micrograms per one hundred grams of whole blood (40 µg/100g). The blood lead levels of workers (both male and female workers) who intend to have children should be maintained below 30 µg/100g to minimize adverse reproductive health effects to the parents and to the developing fetus.

The measurement of your blood lead level is the most useful indicator of the amount of lead being absorbed by your body. Blood lead levels (PbB) are most often reported in units of milligrams (mg) or micrograms (ug) of lead (1 mg=1000 ug) per 100 grams (100g), 100 milliliters (100 ml) or deciliter (dl) of blood. These three units are essentially the same. Sometime PbB's are expressed in the form of mg% or ug%. This is a shorthand notation for 100g, 100 ml, or dl. PbB measurements show the amount of lead circulating in your blood stream, but do not give any information about the amount of lead stored in your various tissues.

PbB measurements merely show current absorption of lead, not the effect that lead is having on your body or the effects that past lead exposure may have already caused. Past research into lead-related diseases, however, has focused heavily on associations between PbBs and various diseases. As a result, your PbB is an important indicator of the likelihood that you will gradually acquire a lead-related health impairment or disease.

Once your blood lead level climbs above 40 µg/100g, your risk of disease increases. There is a wide variability of individual response to lead, thus it is difficult to say that a particular PbB in a given person will cause a particular effect. Studies have associated fatal encephalopathy with PbBs as low as 150 µg/100g. Other studies have shown other forms of diseases in some workers with PbBs well below 80 µg/100g. Your PbB is a crucial indicator of the risks to your health, but one other factor is also extremely important. This factor is the length of time you have had elevated PbBs. The longer you have an elevated PbB, the greater the risk that large quantities of lead are being gradually stored in your organs and tissues (body burden). The greater your overall body burden, the greater the chances of substantial permanent damage.

The best way to prevent all forms of lead-related impairments and diseases-both short term and long term- is to maintain your PbB below 40 µg/100g. The provisions of the standard are designed with this end in mind. Your employer has prime responsibility to assure that the provisions of the standard are complied with both by the company and by individual workers. You as a worker, however, also have a responsibility to assist your employer in complying with the standard. You can play a key role in protecting your own health by learning about the lead hazards and their control, learning what the standard requires, following the standard where it governs your own actions, and seeing that your employer complies with provisions governing his actions.

(4) Reporting signs and symptoms of health problems.

You should immediately notify your employer if you develop signs or symptoms associated with lead poisoning or if you desire medical advice concerning the effects of current or past exposure to lead on your ability to have a healthy child. You should also notify your employer if you have difficulty breathing during a respirator fit test or while wearing a respirator. In each of these cases your employer must make available to you appropriate medical examinations or consultations. These must be provided at no cost to you and at a reasonable time and place.

The standard contains a procedure whereby you can obtain a second opinion by a physician of your choice if the employer selected the initial physician. [56 FR 24686, May 31, 1991]

Mold Remediation

Concern about indoor exposure to mold has been increasing as the public becomes aware that exposure to mold can cause a variety of health effects and symptoms, including allergic reactions. Mold can be found almost anywhere; it can grow on virtually any organic substance, as long as moisture and oxygen are present. There is mold that can grow on wood, paper, carpet, foods, and insulation. When excessive moisture accumulates in buildings or on building materials, mold growth will often occur, particularly if the moisture problem remains undiscovered or unaddressed. It is

impossible to eliminate all mold and mold spores in the indoor environment. However, mold growth can be controlled indoors by controlling moisture indoors.

Since mold requires water to grow, it is important to prevent moisture problems in buildings. Moisture problems can have many causes, including uncontrolled humidity. Some moisture problems in buildings have been linked to changes in building construction practices during the 1970s, 80s, and 90s. Some of these changes have resulted in buildings that are tightly sealed, but may lack adequate ventilation, potentially leading to moisture buildup. Building materials, such as drywall, may not allow moisture to escape easily. Moisture problems may include roof leaks, landscaping or gutters that direct water into or under the building, and unvented combustion appliances.

Hidden Mold

In some cases, indoor mold growth may not be obvious. It is possible that mold may be growing on hidden surfaces, such as the backside of dry wall, wallpaper, or paneling, the top of ceiling tiles, the underside of carpets and pads, etc. Possible locations of hidden mold can include pipe chases and utility tunnels (with leaking or condensing pipes), walls behind furniture (where condensation forms), condensate drain pans inside air handling units, porous thermal or acoustic liners inside ductwork, or roof materials above ceiling tiles (due to roof leaks or insufficient insulation).

Some building materials, such as dry wall with vinyl wallpaper over it or wood paneling, may act as vapor barriers, trapping moisture underneath their surfaces and thereby providing a moist environment where mold can grow. You may suspect hidden mold if a building smells moldy, but you cannot see the source, or if you know there has been water damage and building occupants are reporting health problems. Investigating hidden mold problems may be difficult and will require caution when the investigation involves disturbing potential sites of mold growth—make sure to use PPE.

For example, removal of wallpaper can lead to a massive release of spores from mold growing on the underside of the paper. If you discover hidden mold, you should revise your remediation plan to account for the total area affected by mold growth.

Remediation Plan

Assess the size of the mold or moisture problem and the type of damaged materials before planning the remediation work. The decision to relocate occupants should consider the size and type of the area affected by mold growth, the type and extent of health effects reported by the occupants, the potential health risks that could be associated with debris, and the amount of disruption likely to be caused by remediation activities. If possible, remediation activities should be scheduled during off-hours when building occupants are less likely to be affected.

Remediation

1. Fix the water or humidity problem. Complete and carry out repair plan if appropriate. Revise and carry out maintenance plan if necessary. Revise remediation plan as necessary, if more damage

is discovered during remediation.

2. Continue to communicate with building occupants, as appropriate to the situation. Be sure to address all concerns.

3. Completely clean up mold and dry water-damaged areas. Select appropriate cleaning and drying methods for damaged/ contaminated materials. Carefully contain and remove moldy building materials. Use appropriate Personal Protective Equipment (PPE). Arrange for outside professional support if necessary.

Cleanup Methods

A variety of mold cleanup methods are available for remediating damage to building materials and furnishings caused by moisture control problems and mold growth. The specific method or group of methods used will depend on the type of material affected.

Method 1: Wet Vacuum

Wet vacuums are vacuum cleaners designed to collect water. They can be used to remove water from floors, carpets, and hard surfaces where water has accumulated. They should not be used to vacuum porous materials, such as gypsum board. They should be used only when materials are still wet—wet vacuums may spread spores if sufficient liquid is not present. The tanks, hoses, and attachments of these vacuums should be thoroughly cleaned and dried after use since mold and mold spores may stick to the surfaces.

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Method 2: Damp Wipe

Whether dead or alive, mold is allergenic, and some molds may be toxic. Mold can generally be removed from nonporous (hard) surfaces by wiping or scrubbing with water, or water and detergent. It is important to dry these surfaces quickly and thoroughly to discourage further mold growth. Instructions for cleaning surfaces, as listed on product labels, should always be read and followed. Porous materials that are wet and have mold growing on them may have to be discarded. Since molds will infiltrate porous substances and grow on or fill in empty spaces or crevices, the mold can be difficult or impossible to remove completely.

Method 3: HEPA Vacuum

HEPA (High-Efficiency Particulate Air) vacuums are for final cleanup of remediation areas after materials have been thoroughly dried and contaminated materials removed. HEPA vacuums are also for cleanup of dust that may have settled on surfaces outside the remediation area. Care must be taken to assure that the filter is properly seated in the vacuum so that all the air must pass through the filter. When changing the vacuum filter, remediators should wear PPE to prevent exposure to the mold that has been captured. The filter and contents of the HEPA vacuum must be disposed of in well-sealed plastic bags.

Method 4: Discard

Remove Damaged Materials and Seal in Plastic Bags. Building materials and furnishings that are contaminated with mold growth and are not salvageable should be double-bagged using 6-mil polyethylene sheeting. These materials can then usually be discarded as ordinary construction waste. It is important to package mold contaminated materials in sealed bags before removal from the containment area to minimize the dispersion of mold spores throughout the building. Large items that have heavy mold growth should be covered with polyethylene sheeting and sealed with duct tape before they are removed from the containment area. Always use gloves and eye protection when cleaning up mold!

Personal Protective Equipment (PPE)

If the remediation job disturbs mold and mold spores become airborne, then the risk of respiratory exposure goes up. Actions that are likely to stir up mold include: breakup of moldy porous materials such as wallboard; invasive procedures used to examine or remediate mold growth in a wall cavity; actively stripping or peeling wallpaper to remove it; and using fans to dry items. The primary function of Personal Protective Equipment (PPE) is to avoid inhaling mold and mold spores and to avoid mold contact with the skin or eyes.

Skin and Eye Protection

Gloves are required to protect the skin from contact with mold allergens (and in some cases mold toxins) and from potentially irritating cleaning solutions. Long gloves that extend to the middle of the forearm are recommended. The glove material should be selected based on the type of materials being handled. If you are using a biocide (such as chlorine bleach) or a strong cleaning solution, you should select gloves made from natural rubber, neoprene, nitrile, polyurethane, or PVC. If you are using a mild detergent or plain water, ordinary household rubber gloves may be used. To protect your eyes, use properly fitted goggles or a full-face respirator with HEPA filter. Goggles must be designed to prevent the entry of dust and small particles. Safety glasses or goggles with open vent holes are not acceptable.

Respiratory Protection

Respirators protect cleanup workers from inhaling airborne mold, mold spores, and dust. When cleaning up a small area affected by mold, you should use as a minimum, an N-95 respirator. This device covers the nose and mouth, will filter out 95% of the particulates in the air.

Limited : Limited PPE includes use of a half-face or full-face air purifying respirator (APR) equipped with a HEPA filter cartridge. These respirators contain both inhalation and exhalation valves that filter the air and ensure that it is free of mold particles. Note that half face APRs do not provide eye protection. In addition, the HEPA filters do not remove vapors or gases.

Full : In situations in which high levels of airborne dust or mold spores are likely or when intense or long-term exposures are expected (e.g., the cleanup of large areas of contamination), a full-face, powered air purifying respirator (PAPR) may be required. Full-face PAPR's use a blower to force air through a HEPA filter. The HEPA-filtered air is supplied to a mask that covers the entire face

or a hood that covers the entire head. The positive pressure within the hood prevents unfiltered air from entering through penetrations or gaps. Individuals must be trained to use their respirators before they begin remediation.

Disposable Protective Clothing

Disposable clothing is recommended during a medium or large remediation project to prevent the transfer and spread of mold to clothing and to eliminate skin contact with mold. Disposable paper overalls can be used for some limited areas, or Mold-impervious disposable head and foot coverings, and a body suit made of a breathable material, such as TYVEK®, should be used. All gaps, such as those around ankles and wrists, should be sealed with duct tape.

Containment

The purpose of containment during remediation activities is to limit release of mold into the air and surroundings, in order to minimize the exposure of remediators and building occupants to mold . Mold and moldy debris should not be allowed to spread to areas in the building beyond the contaminated site. In general, the size of the area helps determine the level of containment. However, a heavy growth of mold in a relatively small area could release more spores than a lighter growth of mold in a relatively large area. Choice of containment should be based on professional judgment. The primary object of containment should be to prevent occupant and remediator exposure to mold.

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Limited Containment

Limited containment is generally recommended for areas involving between 10 and 100 square feet (ft 2) of mold contamination. The enclosure around the moldy area should consist of a single layer of 6- mil, fire-retardant polyethylene sheeting. The containment should have a slit entry and covering flap on the outside of the containment area. For small areas, the polyethylene sheeting can be affixed to floors and ceilings with duct tape. For larger areas, a steel or wooden stud frame can be erected and polyethylene sheeting attached to it.

All supply and air vents, doors, chases, and risers within the containment area must be sealed with polyethylene sheeting to minimize the migration of contaminants to other parts of the building. Heavy mold growth on ceiling tiles may impact HVAC systems if the space above the ceiling is used as a return air plenum. In this case, containment should be installed from the floor to the ceiling deck, and the filters in the air handling units serving the affected area may have to be replaced once remediation is finished.

The containment area must be maintained under negative pressure relative to surrounding areas. This will ensure that contaminated air does not flow into adjacent areas. This can be done with a HEPA-filtered fan unit exhausted outside of the building. For small, easily contained areas, an exhaust fan ducted to the outdoors can also be used. The surfaces of all objects removed from the containment area should be remediated/cleaned prior to removal

Full Containment

Full containment is recommended for the cleanup of mold contaminated surface areas greater than 100 ft 2 or in any situation in which it appears likely that the occupant space would be further contaminated without full containment. Double layers of polyethylene should be used to create a barrier between the moldy area and other parts of the building. A decontamination chamber or airlock should be constructed for entry into and exit from the remediation area. The entryways to the airlock from the outside and from the airlock to the main containment area should consist of a slit entry with covering flaps on the outside surface of each slit entry. The chamber should be large enough to hold a waste container and allow a person to put on and remove PPE. All contaminated PPE, except respirators, should be placed in a sealed bag while in this chamber.

Respirators should be worn until remediators are outside the decontamination chamber. PPE must be worn throughout the final stages of HEPA vacuuming and damp-wiping of the contained area. PPE must also be worn during HEPA vacuum filter changes or cleanup of the HEPA vacuum.

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Chapter 24

Sanitation

Potable Water

Potable water shall be provided in all places of employment, for drinking, and in some cases cooking, washing of foods, washing of cooking or eating utensils, washing of food preparation or processing premises, and personal service rooms.

Portable drinking water dispensers shall be designed, constructed, and serviced so that sanitary conditions are maintained, shall be capable of being closed, and shall be equipped with a tap and labeled as such.

When single service cups are supplied, both a sanitary container for unused cups and a receptacle for used cups shall be provided.

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Open containers such as barrels, pails, or tanks for drinking water from which the water must be dipped or poured, whether or not they are fitted with a cover, are prohibited.

A common drinking cup and other common utensils are prohibited.

Toilet Facilities

Except as otherwise indicated in this section, toilet facilities are provided in all places of employment. The number of facilities to be provided shall be based on the number of employees. Where toilet rooms will be occupied by no more than one person at a time, that can be locked from the inside, and contain at least one water closet, then separate toilet rooms for each sex in this case need not be provided.

Where toilet facilities will not be used by women, urinals may be provided instead of water closets.

This requirement does not apply to mobile crews or to normally unattended work locations so long as employees working at these locations have transportation immediately available to nearby toilet facilities which meet the other requirements of this section.

The sewage disposal method shall not endanger the health of employees.

Toilet paper with holder shall be provided for every water closet.

The requirements of this subsection do not apply to mobile crews or to normally unattended work locations.

Food and Beverages on Premises

This section shall apply only where employees are permitted to consume food or beverages, or both, on the premises.

Eating and drinking areas. No employee shall be allowed to consume food or beverages neither in a toilet room nor in any area exposed to a toxic material.

Waste disposal containers. Receptacles, constructed of smooth, corrosion resistant, easily cleanable, or disposable materials, shall be provided and used for the disposal of waste food. The number, size, and location of such receptacles shall encourage their use and not result in overfilling. They shall be emptied not less frequently than once each working day, unless unused, and shall be maintained in a clean and sanitary condition. Receptacles shall be provided with a solid tight-fitting cover unless sanitary conditions can be maintained without use of a cover.

Sanitary storage. No food or beverages shall be stored in toilet rooms or in an area exposed to a toxic material.

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Chapter 25

Bloodborne Pathogen Program

Purpose

This program is for all employees of Grace Consulting Inc. who may possibly be exposed to blood or body fluids in the conduct of their job. This infection control plan complies with OSHA requirement, 29 CFR 1910.1030, Blood Borne Pathogens. The plan includes requirements for personal protective equipment, housekeeping, training, and a procedure for reporting exposures.

Responsibilities

The RSO, Aaron Conner will handle the Bloodborne Pathogen Program and maintain records of any training, inspections and communication required.

Definitions

Biological Hazard. The term biological hazard or biohazard is taken to mean any viable infectious agent that presents a risk, or a potential risk, to the well being of humans.

Medical Wastes/Infectious Wastes. All waste emanating from human or animal tissues, blood or blood products or fluids. This includes used first aid bandages, syringes, needles, sharps, material used in spill cleanup and contaminated PPE or clothing..

Universal Precautions. Refers to a system of infectious disease control that assumes that every direct contact with body fluids is infectious and requires every employee exposed to be protected as though such body fluids were infected with blood-borne pathogens. All infectious/medical material must be handled according to Universal Precautions.

Hazards

Unprotected exposure to body fluids presents the possible risk of infection from a number of bloodborne pathogens notably Hepatitis and HIV.

Hazard Control

Engineering Controls - prevention of exposure to bloodborne pathogens engineering controls include proper storage facilities and containers and disinfectant equipment.

Administrative Controls - prevention of exposure to bloodborne pathogen administrative controls

include universal precautions, assignment of PPE, employee training, use of spill kits specifically designed for blood and body fluids and waste disposal procedures.

Reporting and Record Keeping

Any reports required by OSHA will be maintained by the RSO or designee. All reports (Training Certificates, Notice of HBV Vaccinations, exposure reports) will be maintained for 30 years. Occupationally contracted HBV or HIV will be recorded on the OSHA 300 Log of Occupational Injuries and Illnesses as an illness. Exposures to blood-borne pathogens from contact with sharps will be recorded on the OSHA 200 Log of Occupational Injuries and Illnesses if treatment such as gamma globulin, hepatitis B immune globulin or hepatitis B vaccine is prescribed by a Physician.

Training

All personnel assigned duties as first responders, or custodial Employees (if deemed at risk of exposure in the cleaning of rest rooms, etc.) will receive initial and annual training by a qualified medical practitioner on the Bloodborne Pathogen Program. Additionally, personnel trained in First Aid shall be offered this annual training. All new and current affected Employees will be trained initially and annually thereafter. The content of the training program will include:

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*Site Policy

*Types and transmission of Blood-Borne Pathogens

*General Safety Rules

*Universal Precautions

*Use of Personal Protective Equipment

*Medical or iv drug use Waste Disposal Procedures

*Post Exposure Treatment and Procedures

*HBV Vaccinations

Documentation of training shall be done by the RSO, or designated representative.

The Safety Manager or RSO will be responsible for all medical record keeping.

Hepatitis-B Virus (HBV) Vaccinations

Those workers required to provide first aid or emergency response duties on a routine basis will be offered Hepatitis-B Virus (HBV) Vaccinations at Grace Consulting Inc.'s expense. Employees that transfer to a job or their job is reclassified to include exposure to blood-borne pathogens will be

offered HBV Vaccinations within 10 working days of the transfer or reclassification.

The choice for HBV vaccination is not mandatory. If an affected Employee chooses not to have the vaccination at the initial offering, they will have the opportunity to be vaccinated when they are ready. Grace Consulting Inc. (through the RSO) will document the offer, acceptance or declination, and vaccination dates.

Post Exposure Treatment and Notification Procedures

Should an affected Employee or an Employee acting as a "Good Samaritan" be occupationally exposed to HIV/HAV/HBV the affected Employee will report the exposure to the RSO. Grace Consulting Inc. will provide for the Employee to be tested for HIV/HAV/HBV at Grace Consulting Inc.'s expense. Following the initial blood test at time of exposure, zero negative Employees will be retested at 6 weeks, 12 weeks and 6 months to determine if transmission has occurred. During this period, the Employee will follow the recommendations provided by the Physician or the U. S. Public Health Service.

An "occupational exposure" is defined as blood or body fluid contact from an injured or ill Employee to an open wound, or mucous membrane of the affected Employee, or an injury by a contaminated sharp object. Following the report of exposure, the RSO will contact the exposure source and request that person be tested for HIV/HAV/HBV at Grace Consulting Inc.'s expense. The request is not mandatory and if refused will not effect that Employee's future employment. The source individual's blood is tested as soon as possible and after consent is obtained to determine HBV and HIV infectivity. (Hepatitis B surface Antigen, Hepatitis C Antibody and HIV Screen)

The exposed employee's blood shall be collected as soon as feasible and tested for HBV (Hepatitis Bs Antibody, Hepatitis C Antibody) and HIV serological status after consent is obtained (Employee Consent for HIV Antibody Testing).

During all phases of Post Exposure, the confidentiality of the affected Employee and exposure source will be maintained on a "need to know basis". The results of any HIV/HAV/HBV tests conducted will be provided to the exposed and source Employees within 5 business days of receipt.

General Procedures

Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where there is a potential for exposure to any health hazard. Food and drink must not be stored in refrigerators, freezers, or cabinets where blood or other potentially infectious material is stored or in other areas of possible contamination.

Gloves must be made of appropriate disposable material, usually intact latex or vinyl. They must be used in the following circumstances:

*When the employee has cuts, abraded skin, chapped hands, dermatitis, or similar conditions.

*When examining abraded or non-intact skin of a patient with active bleeding.

*While handling blood or blood products or other body secretions.

*Employees must wash their hands immediately, or as soon as possible, after removal of gloves or other personal protective equipment and after hand contact with blood or other potentially infectious materials.

All personal protective equipment must be removed immediately upon leaving the work area, and if this equipment is overtly contaminated, it must be placed in an appropriate area or container for storage, washing, decontamination, or disposal.

Contaminated clothing must not be worn in clean areas or outside the building.

All procedures involving blood or other potentially infectious agents must be performed in a manner that will minimize splashing, spraying, and aerosolization.

Medical Wastes

Medical/infectious waste must be segregated from other waste at the point of origin.

Medical/infectious waste, except for sharps (i.e., razor blades, broken glass, needles, etc.) capable of puncturing or cutting, must be contained in double disposable red bags conspicuously labeled with the words "INFECTIOUS WASTE" and "BIOHAZARD."

Used needles or other sharps (razor blades, broken glass, scalpels, etc.) must not be sheared, bent, broken, recapped, or re-sheathed.

Infectious sharps must be contained for disposal in leak-proof, rigid puncture-resistant containers. Infectious waste contained as described above must be placed in reusable or disposable leak-proof bins or barrels that are conspicuously labeled with the words "INFECTIOUS WASTE" and "BIOHAZARD." These waste barrels are picked up regularly by an outside company licensed to handle infectious wastes.

All infectious agents, equipment, or apparatus must be disinfected in an autoclave or otherwise disinfected before being washed or disposed of. Each individual working with infectious bio-hazardous agents is responsible for dis-infection and disposal of these agents.

Biological wastes that do not contain radioactive or hazardous substances may be disinfected by steam sterilization (autoclave) then disposed of in the regular trash.

Liquid bio-hazardous waste may be disposed of in the sewage system following chemical decontamination.

Reusable glassware must be decontaminated in sodium hypo chlorite (household bleach) solution

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(1:9) prior to rinsing and acid washing. The glassware must then be sterilized in an autoclave.

Cuts

If an employee has a needle stick, cut, or mucous membrane exposure to another persons body fluids he/she must report the incident immediately.

Blood Exposure

All employees exposed to human blood and blood products must report to the Safety Manager for information and possible inclusion in the Hepatitis B Immunization Program.

Infection Control Plan

The purpose of the Infection Control Plan is to protect the health and safety of the persons directly involved in handling the materials, workers and the general public by ensuring the safe handling, storage, use, processing, and disposal of infectious medical waste. This plan complies with OSHA requirement proposed for 29 CFR 1910.1030, Bloodborne Pathogens.

Universal precautions: Refers to a system of infectious disease control which assumes that every direct contact with body fluids is infectious and requires every employee exposed to be protected as though such body fluids were infected with blood-borne pathogens. All infectious/medical material must be handled according to Universal Precautions (OSHA Instruction CPL 2-2.44A).

The following universal precautions must be taken.

1. Gloves must be made of appropriate disposable material, usually intact latex or vinyl. They must be used:

a. when the employee has cuts, abraded skin, chapped hands, dermatitis, or the like.

b. when examining abraded or non-intact skin of a victim with active bleeding.

c. while handling blood or blood products or other body secretions.

2. Gowns, aprons, or lab coats must be worn when splashes of body fluid on skin or clothing are possible.

3. Mask and eye protection are required when contact of mucosal membranes (eyes, mouth or nose) with body fluids is likely to occur (e.g. splashes or aerosolization).

4. Resuscitation equipment, pocket masks, resuscitation bags, or other ventilation equipment must be provided to eliminate the need for direct mouth to mouth contact.

Waste Disposal Plan

1. Medical/Infectious waste must be segregated from other waste at the point of origin.

2. Medical/Infectious waste, except for sharps (e.g. razor blades, broken glass, needles, etc.) capable of puncturing or cutting must be contained in double disposable red bags conspicuously labeled with the words, "INFECTIOUS WASTE -- BIOHAZARD."

3. Infectious sharps must be contained for disposal in leak-proof, rigid puncture resistant containers.

4. Infectious waste thus contained as described in procedures 2 and 3 above must be placed in reusable or disposable leak-proof bins or barrels which must be conspicuously labeled with the words, "INFECTIOUS WASTE -- BIOHAZARD." These waste barrels are be picked up regularly by an outside company licensed to handle infectious wastes.

5. Spills/Disinfectants: a solution of sodium hypo chlorite (household bleach) diluted 1:9 with water must be used to disinfect, following initial cleanup of a spill with a chemical germicide approved as a hospital disinfectant. Spills must be cleaned up immediately.

6. After removing gloves, and/or after contact with body fluids, hands and other skin surfaces must be washed thoroughly and immediately with soap or other disinfectant in hot water.

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7. Other biological wastes that do not contain radioactive or hazardous substances may be disinfected by steam sterilization (autoclave) and then disposed of in the regular trash.

8. Liquid biohazard waste may be disposed of in the sewage system following chemical decontamination.

9. Reusable glassware must be decontaminated in sodium hyper chlorite (household bleach) solution (1:9) prior to rinsing and acid washing. Then the glassware must be sterilized in an autoclave.

Personal Protective Equipment for Worker Protection

Gowns, aprons, or lab coats must be worn when splashes of body fluid on skin or clothing are possible. Mask and eye protection are required when contact of mucosal membranes (eyes, mouth or nose) with body fluids is likely to occur (e.g. splashes or aerosolization). Resuscitation equipment, pocket masks, resuscitation bags, or other ventilation equipment must be provided to eliminate the need for direct mouth to mouth contact.

Universal precautions are intended to supplement rather than replace recommendation for routine infection control, such as hand washing and using gloves to prevent gross microbial contamination of hands (e.g., contact with urine or feces).

Blood-Borne Pathogen Control Universal Precautions and General Safety Rules

Grace Consulting Inc. will not perform invasive medical treatment or provide intravenous medication.

Therefore, the exposure to Blood-Borne Pathogens, as defined in item # 3 below, is determined to be from routine and emergency first aid treatment of common workplace injuries. The following Universal Precautions and General Safety Rules have been established to prevent the spread of viral and bacterial organisms (namely HIV/HAV/HBV). In all cases, the Universal Precautions and General Safety Rules should be followed.

1. Before and immediately after providing patient care, wash exposed areas (hands, arms, etc.) with antibacterial soap.

2. Don and use the required personal protective equipment for the medical care given.

3. Treat all human body fluids and items soiled with human body fluids (blood, blood products, seamen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, amniotic fluid, concentrated HIV/HAV/HBV, and saliva (in dental settings) as if contaminated with HIV/HAV/HBV. (Note: Feces, urine, nasal secretions, sputum, sweat, tears, or vomitus need not be treated as contaminated unless they contain visible blood)

4. No smoking, eating, drinking or storage of food products are permitted in treatment areas.

5. To avoid special handling, all clothing contaminated with human body fluid will be presoaked (sprayed on the affected areas) with the antibacterial/viral solution before being sent to the laundry. (Note: Gloves and eye protection should be worn when handling contaminated clothing until presoaked for 10 minutes)

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6. Any spills of body fluid will be presoaked (sprayed on the affected area) with antibacterial/viral solution for 10 minutes before being removed. (Note: Gloves and eye protection should be worn when handling spills of body fluids)

7. Medical Wastes (those soiled with covered human body fluids) will be treated following the Medical Wastes Treatment and Disposal Procedures before being discarded as ordinary wastes.

8. Any suspected exposure to HIV/HAV/HBV by human body fluid contact (via broken skin, human bites, needle sticks, etc.) should be reported to your Supervisor immediately.

Fire Prevention / Protection / Extinguishers Program

Introduction

Policy and planning for fire safety at Grace Consulting Inc. takes into account the special fire hazards for specific operating areas, the protection of high-value property, and the safety of employees. These ends are met by:

- Non-combustible or fire-rated materials and construction practices suitable to the assigned uses of buildings and facilities.
- Alarm systems and automatic extinguishing systems.
- Availability of suitable hand extinguishers and local hose lines for use before firefighters arrive.
- Access to professional fire department, always staffed and trained in the control of emergencies that could occur. (The Fire Department makes the initial response to all requests for emergency aid received on the emergency telephone number, 911).

This chapter covers the fire safety responsibilities of employees and supervisors and sets forth the fire safety rules and procedures.

Fire Department

The Community Fire Department is responsible for protecting people and property from fires, explosions, and other hazards through prevention and expeditious control of such events. In addition, the Fire Department provides first-response rescue and transportation services in medical emergencies.

The Fire Department's inspection staff is responsible for ensuring company-wide compliance with fire safety and protection requirements and for reviewing all plans and procedures for compliance with these requirements; for inspecting and testing automatic fire protection and alarm systems and ensuring their maintenance and repair; for conducting fire safety and protection inspections; and for providing fire prevention recommendations. Other responsibilities may include training employees in fire safety equipment, practices, and procedures.

All these fire protection and response functions are performed in conformance with OSHA regulations, State law, Grace Consulting Inc. policies, and nationally recognized standards and guidelines for fire and life safety. The Fire Chief and the Fire Marshall have the authority to enforce applicable requirements of the Uniform Building Code; the Uniform Fire Code; National Fire Protection Association Codes including the Life Safety Code), Standards, and Recommended Practices; and the fire protection provisions of OSHA Orders.

All employees must immediately report fires, smoke, or potential fire hazards to the Supervisor, Responsible Safety Officer and/or Fire Department (dial 911).

All employees must conduct their operations in such a way as to minimize the possibility of fire. This means applying rules such as keeping combustibles separated from ignition sources, being careful about smoking, and avoiding needless accumulations of combustible materials.

Supervisors are responsible for keeping their operating areas safe from fire. The Responsible Safety Officer and the Fire Department will provide guidance and construction criteria with respect to fire and life safety as well as inspections. The provision and maintenance of fire detection systems and both automatic and manual fire extinguishing equipment is the responsibility of the Responsible Safety Officer. But the supervisor, who best knows the day-to-day nature of his/her operations, is responsible for notifying the Responsible Safety Officer of operations that change the degree of fire risk and will therefore require a change in the planned fire protection provisions.

Supervisor Responsibilities

Supervisors must ensure that their personnel are properly instructed regarding potential fire hazards involved in their work and around their workplaces, the proper precautions to minimize fires, and the procedures in case of fire. The local Fire Department and the Responsible Safety Officer also offer formal courses or training and materials on fire prevention and response for:

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- Fire Safety
- Fire-Extinguisher Operation
- Self-Contained Breathing Apparatus
- Emergency Evacuation

Class A Combustibles

Class A combustibles are common materials such as wood, paper, cloth, rubber, plastics, etc. Fires in any of these fuels can be extinguished with water as well as other agents specified for Class A fires. They are the most common fuels to be found in non-specialized operating areas of the work place such as offices.

Safe handling of Class A combustibles means:

Disposing of waste daily.

Keeping work area clean and free of fuel paths, which can spread a fire once started.

Keeping combustibles away from accidental ignition sources such as hot plates, soldering irons, or other heat or spark-producing devices.

Keeping all rubbish, trash, or other waste in metal or metal-lined receptacles with tight-fitting covers when in or adjacent to buildings. (Exception: wastebaskets of metal or of other material and design approved for such use, which are emptied each day, need not be covered.)

Using safe ash trays for disposal of smoking materials and making sure that the contents are extinguished and cold to the touch before emptying them into a safe receptacle.

Planning the use of combustibles in any operation so that excessive amounts need not be stored.

Storing paper stock in metal cabinets and rags in metal bins with automatically closing lids.

Making frequent inspections and checks for noncompliance with these rules in order to catch fires in the potential stage.

Class B Combustibles

Class B combustibles are flammable and combustible liquids (including oils, greases, tars, oil-base paints, lacquers) and flammable gases. Flammable aerosols (spray cans) are treated here. Cryogenic and pressurized flammable gases are treated elsewhere in this manual.

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The use of water to extinguish Class B fires (by other than trained firefighters) can cause the burning liquid to spread carrying the fire with it. Flammable-liquid fires are usually best extinguished by excluding the air around the burning liquid. Generally, this is accomplished by using one of several approved types of fire-extinguishing agents, such as the following:

Carbon dioxide

ABC multipurpose dry chemical

Halon 1301 (used in built-in, total-flood systems)

Halon 1211 (used in portable extinguishers)

Fires involving flammable gases are usually controlled by eliminating the source of fuel, i.e., closing a valve.

Technically, flammable and combustible liquids do not burn. However, under appropriate conditions, they generate sufficient quantities of vapors to form ignitable vapor-air mixtures. As a general rule, the lower the flash point of a liquid, the greater the fire and explosion hazard. It should be noted that many flammable and combustible liquids also pose health hazards.

NOTE: The flash point of a liquid is the minimum temperature at which it gives off sufficient vapor to form an ignitable mixture with the air near the surface of the liquid or within the vessel used.

It is the responsibility of the user to ensure that all Class B combustibles are properly identified, labeled, handled, and stored. If assistance is required, contact the Responsible Safety Officer. Safe handling of Class B combustibles means:

Using only approved containers, tanks, equipment, and apparatus for the storage, handling, and use of Class B combustibles.

Making sure that all containers are conspicuously and accurately labeled as to their contents.

Dispensing liquids from tanks, drums, barrels, or similar containers only through approved pumps taking suction from the top or through approved self-closing valves or faucets.

Storing, handling, and using Class B combustibles only in approved locations, where vapors cannot reach any source of ignition, including heating equipment, electrical equipment, oven flame, mechanical or electrical sparks, etc.

Never storing, handling, or using Class B combustibles in or near exists, stairways, or other areas normally used for egress.

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In rooms or buildings, storing flammable liquids in excess of 10 gallons in approved storage cabinets or special rooms approved for the purpose.

Knowing the locations of the nearest portable fire extinguishers rated for Class B fires and how to use them.

Never smoking, welding, cutting, grinding, using an open flame or unsafe electrical appliances or equipment, or otherwise creating heat that could ignite vapors near any Class B combustibles.

Electrical Fires

There are many combustible materials, including electrical equipment, oxidizing chemicals, fast-reacting or explosive compounds, and flammable metals, which present specialized fire safety and extinguishing problems.

Refer to other appropriate chapters of this manual for safe handling advice. If in doubt, request advice from the Responsible Safety Officer.

Welding and Other Permits

As part of the local Fire Department's program to control and reduce fire hazards, a permit system is in effect to cover welding, burning, or other operations with a high fire hazard. Typically, operations that require a permit are:

Welding (arc, oxyacetylene, or heliarc)

Soldering (which requires an open flame)

Use of a torch (for cutting, bending, forming, etc.)

Use of tar pots (for road work or roofing, etc.)

Open fires for any purpose

HOT WORK PERMIT PROGRAM

Hot Work is any construction or maintenance procedure which requires heat or open flame to complete. This includes, but is not limited to: cutting, grinding, brazing, welding, soldering, thawing pipes, sweating pipes or applying roofing materials with torches.

This policy applies to any Grace Consulting Inc. employee or any contractor who is performing new construction, repair, renovations and/or alterations that require hot work. Sparks, in the presence of flammable vapors, may cause immediate fires or explosions.

Smoldering material hidden from sight can suddenly burst into flame long after work has been completed and personnel have left the area. Heat produced by hot work on one side of a wall can actually ignite combustible material on the other side. Due to the high fire potential, most hot work will require a HOT WORK PERMIT.

Supervisors and managers will determine if welding, cutting, soldering and heating must be done as part of the project or work order. Then determine if the hot work can be performed outside the building, if so a permit is not required. If hot work is performed inside of a building then a hot work permit is required. Hot Work Permits will be requested at least 24 hours in advance of needed work.

Hot Work Permits may be issued for a period of two weeks and may be renewed at the end of two weeks if needed. Employees and contractors will comply with all requirements as outlined on the permit form and the RSO, or designated representative will inspect each hot work site to ensure compliance.

Upon completion of hot work the original copy of the Hot Work Permit will be sent to the main office.

Any area of a building (other than a work shop) that is determined to be a “hot work safe area” will require an initial inspection by the RSO, or designated representative to ensure that it meets all criteria. These “hot work safe areas” shall have no fuel loading or very low fuel loading, in addition to other requirements. Examples of this type of area would be a non-occupied cement basement or crawl space under a building.

Hot Work Permit Form

(Hot Work is not permitted unless this form is completed and signed by the Responsible Safety Officer, or designated representative and site owner notified of hot works location.)

Name of person/company performing Hot Work:

Date of Work: _____

Permit No:_____
(Work Order Number)

Location of Work: _____
(be specific including building and room number)

Description of Work:
This permit is valid from am/pm on ___/___/___ to am/pm on ___/___/___

Special Precautions:
The work site has been inspected by me, I have arranged for the fire panel to be isolated and all other necessary precautions taken.
Name:_____

Signed: _____

Date:_____

(Person performing the work)
The fire alarm and panel has been isolated and the work site has been inspected by me, and declared safe for hot-work to proceed.

Name:_____

Signed:_____

Date:_____
(RSO or designated representative)

FIRE WATCH (if required)
Work site and all adjacent areas where sparks may have spread were inspected by me during, and or at least thirty (30) minutes after the work was completed and no fire conditions were noted. The fire panel has been de-isolated.

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Name: _____ (Fire Watcher)

Signed:_____

Date:_____
The fire alarms and thermal/smoke detectors must be isolated before hot work commences. This is done by informing the site owner of location of hot works
and requesting a fire alarm isolation.

Hot work commenced at am/pm _____

Hot work completed at am/pm_____

PRECAUTIONS CHECKLIST/ GENERAL PRECAUTIONS

	Yes	No	N/A
Are flammable and combustibles removed or protected?			
Are available sprinklers, hose streams and extinguishers operable?			
Is floor swept clean and wet down where necessary?			
Is arc flash shielding in place?			
Is ventilation adequate?			
Is hot-work equipment in good repair?			
Is fire watch required?			
Is fire panel isolated? (Checked with Site Owner)			
Are smoke/thermal detectors isolated? (Checked with Site Owner)			
Are combustible liquid, vapor, gasses removed or protected?			
Are combustible floors protected?			
Are flammable liquids, dust, lint removed or protected?			
Is explosive atmosphere in area eliminated?			
Are all wall and floor openings covered?			
Is construction non-combustible and without combustible materials?			
Are combustibles on the other side of wall or ceiling moved away?			
Are fire resistant coverings under works to collect sparks?			
Is enclosed equipment cleaned of all combustibles?			
Are containers purged of flammable liquids/vapors?			
Is Fire Watcher required?			
If required, has Fire Watcher been briefed?			
Is Fire Watcher trained in use of this equipment and sounding alarm?			
Is Fire Watcher supplied with appropriate fire extinguisher?			

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Spray painting

To obtain additional information or to request a permit for these operations, contact the Responsible Safety Officer or Fire Department on it business line, not the emergency 911 number.

Portable Heaters

The use of these devices, whether privately or company owned, is allowed only where there is no chance of causing injury to personnel or of creating a fire hazard. This provision obviously requires common sense in safely locating such devices and ensuring that they do not operate when they are unattended. These devices may not be used in locations where:

- Flammable or explosive vapors or dusts may be present.
- Smoking, eating, or drinking are prohibited because toxic or radioactive materials may be present.
- The area has been designated as unsafe for such devices.
- The following practices should be carried out when operating portable heating appliances:
- Do not place the appliance on unstable or readily combustible materials.
- Maintain a clearance of at least 12 inches between the appliance and combustible materials.
- Ensure that the appliance is approved by either Underwriters Laboratories, Inc., or Factory Mutual Research Corporation.
- Connect the appliance directly to a proper electrical outlet using only the cord with which it was originally equipped. Do not use extension cords in lieu of permanent wiring.
- Do not operate appliances during off hours if they are unattended unless they are controlled by a timer installed by an Replace with Company Name electrician. The timer will automatically de-energize the appliance during off hours and energize it not more than 30 minutes before the arrival of personnel. If 24 hour operation is desirable, the proposed operation and arrangement must be reviewed by the local Fire Department and a permit obtained. This permit must be posted near the operating appliance for the information of off-shift personnel who may be checking the area.

Fire Fighting Equipment

This section describes the fixed and portable equipment that is provided in working areas for fire protection. The fixed equipment may include automatic sprinklers, detectors and alarms, fire doors, etc. The portable equipment consists of fire extinguishers and hoses to be operated by employees before the arrival of the local Fire Department.

Fire Extinguishers

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Fire extinguisher maintenance programs shall be adhered to in accordance with the manufacturers' recommendations. Maintenance programs shall be maintained and portable fire extinguishers are subjected to monthly visual checks and an annual maintenance check.
Grace Consulting Inc., shall assure that portable fire extinguishers are subjected to monthly visual checks and an annual maintenance check

Fire Detectors

Several types of automatic fire detectors may be used throughout Grace Consulting Inc. , according to particular needs and purposes. All of them will detect fire (by one of several means) and transmit an alarm to the fire station. In the many buildings equipped with evacuation alarm bells, the automatic detectors activate those alarms, as do the manual pull boxes. In some cases, automatic extinguishing systems are activated by automatic detectors. The Fire Department always dispatches firefighters and apparatus to the scene of any automatically actuated alarm.

Sprinkler Systems

Many buildings are provided with automatic sprinkler systems. The sprinkler heads contain a fusible element (most commonly fused at 212 degrees F) which, on melting, opens the head and starts a spray of water. The resulting flow of water in the piping activates an alarm at the fire station, and firefighters are dispatched.

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Automatic sprinkler heads can be damaged if they are subjected to mechanical abuse. A protective cage should be installed where such damage is possible. Heat inadvertently applied to the sprinkler head can also activate the sprinkler when no actual fire is present. Normal heat sources should therefore be kept away from sprinkler heads. To avoid decreasing the flow or spread of water or altering the spray pattern, do not allow material or furniture to be located too near the sprinkler head.

Allow at least 18 inches of clearance around sprinkler heads.

Sprinkler system control valves must be kept accessible for Fire Department use.
Allow at least 3 feet of clearance (enough for a man to pass through easily) around such valves.

Alarm System

In most buildings, evacuation alarm bells are automatically activated when fire is detected. They can also be activated manually at strategically located pull boxes. The emergency actions of personnel and the evacuation procedures for each building or operating area are usually set forth in the Operational Safety Procedures for each building and posted near the main entrance or fire exit or elevator. Never use the elevator in case of a fire.

Fire Doors

Automatic fire doors and dampers are provided at strategic points to close and block the spread of smoke and fire when these are sensed by automatic detectors. Automatic fire doors must never be blocked or left in disrepair so that they cannot close and latch automatically as intended in the event of a fire.

Self-closing fire doors are those doors designed and installed to close each time after being opened. They too must never be blocked, wedged, or tied open. If such doors must be kept open, the self-closers must be replaced with approved automatic smoke-activated release hold-open devices.

Fire Exits

Exit corridors must not be used for storage. The Life Safety Code, NFPA 101, requires that buildings designed for human occupancy must have continuous and unobstructed exits to permit prompt evacuation of the occupants and allow necessary access for responding emergency personnel. The intent of the Code is to keep exits free from obstructions and clear of combustible materials. Attention to housekeeping, therefore, is very important. "Temporary" storage of furniture, equipment, supplies, or anything else is not permitted in exit ways. Combustibles, including recyclable waste paper, are not permitted in exit ways.

Metal lockers with ends and tops ferried to the walls and that do not interfere with minimum exit width requirements may be installed in exit corridors when approved by the Fire Department and the Responsible Safety Officer. The following requirements must be met for storage locker/cabinets:

Cabinets will be permitted on one side of the corridor only.

Cabinets must end at least 6 ft from the corridor exit door.

Cabinet ends must be at least 12 in. from the edge of the doorway on the latch side and from the edge of the door leaf when fully opened into the corridor.

The cabinets must not be more than 20 in. deep by 37 in. wide by 72-3/4 in. high.

The cabinets must be all metal construction with positive latches to prevent spillage of contents in the event of an earthquake.

All doors must return automatically to the closed position when not held open manually.

A 45 degree-angle fairing must be provided from the wall to the corridor corner of the cabinet. Fairing must be provided at both ends of cabinet or bank of cabinets. * A 45 degree-angle fairing must be provided at the top of the cabinets from the outside corridor edge of cabinet to the wall.

All cabinets must be anchored to the wall firmly enough to withstand 0.5g of lateral acceleration (or a lateral load equal to 1/2 the total dead weight of the cabinet and its contents) in the event of an earthquake.

Liquids and chemicals are not to be stored in corridor lockers.

All cabinets must be kept locked, with one key being retained by the Building Manager.

All cabinets must be labeled with the contents and the name, address, and telephone number of the assigned user.

Any deviation from the above requirements must be approved by the Responsible Safety Officer.

Mechanical Equipment Rooms

Mechanical equipment rooms contain boilers, blowers, compressors, filters, electrical equipment, etc. Such rooms must be separated from other areas of a building by fire-resistant walls and doors. To maintain the integrity of these separations, the fire doors must never be left open.

Fan rooms house ventilation equipment which often includes automatic shut down and dampers activated by interlocking with the building smoke and fire detectors. Fire dampers and other automatic shut-down provisions must not be disabled without Fire Department or Responsible Safety Officer approval (as for temporary maintenance procedures).

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Mechanical equipment rooms and fan rooms must not be used for storage of any kind.

Construction Areas

Construction areas under control of either, Grace Consulting Inc. or outside contractors must be maintained in a fire-safe condition and accessible to emergency response forces.

Life Safety Code

The Life Safety Code of the National Fire Protection Association, NFPA 101, requires that emergency lighting be provided for means of egress in certain areas.

The Code states emergency lighting is required in exit corridors in any office-type building where the building is two or more stories in height above the level of exit discharge.

In industrial occupancies such as laboratories and shops, the Code requires emergency lighting in all exit aisles, corridors, and passageways. Emergency lighting may be installed in areas where not required by the Code when such areas present an egress hazard during a power failure.

Several types of emergency lights that satisfy the specifications of the Life Safety Code are:

Battery Type - Only rechargeable batteries may be used. The rating of the battery must be such that it provides power for illumination for one and one-half hours in the event of a failure of normal lighting.

Generator Type - When emergency lighting is provided by an electric generator, a delay of not more than 10 seconds is permitted.

Exit sign lights, when burned out, should be reported to Maintenance for service.

Exit Corridors

Exit corridors must not be used for storage. The Life Safety Code, NFPA 101, requires that buildings designed for human occupancy must have continuous and unobstructed exits to permit prompt evacuation of the occupants and allow necessary access for responding emergency personnel. The intent of the Code is to keep exits free from obstructions and clear of combustible materials. Attention to housekeeping, therefore, is very important. "Temporary" storage of furniture, equipment, supplies, or anything else is not permitted in exit ways. Combustibles, including recyclable waste paper, are not permitted in exit ways.

Metal lockers with ends and tops ferried to the walls and that do not interfere with minimum exit width requirements may be installed in exit corridors when approved by the Fire Department and the Responsible Safety Officer.

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The cabinets must not be more than 20 in. deep by 37 in. wide by 72-3/4 in. high.

The cabinets must be all metal construction with positive latches to prevent spillage of contents in the event of an earthquake.

All doors must return automatically to the closed position when not held open manually.

A 45 degree-angle fairing must be provided from the wall to the corridor corner of the cabinet. Fairing must be provided at both ends of cabinet or bank of cabinets. * A 45 degree-angle fairing must be provided at the top of the cabinets from the outside corridor edge of cabinet to the wall.

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Liquids and chemicals are not to be stored in corridor lockers.

All cabinets must be kept locked, with one key being retained by the Building Manager.

All cabinets must be labeled with the contents and the name, address, and telephone number of the assigned user.

Any deviation from the above requirements must be approved by Responsible Safety Officer.

No Smoking

Smoking is forbidden in certain areas for fire safety reasons. Such areas include the following:

Where flammable gases or liquids are stored, handled, or used.

Where significant quantities of combustible materials, such as paper, wood, cardboard, or plastics are stored, handled, or used.

Where liquid- or gaseous-oxygen is stored, handled, or used.

Within 20 ft. of a smoke detector.

In tape and record storage vaults and computer equipment areas .

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Areas that are designated as "No Smoking" areas for fire safety reasons are indicated by large rectangular signs consisting of white backgrounds with red letters stating "NO SMOKING."

Training

Grace Consulting Inc. has provided portable fire extinguishers for employees use in the workplace, Grace Consulting Inc. also shall provide an educational program to familiarize employees with the general principles of fire extinguisher use and the hazards involved in incipient stage firefighting. This training will be conducted prior to initial assignment and at least annually thereafter.

Hand and/or Power Tools Program

Whether furnished by GCI or the employee, all hand and power tools shall be maintained in a safe condition. Guards shall be in place and operable at all times while the tool is in use. The guard may not be manipulated in such way that will compromise its integrity or compromise the protection in which intended. Guarding shall meet the requirements set forth in ANSI B15.1. Any deviations from the guarding requirements specified herein shall be addressed on a case-by-case basis by the RSO.

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 the particular PPE necessary to protect them from the hazard. Any tool which is not in compliance with any applicable requirement of this part is prohibited and shall be identified as unsafe by tagging or locking the controls to render them inoperable. Such tool shall either be identified as unsafe by tagging or locking the controls to render them inoperable or shall be physically removed from its place of operation.

Grinders

1. Do not use grinding wheels that have chips, cracks or grooves.
2. Do not use the grinding wheel if it wobbles. Tag it "Out of Service."
3. Adjust the tongue guard so that it is no more than 1/4 inch from the grinding wheel.
4. Do not try to stop the wheel with your hand, even if you are wearing gloves.

Drills

1. Do not use dull, cracked or bent drill bits.

Hydraulic/Pneumatic Tools

1. Do not point a compressed air hose at bystanders or use it to clean your clothing.
2. Tag defective or damaged tools "Out of Service" to prevent usage of the tool.
3. Do not use tools that have handles with burrs or cracks.
4. Do not use compressors if their belt guards are missing. Replace belt guards before use.
5. Turn the tool "off" and let it come to a complete stop before leaving it unattended.
6. Disconnect the tool from the airline before making any adjustments or repairs to the tool.

General Hand Tool Safety

1. Tag worn, damaged or defective tools "Out of Service" and do not use them.
2. Do not use a tool if its handle has splinters, burrs, cracks, splits or if the head of the tool is loose.
3. Do not use impact tools such as hammers, chisels, punches or steel stakes that have mushroomed heads.
4. When handing a tool to another person, direct sharp points and cutting edge away from yourself and the other person.
5. When using knives, shears or other cutting tools, cut in a direction away from your body.
6. Do not carry sharp or pointed hand tools such as screwdrivers, scribes, snips, scrapers, chisels or files in your pocket unless the tool or pocket is sheathed.
7. Do not perform "make-shift" repairs to tools.
8. Do not throw tools from one location to another or from one employee to another.
9. Transport hand tools only in tool boxes or tool belts. Do not carry tools in your clothing.

Powder Actuated Tools

- Wear impact resistant safety goggles or face shields when operating any powder actuated tools.

- When using powder actuated tools, do not drive fasteners into structural steel without first looking to see if the steel is backed by a steel plate or barricade, and to see if all personnel are away from the direct line of fire.
- Do not attempt to fasten through a pre-drilled hole unless the powder actuated tool has a hole locator.
- Keep your head and body behind the powder actuated tool when firing it.
- Do not fasten steel beams at a distance closer than 1/2 inch from the edge of the steel.
- Before using powder actuated tools do not alter, bypass, or remove the shield or guard at the muzzle end of the powder actuated tool.
- Do not load a powder actuated tool until you are ready to fire it.

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Safety Manager Statement

It is the policy of Grace Consulting Inc. that accident prevention shall be considered of primary importance in all phases of operation and administration. It is the intention of Grace Consulting Inc.'s management to provide safe and healthy working conditions and to establish and insist upon safe practices at all times by all employees.

The prevention of accidents is an objective affecting all levels of our company and its operations. It is, therefore, a basic requirement that each supervisor make the safety of all employees an integral part of his or her regular management function. It is equally the duty of each employee to accept and follow established safety regulations and procedures.

Every effort will be made to provide adequate training to employees. However, if an employee is ever in doubt about how to do a job or task safely, it is his or her duty to ask a qualified person for assistance. Employees are expected to assist management in accident prevention activities. Unsafe conditions must be reported immediately. Fellow employees that need help should be assisted. Everyone is responsible for the housekeeping duties that pertain to their jobs.

Every injury that occurs on the job, even a slight cut or strain, must be reported to management and/or the Responsible Safety Officer as soon as possible.

Under no circumstances, except emergency trips to the hospital, should an employee leave the work site without reporting an injury. When you have an accident, everyone is hurt. Please work safely. Safety is everyone's business.

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Sincerely,

Grace Consulting Inc.
E.H.S. Manager

Job Hazard Analysis Safety Program

Grace Consulting Inc. is a company that is committed to protecting employees, clients and the general public on all our projects. This premise is a Company value of great importance. Our goal is ZERO incidents. The following guiding principals will evidence this philosophy and our future success:

Senior management is responsible to support and monitor the safety, health and risk management process.

Supervision shall possess the skills and commensurate with project responsibilities.

All employees must comply with safety, health, and risk management requirements.
We will work towards continuous improvement. We will foster a culture that aligns safety, health and risk management with the other business objectives.

The emphasis will be on the Safety, Health and Risk Management. Planning Process and reduction of incidents will be our measure of our success.

ABOUT THIS PROGRAM

This is a Job Hazard Analysis (JHA) that Grace Consulting Inc. implements and maintains as part of our everyday procedures.

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The JHA comprises the following elements: Please note that some of the following items are located in the Company Illness and Injury Prevention Plan and may not be specifically included herein.

1. Responsibility/Key Personnel
2. Identification of Competent Persons
3. Description/ Scope of Work To Be Performed
4. Hazard/Risk/Exposure Assessment
5. Fall Protection Hazards/ Control
6. Control Measures
7. Periodic Inspections
8. Compliance
9. Written Progressive Disciplinary Program
10. Hazard Correction
11. Training and Instruction
12. Project Site Orientation
13. Employee Communication System
14. Record Keeping
15. Accident/ Exposure Investigation
16. Emergency Action Plan
17. Site-specific Medical Emergency Plan

1. RESPONSIBILITY / IDENTIFICATION OF KEY LINE PERSONNEL

Responsible Safety Officer (RSO) for this project: is Aaron Conner

Project Manager: _____

On-site Supervisor: _____

The above noted personnel have the authority for implementing the provisions of this program. All supervisors are responsible for implementing and maintaining the JHA Program in their work areas and for answering worker questions about the JHA Program. A copy of this JHA Program is available from each supervisor.

2. IDENTIFICATION OF COMPETENT PERSON(S)

_____

_____.

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3. DESCRIPTION/ SCOPE OF WORK TO BE PERFORMED

_____

_____

_____

_____

4. HAZARD/RISK/EXPOSURE ASSESSMENT

The major safety hazards/risks and exposures have been assessed as follows:

_____

_____

_____

5. FALL PROTECTION HAZARDS/ CONTROL

Grace Consulting Inc. site staff will identify and provide countermeasures for any fall hazards. In particular, protection from falls will be provided for any scaffolds erected 10 ft. or higher during erection, alteration, or dismantling in addition to working on the scaffold at any time.

If the Competent Person determines fall protection cannot be provided during erection, or dismantling for feasibility/ constructability reasons, other reasonable efforts shall be made to ensure the least risk for workers such as; using experienced crews, utilizing a Safety Monitor, and/ or fall restraint methods.

Workers on scaffolds shall have guardrails in place as the primary means of fall protection, and shall either work from behind the guardrails, or use personal fall arrest/ restraint systems when a guardrail section is removed to receive materials.

Grace Consulting Inc. workers required to work below the scaffold shall be protected from falling objects by the use of head protection. All other workers onsite should be kept clear of the working area underneath the scaffold, and the entire Limited Access Zone.

Overhand bricklaying will be allowed only where necessary. Workers along the roof edge will be protected by use of the scaffold as a catch platform, fall arrest or restraint systems, or a safety monitor/ warning line system if other, safer methods are unfeasible.

6. CONTROL MEASURES

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Grace Consulting Inc. site staff will monitor the hazards/risks and exposures in accordance with this JHA. The plan addresses the various hazards/risks and exposures, and the checklists and will bring any concerns or violations to the attention of the staff for correction. Unsafe or unhealthy work conditions; practices or procedures shall be corrected in a timely manner based on the severity of the hazard.

Protective equipment (PPE) may include (based on the hazard):

* Eye protection
* Safety boots
* Hearing protection
* Gloves
* First aid kit
* Fire extinguishers
* Fall protection
* Hard hats

Personnel will be trained in the proper use and application of PPE.

7. PERIODIC INSPECTIONS

Periodic inspections will be performed according to the following schedule:

* When we initially establish our JHA Program
* Daily
* When required by local regulators
* When new substances, processes, procedures or equipment, which present potential new hazards, are introduced into our workplace
* When new previously unidentified hazards are recognized
* When occupational injuries and illnesses occur
* When we hire and/or reassign permanent or intermittent workers to process, operations, or tasks for which a hazard evaluation has not been previously conducted.
* Whenever workplace conditions warrant an inspection.

Periodic inspection consist of identification and evaluation of work place hazards

8. COMPLIANCE REQUIREMENTS

Management is responsible for ensuring that all safety and health policies and procedures are clearly communicated and understood by all employees. Managers and supervisors are expected to enforce the rules fairly and uniformly. All employees are responsible for using safe work practices, for following all directives, policies and procedures, and for assisting in maintaining a safe work environment.

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Our system of ensuring that all workers comply with the rules and maintain a safe work environment includes:

* Informing workers of the provisions of our JHA Program
* Evaluating the safety performances of all workers
* Recognizing employees who perform safe and healthful practices
* Providing training to workers whose safety performance is deficient
* Disciplining workers for failure to comply with safe and healthful practices.

9. WRITTEN PROGRESSIVE DISCIPLINARY PROGRAM

Non-compliance with Site Specific Safety Plan will result in disciplinary action provided for in the corporate discipline program.

10. HAZARD CORRECTION

Unsafe or unhealthy work conditions; practices or procedures shall be corrected in a timely manner based on the severity of the hazards. Hazards shall be corrected according to the following procedures:

* When observed or discovered
* When an imminent hazard exists which cannot be immediately abated without endangering

employee(s) and/or property, we will remove all exposed workers form the area except those necessary to correct the existing condition.

* Workers necessary to correct the hazardous condition shall be provided with the necessary protection.

All such actions taken and dates they are completed shall be documented on the appropriate forms. Jobs and activities are analyzed after any hazard is established or accident occurs and then will be reviewed by the Safety Committee.

Any employee not strictly adhering to these policies will be subject to a formal write up, program re-training, suspension without pay or immediate dismissal.

11. INSTRUCTION

Workplace safety and health practices for all locations include, but are not limited to, the following:

* Explanation of the JHA Program, Contractor's/Client's Safety Program, emergency action plan and fire prevention plan, and measures for reporting any unsafe conditions, work Practices, injuries and when additional instruction is needed.
* Ensure proper Use of appropriate clothing, including gloves, footwear, and personal protective equipment
* Daily Safety Planner System
* Required information about chemical hazards to which employees could be exposed and other hazard communication program information
* Availability of toilet, hand washing and drinking water facilities for impacted employees.
* Provisions for medical services and first aid including emergency procedures
* In addition, we provide specific instructions to all workers regarding hazards unique to their job assignment, to the extent that such information was not already covered in other training.

12. PROJECT SITE ORIENTATION

We orientate our workers about the following subjects as applicable:

* The employer's Code of Safe Practices
* Good housekeeping, fire prevention, safe practices for operating any equipment
* Safe working procedures for cleaning, repairing, servicing and adjusting equipment and machinery
* Safe access to all working areas
* Proper use of all power tools
* Guarding use of fixed rotating cutting equipment
* Materials handling

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* Driver safety
* Traffic safety
* Slips, falls, and back injuries
* Working aloft
* Ladder safety
* Ergonomic hazards, including lifting techniques and working on ladders or stooped posture for prolonged periods at one time
* Personal protective equipment
* Respiratory equipment
* Hazards communication
* Client requirements
* Job site physical hazards, such as heat stress, noise, and ionizing and non-ionizing radiation
* Personal hygiene/ Blood borne pathogens and other biological hazards.

13. EMPLOYEE COMMUNICATION SYSTEM

We recognize that open, two-way communication between management and staff on health and safety issues is essential to an injury-free, productive workforce.

The following system of communication is designed to facilitate a continuous flow of safety and heath information between management and staff in a form that is readily understandable and consists of the following items:

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* Job Hazard Analysis (JHA)
* Workplace safety and health training programs
* Regular required weekly safety meetings
* Effective communication of safety and health concerns between workers and supervisors
* Posted or distributed safety information
* New worker orientation, required for all new employees.

14. RECORD KEEPING

We have taken the following steps to implement and maintain the following records to document our JHA Program:

A. Records of hazard assessment inspections, including the person(s) or persons conducting the inspection, the unsafe conditions and work practices that have been identified and the action taken to correct the identified unsafe conditions an work practices, are recorded on a hazard assessment and correction form; and

B. Documentation of safety and health training for each worker, including the worker's name or other identifier, training dates, type(s) of training, and training providers are recorded in a worker

training and instruction from.

C. Documentation of JHA's will be documented on company JHA forms. All management, supervisors, ect. will be properly trained on how to conduct JHA prior to doing so.

Inspection records and training documentation will be maintained as required by contract specifications and/or local regulations.

15. ACCIDENT/EXPOSURE INVESTIGATIONS

Procedures for investigating workplace accidents and hazardous substances exposures include:

* Responding to the accident scene as soon as possible
* Reporting to Director of Safety
* Reporting immediately to the appropriate Client point-of-contact
* Interviewing injured workers and witnesses
* Examining the workers for factors associated with the accident exposure
* Determining the cause of the accident/exposure
* Taking corrective action to prevent the accident/exposure from reoccurring and Recording the findings and corrective actions taken.

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16. EMERGENCY ACTION PLAN

In the event an evacuation of the work site is necessary, it will be announced and all staff and visitors are to leave the area immediately and assemble at the pre-determined emergency meeting location.

The Supervisor (or acting supervisor) shall contact the Project Manager and Director of Safety any time an emergency action plan has been enacted. The on-site Client Representative will also be contacted immediately.

17. SITE SPECIFIC MEDICAL EMERGENCY PLAN

In the event serious injury or illness occurs to a Grace Consulting Inc. employee, he/she is to be taken immediately to:

_____

_____

_____

For minor injuries such as simple cuts, sprains, etc. The employee will be taken to the nearest required medical treatment facility. If in doubt, assume the worst and transport the employee to: he

nearest Emergency Medical Center. The on-site Client Representative shall be notified as soon as possible. In cases of serious injury or illness, the employee is to be sent immediately to the nearest hospital, by ambulance if necessary.

If the injury is the result of an accident on site then an Accident Report Form is to be filled out and submitted to the crew chief.

Grace Consulting Inc. employees MUST report all injuries or illnesses, as soon as possible, to the on-site supervisor.

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Chapter 27

Drug Free Workplace Program

In a commitment to safeguard the health of our employees, and to provide a safe working environment for everyone, a Drug-Free Workplace Program has been established by Grace Consulting Inc. This program is implemented pursuant to the Drug-Free Workplace Program requirements, the applicable rules of the agency for Health Care Administration, the Department of Labor and Employment Security and the U.S. Department of Transportation Regulations.

General Policy:

GCI has a zero tolerance policy regarding illegal drug use. All new hires will be tested for drugs before becoming a full time employee. Random drug tests will be performed on all employees. If an existing employee tests positive for illegal substances, they will immediately be suspended without pay and will not be allowed to return to work until they have tested negative in a specified test paid for by the employee. At this point, they can return to work on a probation period of 3 months and will be tested at random. If the employee tests positive during the probationary period, this second positive test will result in immediate termination.

Grace Consulting Inc. prohibits its employees from illegally or improperly using, possessing, selling, manufacturing, or distributing drugs on its property or while its employees are at work. It is also Grace Consulting Inc. policy to report to work NOT under the influence of drugs and alcohol. It is a condition of employment to refrain from using illegal drugs or alcohol on the job, or abusing legal drugs on or off the job such that it affects the job. If

Grace Consulting Inc. and all employees are required to submit for drug testing in compliance with all Midwest Toxicology Services (MICCS) rules and regulations, which may supersede company substance abuse policies. It is the policy of Grace Consulting Inc. to implement the more stringent of the two substance abuse policies if there is a conflict in policy, such right will be at the discretion of Grace Consulting Inc.

The drug use prohibitions and the testing procedures provided for under this Program may involve the following drugs or metabolites but not limited to:

Alcohol
Phencyclidine (PCP)

Benzodiazophines (Valium)
Amphetamines (Desoxyn)
Methaqualone Methadone (Dolophine)
Cannabinoids (marijuana)
Opiates (opium)
Propoxyphene (Darvocet)
Cocaine (coke, crack)
Barbiturates (Phenobarbital)

To ensure that drugs and alcohol do not enter or affect the workplace, Grace Consulting Inc. has the right to conduct reasonable searches of all vehicles, containers, lockers, or other items on Grace Consulting Inc. property or Grace Consulting Inc. worksites in furtherance of this program. Individuals may be requested to display personal property for visual inspection upon the Grace Consulting Inc.'s request. All personal property searches will take place only in the employee's presence. All searches under this program will occur with the utmost discretion and consideration for the employees involved. Searches for the purposes described herein will be conducted when Grace Consulting Inc. has reasonable suspicion that the employee has violated Grace Consulting Inc.'s Drug-Free Workplace Program, and that evidence of such misconduct may be found during the search.

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Alcohol Testing Procedures:

Alcohol testing is required for probable cause, post accident/incident, and for immediate random testing situations. Tests for alcohol shall be performed using the breath or blood to determine a Blood Alcohol Content (BAC). If possible, a breathalyzer type instrument conforming to DOT standards should be used. If not available, then a blood sample may be used. If blood testing is necessary, the contractor/owner is responsible to provide a documented reason as to the reasons why a breath test could not be performed. Failure to provide a sufficient breath sample to complete a breath test or refusing to provide a blood sample will be considered a “refusal to test” and have the same consequences as a positive test. All alcohol test results with a confirmed BAC test level of .04 or higher will be considered positive and will require the employee to be removed from the owner’s property immediately. This result will also invalidate the employee’s MICCS ID Card. In order for the employee to become eligible for a MICCS ID Card again, the employee will have to complete the required program of rehabilitation outlined in this document. All alcohol test results with a confirmed BAC test level of .020 through .039 will require the employee to be removed from the owner’s property for 24 hours or until the employee’s next scheduled work time, whichever is longer. Any initial test that indicates a BAC level of .02 or greater must be confirmed by an Evidential Breath Testing Device (EBT) operated by the Breath Alcohol Technician (BAT). The confirmation test will be performed no sooner than 15 minutes and no later than 30 minutes following the completion of the initial test in accordance with current DOT guidelines.

Job Applicant Drug Testing

a. All applicants are subject to be tested for the presence of drugs or alcohol prior to hiring.
b. Any job applicant who refuses to submit to drug testing, refuses to sign the consent form, fails to appear for testing, tampers with the test, or fails to pass the pre-employment confirmatory drug test will not be hired and, unless otherwise required by law, will be ineligible for hire for a period of at least two (2) years.

Employee Drug Testing

a. **Reasonable Suspicion Testing:** All employees will be tested when there is a reasonable suspicion that the employee is using or has used drugs in violation of the program.
b. **Random Testing:** To the extent allowed by law, employees in safety sensitive or special risk positions will be required to submit to drug testing on a random basis. Those positions designated as safety-sensitive are described on a list maintained on file in the Human Resources Department.
c. **Routine Fitness for Duty Testing**: Employees will be subject to drug testing if the test is conducted as part of a routinely scheduled employee fitness-for-duty medical examination applicable to all similarly situated employees.
d. **Return to Duty Testing:** Any employee who does not pass a test (and has not been fired) may not return to work until meeting the Return to Duty requirements established by this program.
e. **Follow-up Testing:** All employees who have entered drug rehabilitation programs while employed by Grace Consulting Inc. will have to pass 3 drug screens prior to returning to work and submit periodic follow-up tests as may be required.
f. **Position Change Testing:** To the extent allowed by law, employees moving from a non-safety sensitive/special risk position to one designated as safety-sensitive or special risk, as a result of a formal personnel action, shall be required to successfully pass a drug test within 48 hours of receiving notification that they have been selected to fill the safety sensitive position.
g. **Post-Accident Testing:** All employees who are injured as well as those who have caused or contributed to an on-the-job accident. Administered as soon as possible after the employee receives medical attention, or within 8 hours for alcohol and 32 hours for drugs.

Additional Testing: Additional testing may also be conducted for any employee injured on the job prior to returning to work or as deemed necessary by Grace Consulting Inc.

All employees are required to be drug tested and meet all requirements as stated by MICCS substance abuse policy within 30 days of initial hiring date. Annual drug testing is required to continue employment.

Specimen Retest Protocol

- When the MRO has informed the employee of a verified “positive drug test” or “refusal to test” because of adulteration or substitution, the employee/worker has 72 hours from the time of notification to request a retest of the specimen at a different SAMHSA laboratory.
- The employee may make the request verbally or in writing and make arrangements for payment with the MRO service, as the cost of the test is the responsibility of the employee.
- If the result of the retest is different from the original result, the test will be cancelled, and a recollection will be needed.

Disciplinary Action

a. Any employee using, selling, purchasing, possessing, distributing, or dispensing drugs on duty or on Grace Consulting Inc. property, reporting to work or working under the influence of drugs, or having a positive drug test result, except first time violations found through Random Testing, will be subject to dismissal.
b. In the case of a first-time violation of Grace Consulting Inc.'s policy, based on Random Testing only, an employee may be offered an opportunity to enter into an approved and supervised rehabilitation program as an alternative to dismissal.
c. Any employee who refuses to submit to a drug test will be dismissed from employment by Grace Consulting Inc..
d. An employee injured while at work that refuses to submit to a drug test, or has a positive confirmation test, may be dismissed from employment or otherwise disciplined by Grace Consulting Inc. and may forfeit his eligibility for all Grace Consulting Inc. workers' compensation medical and indemnity benefits.
e. Failure to consent to a reasonable search of vehicles, containers, lockers, or other items on Grace Consulting Inc. property, will be grounds for dismissal or reason for denial to Grace Consulting Inc. premises.

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Confidentiality

a. All information, interviews, reports, statement memoranda, and drug test results, written or otherwise, received by Grace Consulting Inc. through a drug testing program are confidential communications and may not be used or received in evidence, obtained in discovery, or disclosed in any public or private proceeding, except as may otherwise be provided by statute or regulation. Similarly, Medical Review Officers, laboratories, employee assistance programs, drug and alcohol rehabilitation programs, and their agents and employees who receive or have access to information concerning drug test results obtained pursuant to this program shall keep all such information confidential except as provided above, or when its release is authorized pursuant to a written consent form, Signed voluntarily by the person tested.
b. Information on drug test results shall not be released or used in any criminal proceeding against the employee or job applicant. Information released contrary to this section shall be inadmissible as evidence in any such criminal proceeding.

Affect of Other Medication

Each employee or job applicant may provide any information he or she considers relevant to a drug test including identification of currently or recently used prescription or non-prescription medication or other relevant information. The employee or applicant may provide this information both before and after testing to the Medical Review Officer. The information provided shall be confidential. Employees and job applicants may consult the Medical Review Officer for technical information regarding prescription and non-prescription medication.

Explanation of Test Results

Adulterated Test

- If a test was tampered with by the substitution or addition of other ingredients, the test result will be processed the same as a positive test result.
- When a recollection is required, i.e., due to adulteration or temperature, etc., the recollection will be observed according to DOT procedures.

Diluted Test

- A test result that produces a diluted specimen requires a retest. Refer to Appendix B for detailed instructions on how to process a diluted specimen. If the retest also produces a diluted specimen, it will carry the same consequences as a positive test result unless a valid medical reason exists.

Negative Test Result

A drug result is considered negative if:

- the laboratory finds no drug metabolite levels over the confirmed cutoff values, or
- the screen test and confirmation test indicated the presence of a legal or illegal substance(s) in excess of the limits but the donor (employee) had a valid medical reason for the substance being detected in the specimen.
- An alcohol result is considered negative if the BAC is below 0.02.

Positive Alcohol Test

- A positive alcohol test occurs if the breathalyzer test, or its equivalent test, indicates the presence of alcohol that meets or exceeds the cut-off limits of the DOT and the Commercial Drivers License (CDL) as shown in this document.

Positive Drug Test Result

- A result is considered positive if the presence of the drug meets or exceeds both the screening and confirmation levels.
- The test must be verified by the MRO.
- The MRO must determine that the test results are not from the use of prescription or over the counter medications, food, or any reason other than the illegal use of unlawful substances or controlled substances.

Refusal to Test

Refusal to submit to a test will carry the same consequences as a positive test.
A refusal to test occurs if an employee:

- Adulterated, substituted, or refused to provide a urine specimen
- Failed to appear for testing within a reasonable period of time
- Failed to remain at the testing site until the testing process was completed
- Failed to provide a sufficient amount of urine within 2 hours without a medical reason and/or failed to undergo an MRO directed medical evaluation for such a reason
- Failed to cooperate with any part of the testing process, which includes the use of abusive/threatening language or behavior
- Disrupted the testing process
- Is found to possess or wear a prosthetic or other device that could be used to interfere with the collection process.
- Admits to the collector or MRO that he/she adulterated or substituted the specimen.

Sanctions and Consequences for Failing a Test

GCI requires employees, who test positive (including a refusal to test), to surrender their MICCS ID Card. GCI will refer employees with positive test results to a SAP for evaluation and treatment at the discretion of GCI.

If approved by GCI, the employee must start a program of rehabilitation prior to returning to work, and must continue and complete the rehabilitation in order to be eligible to work for GCI. The rehabilitation must include the following steps:

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1. The employee must arrange and pay for an evaluation with a Substance Abuse Professional.
2. The SAP evaluation must specify that the employee:

- Must attend education classes and/or treatment.
- Must perform the actions recommended by the SAP or assigned rehabilitation specialists.
- Is subject to random follow-up testing not less than 3 times within the next 12 month from the employee's return to work test. In cases where the employee was unable to complete the follow-up test due to being laid off or out of town, etc., the length of time that was designated by the SAP to complete their follow-up test will be extended by the length of time the employee was not available for testing.
- Will not be allowed to take another drug test for at least 14 days from the date of the first positive test.

3. The employee is required to submit a letter from the SAP to GCI concerning their fitness for return to work including that the employee is eligible for a return to duty test.
4. The employee must take a return to duty test with negative results. These results must be submitted to GCI for GCI database entry.
5. The employee must actively complete any ongoing rehabilitation and follow-up testing required by the SAP.
6. Arrangements for all costs are the responsibility of the employee.
7. If an employee tests positive 1 time within a 12-month period, the employee will not be eligible to retest and will be subject to immediate dismissal or disciplinary action.

8. Failure to comply with any of the above sanctions shall result in the employee's immediate dismissal or disciplinary action.
9. The result of a person using a counterfeit drug card will be the same as a positive drug test.

An employee or job applicant who receives a positive confirmed test result may contest or explain the result to the Medical Review Officer within five (5) working days after receiving written notification of the test result. If an employee's or job applicant's explanation or challenge is unsatisfactory to the Medical Review Officer, the Medical Review Officer will report a positive test result back to Grace Consulting Inc. The employee or job applicant may contest the drug result. An employee or job applicant is responsible for notifying the laboratory in the event he/she initiates any administrative or civil action, in order to ensure that the laboratory retains the specimen. Employees covered by a collective bargaining agreement or a "last chance agreement" may challenge actions taken under this program if such challenge(s) is authorized by their collective bargaining agreement, or the last chance agreement as applicable.

Employee Assistance Programs

In the case of a first-time violation of Grace Consulting Inc.'s policy, based on Random Testing only, an employee may be offered an opportunity to enter into an approved and supervised rehabilitation program as an alternative to dismissal.

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Over-The Counter And Prescription Drugs Which Could Alter Or Affect The Outcome Of A Drug Test

The following is a list of over-the-counter or prescription drugs which could alter or affect a test result. Due to the large number of obscure brand names and the constant marketing of new products, this list cannot be and is not intended to be all inclusive:

ALCOHOL

All liquid medications containing ethyl alcohol (ethanol). Please read the label for alcohol content. As an example, Vick's Nyquil is 25% (50 proof) ethyl alcohol, Comtrex is 20% (40 proof), Contac Severe Cold Formula Night Strength is 25% (50 proof) and Listerine is 26.9% (54 proof).

AMPHETAMINES
Obetrol, Biphetamine, Desoxyn, Dexedrine, Didrex

CANNABINOIDS
Marinol (Dronabinol, THC)

COCAINE
Cocaine HCI topical solution (Roxanne)

PHENCYCLIDINE

Not legal by prescription.

METHAQUALONE
Not legal by prescription.

OPIATES
Paregoric, Parepectolin, Donnagel PG, Morphine, Tylenol with Codeine, Empirin with Codeine, APAP with Codeine, Aspirin with Codeine, Robitussin AC, Guiatuss AC, Novahistine DH, Novahistine Expectorant, Dilaudid (Hydromorphone), M-S Contin and Roxanol (morphine sulfate), Percodan, Vicodin, etc.

BARBITURATES
Phenobarbital, Tuinal, Amytal, Nembutal, Seconal, Lotusate, Fiorinal, Fioricer, Esgic, Butisol, Mebaral, Burabarbital, Butabital, Phrenilin, Triad, etc.

BENZODIAZEPHINES
Ativan, Azene, Clonopin, Dalmane, Diazepan, Librium, XanaX, Serax, Tranxene, Valium, Verstran, Halcion, PaXipam, Restoril, Centrax.

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METHADONE
Dolophine, Methadose

PROPOXYPHENE
Darvocet, Darvon N, Dolene, etc.

Employee Responsibilities

Employee responsibilities are as follows:

- Report to work fit for duty.
- Be in the appropriate mental and physical condition necessary to work in a safe and competent manner, free of the influence of drugs and alcohol.
- Report to the employer any medications that may impair job performance or safety.
- Consent to and participate in owner/employer required tests
- Consent to the release of the drug test results to the employer, for the MICCS database, or for specific purposes required by law.