SAFETY PROGRAM

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1.0 Introduction

1.1 Policy Statement

It is the policy of Allied Environmental Services, Incorporated to provide a work environment as free as possible from all recognized hazards. Employees are expected to comply with all safety and health requirements, whether established by management or by Federal, State, or local law. All employees are expected to follow all safety regulations by all other companies that Allied Environmental Services, Inc. is working for at a given time. Failure to comply with established safety and health requirements will subject the employee to disciplinary action, up to and including dismissal. The Safety and Health Program elements are contained in this manual.

1.2 Purpose

The purpose of this Safety Program is to provide Allied Environmental Services, Inc. employees with standard procedures and the required technical information necessary to provide for a safe and healthful work environment.

Allied Environmental Services, Inc. is a diversified company with a wide range of safety and health concerns. This Safety Program is not meant to cover all specific situations and circumstances that employees may encounter. It is intended to provide general procedures and information that can be molded by Allied Environmental employees to meet specific requirements of any project. The information contained in this manual has been developed to meet the requirements of the Occupational Safety and Health Act of 1970 (OSHA).

1.3 Intent

This manual is intended to serve as a resource tool for Allied Environmental Services, Inc. employees. It is Allied Environmental Services, Inc. intent to provide a copy of this manual to each employee. Allied Environmental Services, Inc. will also ensure a copy of this manual is available to any employee at all times. Copies of this manual will be furnished to each project as well.

1.4 Responsibilities

1.4.1 General

It is the responsibility of Allied Environmental Services, Inc. to develop and administer an effective Safety and Health Program, as well as provide the necessary resources to maintain an effective Safety and Health Program (i.e., Personal protective equipment, industrial hygiene equipment, etc.).

1.4.2 Supervisor's Responsibilities

Supervisors shall be responsible not only for their own safety, but also for the safe work performance of other employees under their supervision:

- Before assigning work to an employee, supervisors shall ensure employees know and understand the hazards associated with the work and the proper procedures to perform the work safely.
- Supervisors shall ensure all employees under their supervision are familiar with this manual and abide by the sections of the manual that pertain to their particular job.
- Supervisors shall ensure the employees under their supervision have the necessary resources to perform their job safely.
- Supervisors, at all times, shall accept in a positive and cooperative manner all reports of hazards, and employees shall not be reprimanded or penalized for reporting hazards.
- Supervisors shall be responsible for developing specific safety and health procedures for their project. The specific procedures shall not conflict with the information contained in this manual.

- Supervisors shall be responsible for their specific duties as outlined in this manual.

1.4.3 Employees Responsibility

All employees shall be required to know and understand the safety and health rules and procedures, which apply to the work they are performing:

- If a condition, practice, or equipment is observed that, is either unsafe, defective, or destructive to the employee or Allied Environmental Services, Inc. property, it is the employee's duty to correct the condition, if possible, or report it to their supervisor.
- If an Allied employee observes defective equipment, an unsafe, or destructive condition that is caused either by client's employees or contractor personnel working for a client, Allied Environmental has a responsibility to inform the client of the condition. If Allied Environmental has a contractual relationship with the client to detect and eliminate such conditions, the Allied employee shall take the necessary action to correct the situation.
- If an employee is assigned work, which he/she feels, will contribute to the destruction of equipment or is hazardous and without proper protection, the employee shall bring the matter to the attention of his/her supervisor.
- Employees shall use care in the performance of their duties, ensuring at all times maximum protection against accidents involving themselves, other employees, the public and any Allied property or the property of others.

OHIO REVISED CODE, SECTION 4101.13 DUTY OF EMPLOYEES

No employee shall remove, displace, damage, destroy, or carry off any safety device or safeguard furnished or provided for use in any employment or place of employment, or interfere in any way with the use thereof by any other person. No employee shall interfere with the use of any method or process adopted for the protection of any employee in such employment or place of employment, or frequenter of such place of employment, or fail to follow and obey order and to do every other thing reasonably necessary to protect the life, health, safety, and welfare of such employees and frequenters.

Violators will be prosecuted

2.0 Training/Competent Persons

2.1 General

Before assigning an employee to work on a specific task or project, the employee should be instructed on the safety and health hazards associated with the task or project and the proper procedures to be used to avoid the hazard(s).

2.1.1 Competent Persons

OSHA defines a competent person as one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authority to take prompt corrective action to eliminate them. In as much as Allied Environmental Services Supervisors are on the jobsite each day, they are in the best position to correct any unsafe, unsanitary, or hazardous conditions, which may be present.

The supervisor may delegate competent person duties to other qualified person(s) on the job site providing the person(s) being delegated the duties has received appropriate training and has demonstrated proficiency in the subject matter. Delegation of competent person duties should be considered when supervising 25 or more workers.

OSHA standards, which require a competent person on site, include:

- Individual on site to implement the Accident Prevention Program
- Supervise erection and inspection of all scaffolding
- Perform and maintain the Assured Equipment Grounding Electrical Inspection Program, if used.
- Excavations and trenching over four feet deep
- Assign qualified equipment operators
- Supervise confined space and lockout procedures
- Work on or near energized electrical parts
- Demolition – Preparatory operations
- Lead
- Ladders
- Slings
- Asbestos
- Hearing Protection
- Welding and Cutting
- Respiratory Protection
- Material/Personnel hoists
- Fall Protection
- Tunnels and shafts, caissons, cofferdams and compressed air
- Underground construction

2.1.2 Documentation

Any employee assigned responsibilities as a competent person shall be so designated in writing with those responsibilities clearly identified. Documentation must be maintained at the worksite with a copy of this written assignment forwarded to the Allied Environmental Services Operations Manager. Use of form Figure 2-1 is recommended.

***A Competent Person must be on site to qualify for OSHA's Focused Inspection Process.**

Designation of Competent Persons

Job Number:_____ Job Name_____ Date_____

Contractor_____ Scope of Work_____

OSHA Standard	Applicable (Y/N)	Designated Competent Person (Employee Name)
Subpart C – General Provisions		
1926.20 General Provisions		
Accident Prevention		
Subpart D – Health & Environmental Controls		
1926.53 Ionizing Radiation		
1926.55 Gases, Vapors, Fumes, Dusts, Mists		
1926.58 Asbestos		
1926.59 Hazard Communication		
1926.62 Lead		
1926.63 Cadmium		
Mercury		
High Pressure Water Jetting		
Tank Cleaning		
Subpart E – Personal Protective Equipment		
1926.101 Hearing Protection 1926.95 Criteria for PPE 1910.132 Personal Protective Equipment		
Subpart H – Material Handling, Storage, Etc.		
1926.251 Rigging Equipment, For material Handling		
Subpart L – Scaffolding		
1926.451 Scaffolding		
Subpart M – Floors and Wall Openings		
1926.500 Guardrails, Handrails, Covers		
1926.502 Definitions		
1926.503 Training Requirements		
Subpart O – Motor Vehicles and Equipment		
1926.601		
Subpart P – Excavations, Trenching, Shoring		
1926.651 General Requirements		
1926.652 Protective Systems		
Subpart S – Tunnels, Shafts, Caissons, Etc.		
1926.800 Tunnels and Shafts		
1926.803 Compressed Air		
Subpart T – Demolition		
1926.850 Preparatory Operations		
1926.852 Chutes		
1926.859 Mechanical Demolition		
Subpart V – Power Transmission/Distribution		
1926.955 Overhead Lines		
Subpart X – Stairways and Ladders		
1926.1053 Ladders		
1926.1060 Training Requirements		

Figure 2-1

2.2 New Hire Orientation

2.2.1 General

The Safety Manager will be responsible to implement a program designed to ensure that each new employee will receive a thorough safety orientation, which will provide the employee with basic information regarding the safety program. It is recognized that additional safety instructions may be required at a later date in the performance of hazardous and/or unfamiliar tasks.

2.2.2 Specific Procedure

Upon arrival of a new employee to the project, the Safety Manager shall distribute a copy of this manual to the employee with instructions to thoroughly familiarize themselves with the safety and health requirements of Allied Environmental Services, Inc. The employee shall acknowledge receipt of the program, sign a statement to that effect with the statement maintained in his/her personnel record.

The New Hire Orientation process shall include review of the following topics:

- Air Support – classroom and O-J-T
- Respirators and PAPR's – Fitted by Occupational Health Clinic; classroom and O-J-T
- Torch Cutting – classroom, O-J-T or training as deemed appropriate
- Articulating Boom and Scissor Lifts – classroom, O-J-T or training as deemed appropriate
- Vacuum Truck – classroom – driving test or training as deemed appropriate
- Water Blaster – classroom , O-J-T or training as deemed appropriate
- Employer/Employee responsibilities under the OSHA Act
- Personal Protective Equipment
- Access to Medical Records
- Use of fall protection equipment and perimeter guarding
- Scaffolding
- Fire Protection
- Hand and Power Tools
- Toxic substances, where applicable
- Trenching and Excavations
- Hazard Communication/MSDS
- Material handling

2.3 Weekly Safety Training

- At the beginning of each new job a safety meeting must be held, then regularly each week thereafter.
- Fill out Safety Training Session Report. List subject(s) covered, have all in attendance sign-in (Send report to main office).
- Cover special subjects when work exercise changes might dictate, provide training for these subjects.

2.4 Heavy Equipment Training

- Backhoe classroom O-J-T
- Bobcat classroom O-J-T
- Hydro Hoe classroom O-J-T
- Bull Dozer classroom O-J-T
- Loader classroom O-J-T

All personnel assigned as trainers shall be qualified to teach and evaluate operators. Training can be modified as needed to fit schedule and experience.

2.5 Hydroblasting Safety

- Refer to the U.S. Water Jet Technology Association for safety guidance and program elements. Section 17.10.12 of this manual.

2.6 Documentation

2.6.1 General

Employee training shall be documented. Included in the documentation should be a description of the items covered in the training session, the name of the discussion leader/trainer, and an attendance roster signed by each employee in attendance. Copies of all safety-training records shall be sent to the main office for filing. Documentation shall also include results of practical training and evaluation.

DATE:_____

SAFETY TRAINING SESSION

JOBSITE:_____

SUPERVISOR:_____

TIME:_____

SUBJECT OF TRAINING SESSION:_____

THE UNDERSIGNED CERTIFY THAT THEY HAVE ATTENDED THIS SAFETY MEETING AND UNDERSTAND THE HAZARDS AND INSTRUCTIONS IT COVERED.

PRINT NAME	SIGNATURE
1.	
2.	
3.	
4.	
5.	
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12.	
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17.	
18.	
19.	
20.	
21.	

3.0 Emergency Procedures

3.1 General

Each employee should become familiar with the emergency notification procedures for the building, facility, or project where they are working:

1. Emergency telephone numbers shall be posted in a conspicuous location.
2. Employees making emergency calls should try to remain calm and be prepared to relay the following information:
   (a) Name of caller and telephone number from which the call is being made.
   (b) Type of emergency.
   (c) Location of emergency.
   (d) Severity of the emergency
3. Employees making emergency calls should not break communication until directed.
4. The main office shall be notified immediately of any accident or injury incurred in the performance of Allied Environmental Services, Inc. business.

3.2 Accident/Injury Instructions

In the event of a personal injury accident, the following shall be implemented:

- Call ambulance, if needed.
- Do any first aid that can be done on the job, if trained and willing. (Utilize universal precautions)
- Do not move the victim unless his/her life is in danger (i.e., fire, traffic, building collapse, etc…).
- Notify the Supervisor and/or Main Office.
- Take statement from injured employee as to what happened if possible.
- Take pictures of the accident/injury site immediately.
- Have witnesses to the accident write in their own handwriting what they saw.
- Complete Accident Report and fax/mail to main office immediately.

3.3 Crisis Response Checklist/Approved Media Statements

3.3.1 General

These guidelines are for use in accidents and emergencies involving company projects, workers, or equipment:

- Tell your employees only the Supervisor on site is to respond to media questions.
- Notify the General Contractor, owner, and/or Project Manager on the project about the incident.
- Use the appropriate pre-approved media statements given below.
- Set up a neutral site for the media to gather if there are many reporters on site. Do not allow reporters or any other media type personnel to enter the job-site/incident area.
- The Supervisor must remain on site during an emergency.

3.4 Emergency Action Plan

Each site shall establish a plan designed to ensure employee safety from fire and other emergencies. See Figure 3.1.

Approved Media Statements

For accidents involving injuries:

"Allied Environmental Services policy is not to comment on an accident until we have gathered all the facts. We're investigating the situation now and will keep you informed."

For accidents involving death(s):

"Naturally, we are very concerned about the people involved in this tragic event. We are busy tending to the injured. We won't be able to release any information until we have gathered all the facts. Right now we are in the process of analyzing the situation and will keep you informed."

For other contractors' accidents:
"Right now this appears to have been an accident involving another contractor on site. It's our policy not to comment on accidents involving other contractors."

Allied Environmental Services, Incorporated

Accident/Incident Report and Investigation Form

SECTION A: TO BE COMPLETED BY **PERSON INVOLVED** (or by supervisor if worker is incapacitated) AND BY THEIR **SUPERVISOR** within 24 hours of the accident/incident.

This form is to be used to report all accidents, or near misses, whether an injury occurred or not, and to document the investigation into the accidents by the supervisor of the person involved.

Please complete within 24 hours of the accident. If the accident caused, or could have caused, serious injury or property damage, please contact the main office immediately.

PERSON INVOLVED IN ACCIDENT/INCIDENT (Please print)

Last Name	First Name	Middle Initial	Date of Birth	Age
(Please check) Allied ☐ Contractor ☐ Visitor/Other ☐	Phone Number		Male ☐	Female ☐
Jobsite	Job		Employer	

DETAILS OF THE ACCIDENT: **Incident** ☐ **Near Miss** ☐ **Medical** ☐

Date: _____ Time:_____ AM/PM

Location (Please print): _____

Was the accident/incident/near miss reported to the owner? Y / N

Part of body (Check as appropriate)

Head	**Trunk**	**Internal**	**Arm**	**Hand**	**Leg**	**Foot**
☐ Eye	☐ Neck	☐ Heart	☐ Left	☐ Left	☐ Left	☐ Left
☐ Ear	☐ Hip	☐ Lungs	☐ Right	☐ Right	☐ Right	☐ Right
☐ Nose	☐ Chest	☐ Systemic	☐ Shoulder	☐ Hand	☐ Knee	☐ Great toe
☐ Mouth	☐ Stomach		☐ Upper arm	☐ Thumb	☐ Lower leg	☐ Other toes
☐ Teeth	☐ Groin		☐ Elbow	☐ Fingers	☐ Ankle	
☐ Face	☐ Back		☐ Forearm	☐ Palm	☐ Thigh	
☐ Skull	☐ Multiple		☐ Wrist		☐ Upper leg	

Nature of Injury (Check as appropriate)

☐ Abrasion	☐ Puncture	☐ Heart attack	☐ Sprain	☐ Burn	☐ Traumatic shock
☐ Bruise	☐ Laceration	☐ Hearing loss	☐ Strain	☐ Scald	☐ Electric shock
☐ Fracture	☐ Amputation	☐ Foreign body	☐ Hernia	☐ Rash	☐ Psychosocial
☐ Concussion	☐ Bite	☐ Minor Cuts		☐ Allergy	☐ Chemical
☐ Aggravation of previous injury or medical condition.					

Type of Action which caused Incident / Injury (Check as appropriate)

☐ Striking against	☐ Stumbling	☐ Lifting	☐ Pushing	☐ Ingestion
☐ Struck by	☐ Slipping	☐ Bending	☐ Pulling	☐ Absorption
☐ Caught in	☐ Tripping	☐ Twisting	☐ Jumping	☐ Inhalation
☐ Stepping on	☐ Falling	☐ Stress	☐ Motor vehicle	
☐ Other: Describe				

Agency of Incident / Injury (Check as appropriate)

☐ Vehicle	☐ Buildings	☐ Mobile	☐ Structures
☐ Power tools	☐ Furniture	☐ Other tools	☐ Surfaces
☐ Animal/Insect	☐ Heat Stress	☐ Materials	☐ Sunburn
☐ Biological Agent	☐ Chemicals	☐ Equipment	☐ Stress
☐ Objects	☐ Ionizing radiation	☐ Other	

Allied Environmental Services, Incorporated
Accident/Incident Report and Investigation Form

SECTION B: TO BE COMPLETED BY THE **SUPERVISOR** AND THE **PERSON INVOLVED** WITHIN 24 HRS

This is an extremely important section as the aim of the accident/incident investigation is to identify preventive action(s) that will avoid recurrence of a similar accident.

Probable cause or causes of Incident/Accident (Check as appropriate)

☐	Inadequate instruction	☐	Fault of equipment	☐	Poor storage	☐	Weather
☐	Inadequate workspace	☐	Equipment unavailable	☐	Poor access	☐	Terrain
☐	Assistance unavailable	☐	Lack of attention	☐	Incorrect method	☐	Work Practices

Describe the event _____

_____

_____

_____

_____

PREVENTION OF ACCIDENT/INCIDENT RECURRENCE
Describe what action is planned or has been taken to **prevent a recurrence** of the accident, based on the key contributing factors identified above. (Please print)

(Immediate) _____

(Long Term) _____

_____

TRAINING	**REQUIRED?**
Orientation	Yes / No
Task specific	Yes / No
Area specific	Yes / No

DISIPINARY ACTION
- ☐ Is required
- ☐ Is not required
- ☐ Unknown as yet
- ☐ Indicate Action Taken if any

SECTION C:

Supervisor Signature_____ Supervisor's Name_____

Person Involved Signature_____ Date_____

Safety Director Signature _____ Date _____

JOB PHONE:
JOB SUPERVISOR:

EMERGENCY ACTION PLAN

- **AFTER EVACUATION OF BUILDING, ALL WORKERS WILL MEET AT ALLIED'S FIELD OFFICE FOR A HEAD COUNT.**

- **PRIOR TO BUILDING ENCLOSURE, EXIT SAFEST MEANS POSSIBLE. MEET AT ALLIED TRAILER.**

- **AFTER BUILDING ENCLOSURE, USE EXITS MARKED AS SHOWN ON DRAWING.**

- **EACH PRIME CONTRACTOR SUPERVISOR/FOREMAN RESPONSIBLE FOR HEAD COUNT, RESCUE, MEDICAL TREATMENT OF THEIR EMPLOYEE. NOTIFY ALLIED JOB SUPERVISOR OF THE RESULTS OF THE COUNT.**

WARNING SIGNALS

TORNADO:_____

FIRE:_____

WARNING:_____

Needs to be site specific and communicated to all employees

Figure 3-1

EMERGENCY INFORMATION

POLICE

911

FIRE

AMBULANCE

911

HOSPITAL

NEAREST MEDICAL FACILITY _____
AFTER HOURS EMERGENCY _____
GENERAL CONTRACTOR _____
This is the _____job site, located at
_____in _____county.
Nearest landmark or major road is _____

Job Supervisor is: _____

Job Phone number is: _____

Supervisor's mobile phone is:_____

4.0 Medical Services

4.1 Medical Services and First Aid

4.1.1 General

Employees should become familiar with the medical services and first aid procedures for the building, facility, or project at which they are working. Refer to Subsection 3.2. Due to potential hazards associated with blood borne pathogens that cause diseases such as Hepatitis B and Aids, when administering any type of first aid, care shall be taken to limit or eliminate contact with blood and body fluids. Use of rubber gloves, goggles, safety glasses, and a specialized mask for administering CPR is recommended. Employees shall wash hands and other potentially contaminated body areas and remove all contaminated clothing immediately after administering first aid. Employees shall immediately report all exposure to blood and body fluids to their supervisor so post exposure care can be initiated.

4.1.2 Requirements

The following is a list of OSHA requirements for medical services and first aid:

- Employee medical records shall be maintained by medical professionals at Lima Memorial Occupational Health Clinic or St. Rita's Occupational Health Clinic.
- Allied Environmental Services shall maintain written opinion from a physician that an employee is capable of performing assigned duties and wear appropriate Personal Protective Equipment.
- All medical records pertaining to each employee shall be maintained for the duration of employment plus 30 years.
- The employer shall assure the availability of medical personnel for advice and consultation on matters of occupational health.
- Proper equipment for prompt transportation of the injured person to a physician or hospital or a communication system for contacting necessary ambulance service shall be provided.
- Provisions shall be made prior to the commencement of the project for prompt medical attention in case of serious injury.
- In the absence of an infirmary, clinic, hospital, or physician that is reasonably accessible in terms of time and distance to the worksite, and which is available for the treatment of injured employees, a person who has a valid certificate in first aid training from the US Bureau of Mines, the American Red Cross, or equivalent training that can be verified by documentation shall be available at the worksite to administer first aid.
- First aid supplies shall be easily accessible when required. First aid kits shall consist of appropriate items stored in a weather-proof container with the following items (per ANSI Standard Z308.1-1998):

  -Absorbent compresses
  -Adhesive bandages
  -Adhesive tape
  -Antiseptic applications
  -Burn treatment applications
  -Sterile pads
  -Medical exam gloves
  -Triangular bandage

- First aid supplies shall be inspected before being sent out to each job and weekly by the job foreman to ensure expended items are replaced.
- Proper equipment for prompt transportation of the injured person to a physician or hospital or a communication system for contacting necessary ambulance service shall be provided.

- The telephone numbers of the physicians, hospitals, or ambulances shall be conspicuously posted.
- Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use.

4.2 Back Care

4.2.1 Back Care for Lifting

The majority of back injuries that occur during lifting experiences can be avoided. Almost all lifting situations can be approached safely by following five simple "rules of lifting":

- Assess the object you are about to lift. Be certain of how you intend to lift the object. If the object is heavy or awkward, get someone to help you lift. Think before you lift!
- Bend at your knees, not your waist. Bend down with your knees and straddle the load you are about to lift. Avoid bending at the waist and keep your back straight.
- Tuck your pelvis under and firm up your stomach muscles just before you lift. Tightening the stomach muscles helps support your back.
- Hug the object you are lifting close to your body. Unnecessary and potentially dangerous amount of stress and strain are placed on your back when objects are held away from the body.
- Lift with your leg muscles. Once you have a firm grip on the object, slowly straighten your legs and feel the leg muscles doing the actual work of the lift.

The following group of lifting tips will enhance your basic lifting technique and help avoid potential back injuries:

- Never twist your body while lifting
- Make sure your walkway is clear.
- Use appropriate footwear when lifting.
- Use mechanical help or the assistance of a co-worker when necessary.
- Know where you will put the load down.
- Push, don't pull, objects across the floor.

The following, simple exercises, if done on a regular basis, will help strengthen and maintain flexibility of your back:

- Partial sit-up. Lie on your back with your legs bent. Tuck your chin in, cross your arms in a comfortable position, and tighten your stomach muscles. Slowly curl up until your shoulder blades are off the ground. Hold for five counts and slowly lie back. Repeat four to five times.
- Pelvic Tilt. Lie on your back, bend your knees, and keep your feet flat on the floor. Tighten the stomach muscles and gently press your low back on to the floor. Hold five counts and release. Repeat four to five times.

4.3 Standard Sources

Detailed requirements for medical services can be found in the following OSHA Standards:

- 29 CFR 1910.151 Medical and First Aid.
- 29 CFR 1926.50 Medical Services and First Aid.

5.0 General Safety Rules

5.1 Intent

To establish general safety rules and procedures designed to protect employees, company property, customers, and the general public. These rules are not intended to address any specific operation. Employees should become familiar with these general safety rules and any additional safety rules of our customers. Any employee who does not meet these minimum safety standards shall be subject to disciplinary action or discharge.

5.2 Accountability

All management and supervisory personnel are responsible and accountable for the effective communication and enforcement of these safety rules. Employees should understand that these rules do not cover all situations, and additional rules or variation of these rules may be required under certain circumstances.

5.3 Safety Rules Summary

The following 2 pages contain Allied Environmental Services, Inc. Mandatory Safety Rules.

Allied Environmental Services, Inc.

MANDATORY SAFETY RULES

All employees are required to know and follow the mandatory safety and health rules prior to beginning work.

- All Federal, State, and Local safety regulations will be followed at all times.
- All injuries, no matter how slight, must be reported to your supervisor immediately. Workers shall not attempt to treat themselves or others in the event of an injury. (includes removal of foreign matter from the eyes)
- Fighting, gambling, horseplay and other misconduct are not permitted, nor shall threatening another employee be tolerated.
- The use, or possession of, intoxicants, or drugs on the job are prohibited. Any employee suspected of being intoxicated or under the influence of intoxicants or drugs will not be allowed to work and will be removed from the site.
- Hard-hats are required to be worn at all times unless specifically waived by the project manager and supervisor.
- Safety glasses with side shields are required on all jobsites.
- The appropriate specific face and eye protection shall be worn for the task being performed.
- Hearing protection will be required when exposed to noise levels at or above 90 dbA or if customer required. (rule of thumb – if you have to raise your voice to be heard - you need hearing protection)
- 100% fall protection is required for work at heights of 6 feet or greater unless otherwise exempted from this requirement such as steel erection connectors etc.
- Proper tie-off when working in a JLG or other articulating equipment.
- Be alert for and heed all warning signs at all times.
- Keep clear of all equipment. Avoid pinch points and blind areas. Be alert to and avoid swinging or suspended loads.
- Maintain good housekeeping at all times. Keep waste, debris, and rubbish cleaned up. Place all papers, wrappers, cups, cans, and other litter in trash receptacles. Discard and/or store all oily rags, waste and similar combustible materials in metal containers provided for that purpose.
- Riding loads, slings, the ball, hook, bucket, or forks or other material hoisting equipment is strictly prohibited.
- Guardrails on scaffolds or other elevated work platforms must be installed and maintained to protect personnel.
- Never enter a confined space without atmospheric testing, and obtaining proper permits.
- Follow all established rules and regulations regarding trenching and excavation activities.

- Always use safe and proper means to access elevated work areas and scaffolds. Do not use guardrails or unsecured ladders of insufficient length or type for the situation. Always follow the 3-point contact rule when climbing ladders or accessing elevated areas.

- Insure all power tools are sufficiently guarded and grounded, GFCI protected, and all cords and cord sets are in good condition.

- Obtain necessary permits governing hot work operations as well as following established procedures such as fire protection and prevention as applicable before beginning any hot work activities.

- Never ignore or remove red barricade tape and understand the hazard before entering any yellow barricaded area.

- Never operate tools or equipment unless you have been properly trained in their use or operation.

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

- Safety devices are for your protection. Never operate any machine unless all guards and safety devices are in place. Do not tamper with electrical, air or water lines or any other equipment or machinery unless it is within the scope of your duties, or you have been instructed to do so. All power equipment will be disconnected while being repaired.

- Bracelets, key chains, watch chains, etc., shall not be worn, as these items might catch in machinery.

- Never stand or walk under a crane, backhoe or hoist load.

- Do not use compressed air to clean clothing or person. Use only on work object.

- Do not attempt to lift or push objects that may be too heavy for you. Ask for help when you need it. Learn to lift the right way, keep your body erect, and push upward with your legs.

- If you are working where there are safety hazards (heavy fumes, vapors, dust, etc.), you must wear appropriate personal protective equipment (respirators, safety glasses, hard hats, etc.).

- Learn the location and proper use of fire fighting equipment.

- When on a job site, all client safety rules in addition to Allied Environmental Services' rules and procedures will be enforced.

5.4 Safety and Health Violations and Discipline

If Allied Environmental Services, Inc. or a customer's safety and health rule or policy is violated, the employee shall receive a written reprimand with the original maintained in the employee's personnel record. A copy shall be given to the employee for his/her records. Use of the Record of Reprimand located on the following page is recommended. The Operations Manager is responsible for initiating this process if needed.

RECORD OF REPRIMAND

_____ _____

Employee Name Job Site

_____ _____

Date Time

_____

VIOLATION

- ☐ Working in elevated areas, in excess of 6 feet, without a full body harness and/or tied off.
- ☐ Entering a confined space without proper testing of the atmosphere & required permits not obtained.
- ☐ Working in a JLG or other articulating equipment without proper tie off.
- ☐ Riding on the forks of a forklift.
- ☐ Working under a suspended load without blocking
- ☐ Failure to install guardrails on scaffold or other elevated work areas
- ☐ Climbing on guardrails to access scaffold.
- ☐ Attempting to work under the influence of drugs, alcohol, or both.
- ☐ Horseplay, fighting or gambling
- * ☐ Any other acts that pose significant risks to workers on site

VIOLATION

- ☐ Use of a power tool without proper guards
- ☐ Using an electrical extension cord with the ground prong missing.
- ☐ Transporting tools or materials in your hands while climbing a ladder.
- ☐ Failure to use a GFCI while using electrical powered tools.
- ☐ Use of any equipment without adherence to the operating procedures governing such equipment.
- ☐ Ignoring or removing red barricade tape.
- ☐ Failure to use personal protective equipment as required for the job.
- ☐ Welding or cutting without a fire watch, or a fire extinguisher. Welding or cutting without a permit when required by the site.
- ☐ Failure to inform your supervisor of an accident, injury, or near miss.
- ☐ Intentional disregard for company and owner safety rules and goals.

Has Employee been warned about this action before?

Yes No

If yes, type Verbal Written

Issued By: _____Date of Previous Warning_____

* Comments:_____

_____

_____

_____

My signature hereupon does not necessarily signify my agreement with the above but attests that I have read & understand the serious nature of this report. A repetition of this action(s) or action(s) of a similar nature may result in more serious corrective action and/or termination of employment.

Employee Signature: _____

Supervisor Signature:_____

5.4.1 Progressive Discipline Policy

The purpose of this policy is to state Allied's position on administering equitable and consistent discipline for unsatisfactory conduct in the workplace. The best disciplinary measure is the one that does not have to be enforced and comes from good leadership and fair supervision at all employment levels.

Allied's own best interest lies in ensuring fair treatment of all team members and in making certain that disciplinary actions are prompt, uniform, and impartial. The major purpose of any disciplinary action is to correct the problem, prevent recurrence, and prepare the team member for satisfactory service in the future.

Although employment with Allied is based on mutual consent and both the team member and Allied have the right to terminate employment at will, with or without cause or advance notice, Allied may use progressive discipline at its discretion.

Disciplinary action may call for any of four steps -- verbal warning, written warning, suspension with or without pay, or termination of employment -- depending on the severity of the problem and the number of occurrences. There may be circumstances when one or more steps are bypassed.

Progressive discipline means that, with respect to most disciplinary problems, these steps will normally be followed: a first offense may call for a verbal warning; a next offense may be followed by a written warning; another offense may lead to a suspension; and, still another offense may then lead to termination of employment. Warnings will be maintained in a team member's personnel folder.

Allied recognizes that there are certain types of team member problems that are serious enough to justify either a suspension, or, in extreme situations, termination of employment, without going through the usual progressive discipline steps.

While it is impossible to list every type of behavior that may be deemed a serious offense, the Employee Conduct and Work Rules policy includes examples of problems that may result in immediate suspension or termination of employment. However, the problems listed are not all necessarily serious offenses, but may be examples of unsatisfactory conduct that will trigger progressive discipline.

By using progressive discipline, we hope that most team member problems can be corrected at an early stage, benefiting both the team member and Allied. Any team member that feels discipline they received was not just, has the right to contact Human Resources for a meeting to be scheduled with the Project Manager and/or the C.E.O. in attendance.

To ensure orderly operations and provide the best possible work environment, Allied expects team members to follow rules of conduct that will protect the interests and safety of all team members and the organization.

It is not possible to list all the forms of behavior that are considered unacceptable in the workplace. The following are examples of infractions of rules of conduct that may result in disciplinary action, up to and including termination of employment:

* Violation of Federal or State EPA regulations
* Working under the influence of alcohol or illegal drugs
* Fighting or threatening violence in the workplace
* Insubordination or other disrespectful conduct
* Violation of safety or health rules

* Removing **any** customer property from a job site

Safety violations include:
* Failure to follow verbal or written safety procedures, guidelines and rules
* Horseplay
* Failure to wear selected PPE
* Abuse of PPE

The Allied disciplinary program shall be enforced by the Project Managers, Superintendents, and Safety Program Director. Upon issuance of a violation associated with the safety program, a meeting shall be held with the employee(s), managers and Safety Director to discuss the infraction and inform the employee(s) of the rule or procedure that was violated and the corrective action to be taken.

Allied is committed to achieving safety goals. Physical inspections by company officials that indicate violations showing overall lack of commitment to company safety goals shall be held to the same level of disciplinary actions.

6.0 Medical Records - Exposure Monitoring and Measurement

- Recordkeeping
  - Results and records of any personal or area environmental and/or biological monitoring shall be maintained by the Allied Industrial Hygienist. Employees shall be informed of monitoring results in writing or posted on the bulletin board. Records of employee exposure monitoring shall be maintained by Allied Environmental Services, Inc. for 30 years. Specific record keeping requirements are also found in specific sections of this manual for hazardous chemicals and exposures.
- Access to Medical and Exposure Records
  - Employees and their authorized representatives shall have access to all records pertaining to medical examinations and exposure monitoring. Access shall be provided within 15 days. If access to records cannot reasonably be provided within fifteen (15) working days, Allied shall (within the fifteen (15) working days) apprise the employee or designated representative requesting the record of the reason for the delay and the earliest date when the record can be made available.
  - Copies of medical and exposure records shall be provided to the employee at no cost.
  - If full or portions of records of employees are requested to anyone other than the employee or his/her authorized representative, the following shall be removed or redacted from the copied record: name, address, social security number, payroll number, exact age, height, weight, race, sex, date of initial employment, and job title.
  - As indicated in other areas of this manual, employees shall be informed of their access to medical an exposure records upon hire and annually thereafter. Sign-In sheets of this orientation and training shall be maintained by the Safety Manager.
  - If Allied Environmental Services is ceasing or ceases to do business, Allied shall transfer all records subject to this safety manual and section to the successor employer. If Allied either is ceasing to do business and there is no successor employer to receive and maintain records,, or intends to dispose of any records required to be preserved for at least thirty (30) years, Allied shall notify affected current employees of their rights of access to records at least three (3) months prior to the cessation of the employer's business.

6.1 Air Sampling Types and Collection Methods

6.1.1 Many different air monitoring methods, utilizing a wide variety of media, are currently available for most agents. The National Institute of Occupational Safety and Health (NIOSH) has developed, over a number of years, a list of accepted monitoring methods which can be found in the NIOSH Manual of Analytical Methods.

6.1.2 Choosing an appropriate monitoring method should be a result of multifactorial consideration. A careful investigation must be made to avoid any media cross-sensitivity with other agents present. When results are needed in a short time period, such as during a process shut-down or an emergency response, direct-reading methods are preferable, provided such a method is available. Otherwise, an approved monitoring method, as listed in the NIOSH Manual, should be used if available. Many new monitoring methods have emerged recently, however, that have not yet been tested by NIOSH.

6.1.2.1 Air Sampling - Detector Tubes

A number of types of air sampling are currently available for use. The most pervasive of these is detector tube sampling. A wide array of detector tubes of two basic types, short-term grab sampling tubes and long-term passive diffusion tubes are available for use. Detector tubes have a higher degree of variance in their measurements, as they are affected by temperature, humidity and barometric pressure. They are, however, entirely acceptable for all but a few monitoring situations. They are particularly useful when an immediate determination is necessary. For this use, the short-term grab sampling tube is appropriate. Passive diffusion tubes, on the other hand, provide a longer term time-weighted average measurement without necessitating laboratory analysis.

6.1.2.2 Air Sampling - Active Pump

Active pump sampling is the second most common monitoring type utilized. This sampling type is utilized only by trained personnel, and is favored above detector tube sampling when a higher degree of accuracy is preferred for long-term sampling. Agents measured using an air sampling pump include such agents as respirable and total dust, metals, Asbestos, and volatile organics. Air sampling pumps are used in both low and high flow versions, and their use is determined by the specifications of the collection media and the monitoring method.

Filter cassettes employ filter media such as Cellulose Ester and PVC. Whether in the regular form used for asbestos and metals sampling, or in the pre-weighed or matched-weight form used for gravimetric determinations such as respirable and total dust sampling, they typically require the use of a high flow pump. Specific flow rates and volumes can be found under the specific monitoring method in the NIOSH Manual of Analytical Methods.

Adsorbent media, such as Charcoal tubes, used in sampling for volatile organics, and Orbo 23 tubes (XAD-2 resin), typically require the use of a low flow pump. Again, specific flow rates and volumes are dictated by the NIOSH Manual of Analytical Methods.

6.1.2.3 Air Sampling - Pump Calibration

Calibration of air-sampling pumps is an integral part of the accurate measurement of air flow rate and volume. Calibration of air sampling pumps is performed both immediately before and after sampling, using an electronic bubble meter which is considered a primary standard. The average of three readings is recorded each time. Each pump is also periodically sent to the manufacturer for cleaning and refurbishing.

6.1.2.4 Air Sampling - Electrochemical Sensor Equipment

Air monitoring with the use of electronic equipment, utilizing electrochemical sensor technology, can also be utilized. These are found in three basic types including direct-reading personal warning devices such as the Monitox or MSTox, direct-reading devices such as the Aim 4500, and real-time monitoring devices such as the Toxilog and STX70. They are not designed to be used as survey tools.

The real-time monitoring devices are utilized only by trained personnel to determine both short-term and long-term exposures to airborne contaminants.

6.1.2.5 Air Sampling - Calibration of Electrochemical Sensor Instruments

Calibration of instruments containing electrochemical sensors is performed by utilizing a known concentration of calibration gas. The frequency of calibration and concentration of calibration gas is according to specific manufacturer recommendations. As each sensor has a finite life, calibration is typically performed less frequently than an air sampling pump, often monthly. Each instrument is also periodically sent to the manufacturer for calibration, cleaning and refurbishing.

6.2 Hearing Conservation and Noise Control

High levels of noise are prevalent in most industrial settings. Common sources of noise include continuous sources, such as compressors, pumps, agitating screens, high pressure gases, as well as intermittent sources such as steam purges, relief valves and power tools.

6.2.1 Noise Measurement – Sound Level Meters

Measurement of noise involves two basic instruments, the Sound Level Meter and the Noise Dosimeter. Each has its advantages and specific uses.

Sound level meters are most helpful in outlining the noise topography of an operating area and in identifying specific point sources. Several types of sound level meters are available, ranging from a basic meter to an octave band analyzer. The octave band analyzer, a specialized sound level meter, can determine where noise energy lies in the frequency spectrum. This information is extremely useful when engineering controls are designed.

Calibration of sound level meters is performed using an accompanying sound generating calibrator before each use according to manufacturer's recommendations. The meters and calibrators are also periodically sent to the manufacturer for calibration and cleaning.

Sound level surveys of each operating unit are performed whenever there are changes in process or equipment affecting noise levels, or when engineering controls are planned.

Noise Dosimeters

Sound level surveys provide an overall picture of the noise environment in which an employee works. They do not, however, fully reflect the actual noise experience of a mobile employee. Therefore, noise dosimetry is also performed for each job title to initially establish personal exposure at that job, and intermittently thereafter, and whenever changes in process or equipment occur, as required by OSHA's Occupational Noise Standard. As with a sound level meter, noise dosimeters are calibrated before each use using an accompanying sound generating calibrator according to manufacturer’s recommendations.

The Occupational Safety and Health Administration (OSHA) Occupational Noise Exposure standard 29 CFR 1910.95 establishes a permissible exposure limit (PEL) for occupational noise

exposure, and requirements for audiometric testing, hearing protection, and employee training if those sound levels are exceeded. This regulation defines an "action level" (AL) as a "dose" of 50%, which is equivalent to an eight-hour time weighted average of 85 dBA. When noise levels exceed this amount, an effective hearing conservation program is required, which includes as a minimum:

Requirement	**Section**
1. Noise monitoring	29 CFR 1910.95(d)(e)(f)
2. Audiometric testing	29 CFR 1910.95(g)(h)
3. Hearing protectors	29 CFR 1910.95(i)(j)
4. Education and training	29 CFR 1910.95(k)(1)
5. Recordkeeping	29 CFR 1910.95(m)

Note: The OSHA regulation only indicates a minimum level of hearing protection and focuses on permanent hearing loss. Short durations of noise, especially sharp bursts of noise at these levels can not only induce hearing loss but can also affect an employee's health and safety in other.

- Occupational noise can cause hearing loss, and increase the worker's susceptibility to other workplace problems including physical and psychological disorders, interference with speech and communication, and disruption of job performance associated with excessive noise intensities. This exposure to noise produces hearing loss of a neural type involving injury to the inner ear hair cells. The loss of hearing may be temporary or permanent. Brief exposure causes a temporary loss. Repeated exposure to high noise levels will cause a permanent loss.

- Permanent hearing loss is preventable with the continued use of proper hearing protection and reduction of workplace noise levels to below 85 decibels. This will benefit not only employees who can listen and communicate well throughout there lifetimes, but also helps the employer in terms of reduced exposure to hearing loss compensation claims and a potential for increased general safety and job performance.

- The project manager and site superintendents shall ensure the program elements of this process are implemented and maintained.

o Administrative responsibilities include:

  - Coordination and supervision of noise exposure monitoring.
  - Identification of employees to be included in the Hearing Conservation Program.
  - Coordination and supervision of audiometric testing program.
  - Supervision of hearing protector selection.
  - Development of policies relating to the use of hearing protectors.
  - Supervision of employee training programs.
  - Coordination and supervision of required recordkeeping.
  - Periodic evaluation of overall program.
  - Coordination of required changes/improvements in the program.

Noise Monitoring

When information indicates that any employee's exposure may equal or exceed an 8-hour time-weighted average of 85 decibels, the employer shall develop and implement a monitoring program. Allied Environmental Services has developed this program to meet the requirements of 29 CRF 1910.95.

Allied Environmental Services shall identify employees for inclusion in the hearing conservation program and to enable the proper selection of hearing protectors.

All continuous, intermittent and impulsive sound levels from 80 decibels to 130 decibels shall be integrated into the noise measurements.

Instruments used to measure employee noise exposure shall be calibrated to ensure measurement accuracy.

Monitoring shall be repeated whenever a change in production, process, equipment or controls increases noise exposures to the extent that:

- Additional employees may be exposed at or above the action level; or
- The attenuation provided by hearing protectors being used by employees may be rendered inadequate to meet the requirements of this program.

Allied Environmental Services shall notify each employee exposed at or above an 8-hour time-weighted average of 85 decibels of the results of the monitoring.

Allied Environmental Services shall provide affected employees or their representatives with an opportunity to observe any noise measurements conducted.

Monitoring will be coordinated by the project manager with assistance from the site superintendent.

6.2.3 Audiometric Testing

Allied Environmental shall establish and maintain audiometric testing by making audiometric testing available to all employees whose exposures equal or exceed an 8-hour time-weighted average of 85 decibels.

The program shall be provided at no cost to employees.

Audiometric tests shall be performed by a licensed or certified audiologist, otolaryngologist, or other physician, or by a technician who is certified by the Council of Accreditation in Occupational Hearing Conservation, or who has satisfactorily demonstrated competence in administering audiometric examinations, obtaining valid audiograms, and properly using, maintaining and checking calibration and proper functioning of the audiometers being used. A technician who operates microprocessor audiometers does not need to be certified. A technician who performs audiometric tests must be responsible to an audiologist, otolaryngologist or physician.

Baseline audiogram
Within 6 months of an employee's first exposure at or above the action level, the employer shall establish a valid baseline audiogram against which subsequent audiograms can be compared. The employee shall not be exposed to workplace noise levels for a minimum of 14 hours prior to this baseline audiogram.

Annual audiogram
Audiograms will be conducted at least annually after obtaining the baseline audiogram for each employee exposed at or above an 8-hour time-weighted average of 85 decibels.

Allied Environmental Services administrative staff will maintain a record of all employee audiometric test records. This record will include:

- Name and job classification of the employee.
- Date of the audiogram.
- The examiner's name.
- Date of the last acoustic or exhaustive calibration of the audiometer.
- Employee's most recent noise exposure assessment.

6.2.4 Audiometric Evaluation

Each employee's annual audiogram will be compared to his/her baseline audiogram by qualified evaluator to determine if a Standard Threshold Shift (STS) has occurred. This comparison may be done by a technician.

A Standard Threshold Shift is defined by OSHA as a change in hearing threshold relative to the baseline of an average of 10dB or more at 2000, 3000, and 4000 Hz either ear.

In determining if a Standard Threshold Shift has occurred, an allowance can be made for the contribution of aging (presbycusis).

The audiologist, otolaryngologist, or physician shall review problem audiograms and shall determine whether there is a need for further evaluation. The employer shall provide to the person performing this evaluation the following information:

- A copy of the requirements for hearing conservation as set forth in the standard.
- The baseline audiogram and most recent audiogram of the employee to be evaluated.
- Measurements of background sound pressure levels in the audiometric test room.
- Records of audiometer calibrations
- If the annual audiogram shows that an employee has suffered a standard threshold shift, the employer may obtain a retest within 30 days and consider the results of the retest as the annual audiogram.
- Unless a physician determines that the standard threshold shift is not work related or aggravated by occupational noise exposure, the employer shall ensure that the following steps are taken when a standard threshold shift occurs:

    - Employees not using hearing protectors will be trained, fitted, and required to use hearing protectors if they are exposed to an 8 hour TWA average sound level of 85 decibels or greater.
    - Employees already using hearing protectors shall be re-trained, refitted, and required to use hearing protectors and provided with hearing protectors offering greater attenuation if necessary.
    - The project manager will inform the employee, in writing, within 21 days of this determination, of the existence of a permanent Standard Threshold Shift. A copy of the STS letter will also be sent to the employee's superintendent.
    - The project manager will counsel the employee on the importance of using hearing protectors and refer the employee for further clinical evaluation if necessary.

Persistent significant threshold shifts must be entered on the OSHA 300 Log if determined to be work related.

If subsequent audiometric testing of an employee whose exposure to noise is less than an 8-hour TWA of 90 decibels indicates that a Standard Threshold Shift is not persistent, the project manager:

- Shall inform the employee of the new audiometric interpretation.
- May discontinue the required use of hearing protectors for that employee.

6.2.5 Hearing Protection

The project site superintendent shall ensure that hearing protectors are worn:

- By any employee who is subjected to sound levels equal to or exceeding an 8-hour TWA of 90 decibels.

- By any employee who has experienced a persistent Standard Threshold Shift and who is exposed to 8-hour TWA of 85 decibels or greater.
- By any employee who has not had an initial baseline audiogram and who is exposed to 8-hour TWA of 85 decibels or greater.

Employees will be given the opportunity to select their hearing protectors from a variety of suitable hearing protectors at no cost to them.

The site superintendent will provide training in the use and care of all hearing protectors.

The site superintendent will ensure proper initial fitting and supervise the correct use of all hearing protectors.

Employees will be held accountable for not properly using and maintaining the equipment furnished.

The project manager will evaluate the attenuation characteristics of the hearing protectors to ensure that a given protector will reduce the individual's exposure to the required decibels:

- If the 8-hour TWA is over 90 decibels, then the protector must attenuate the exposure to at least an 8-hour TWA of 90 decibels or below.
- If the protector is being worn because the employee experienced a Standard Threshold Shift, then the protector must attenuate the exposure to a 8-hour TWA of 85 decibels or below.
- If employee noise exposures increase to the extent that the hearing protectors provided may no longer provide adequate attenuation, the employee will be provided more effective hearing protectors.

It is the responsibility of the supervisor to ensure that hearing protectors are worn by all employees who are exposed to noise levels at or above an eight hour TWA of 90 decibels or if the employee experienced a permanent STS or has not yet had a baseline audiogram.

6.2.6 Employee Training

An annual training program for each employee included in the hearing conservation program will be conducted by Allied Environmental Training Coordinator and will include information on:

- The effects of noise on hearing.
- The purpose and use of hearing protectors.
- The advantages, disadvantages, and attenuation of various types of protection.
- Instruction in the selection, fitting, use and care of protectors.
- The purpose of audiometric testing and an explanation of the test procedures.

Ensure documentation of the training dates and the employees in attendance.

Information provided in the training program shall be updated to be consistent with changes in protective equipment and work processes.

6.2.7 Recordkeeping

Noise exposure measurement records will be retained for two years.

Audiometric test records will be retained for the duration of the affected workers employment plus thirty years.

All records required by this program shall be provided upon request to employees, former employees, and representatives designated by the individual employee.

6.2.8 Program Evaluation

At least annually, the Hearing Protection Program will be evaluated by Allied Environmental Services professional staff. After the evaluation, the changes/revisions to the program deemed necessary will be made as soon as possible.

Permissible Noise Exposures
29 CFR 1910.95 Table G-16(a)

Duration (Hours)		**Sound Level Slow Response**
32.0		80
27.9		81
24.3		82
21.1		83
18.4		84
16.0		as
13.9		86
12.1		87
10.6		88
9.2		89
8.0		90
7.0		91
6.2		92
5.3		93
4.6		94
4.0		95
3.5		96
3.0		97
2.6		98
2.3		99
2.0		100
1.7		101
1.5		102
1.4		103
1.3		104
1.0		105
0.87		106
0.76		107
0.66		108
0.57		109
0.5		110
0.44		111
0.38		112
0.33		113
0.29		114
0.25		115
0.22		116
0.19		117
0.16		118
0.14		119
0.125		120
0.11		121

0.095		122
0.082		123
0.072		124
0.063		125
0.054		126
0.047		127
0.041		128
0.036		129
0.031		130

6.3 Heat Stress

6.3.1 Heat stress, the total heat load imposed upon the body, is caused by the interaction of metabolic heat production with a number of environmental factors, including air temperature and movement, water vapor pressure, and radiant heat. Metabolic heat is produced through physical work, and is affected by clothing. Heat stress evaluations should take into account all of these factors.

6.3.2 The WBGT Index should be used as a measure of heat stress. This index has the official sanction of both the American Conference of Governmental Industrial Hygienists (ACGIH) and National Institute of Occupational Safety and Health (NIOSH), and is used by comparing with permissible heat exposure Threshold Limit Values (TLVs) found in the ACGIH TLV documentation.

6.3.3 When unacceptable levels of heat stress occur, four approaches are available, including, acclimatization, clothing or equipment modification, work modification and environment modification. Work modification is the most common method primarily utilized which involves shortened heat exposure time. This can also be augmented, if necessary, with the use of body cooling equipment. Maintenance and spill clean-up activities, utilizing various levels of protective equipment, usually create situations where heat stress is a factor.

6.4 Illumination

6.4.1 The primary purpose of ensuring adequate industrial lighting is to promote safe, comfortable, efficient work performance. Proper lighting is necessary to avoid fatigue, excessive eye strain, headaches, and other symptoms, especially in individuals with astigmatisms and other eye defects.

6.4.2 While lighting should be bright enough for easy sight, it should also be directed so that it does not create glare. Glare is brightness within the field of vision that causes discomfort or interferes with vision. In order to avoid glare, the source of light should be kept well above the field of vision, or shielded with opaque or translucent material.

6.4.3 Illumination is generally measured in foot-candles using a foot-candle meter or light meter. Recommendations for illumination levels and brightness ratios for manufacturing and service industries can be found in the ANSI Standard RP7-1983, as well as in ACGIH documents.

6.5 Sampling Strategy

6.5.1 Effective evaluation of environmental stressors involves not only the identification of the stressors themselves and the appropriate monitoring method, but also the determination of an appropriate sampling strategy.

Sampling strategy outlines the number and type of samples and is designed with an overall goal. The overall goal may be to identify the point source(s) of a particular exposure, or it may be to develop an overall picture of the day-to-day exposure variation. It may involve only a particular person, a group of people within a job title, or simply a general area. The strategy may be highly defined by governmental regulations, or it may be more free form.

6.5.2 Exposure Characterization

When an overall characterization of exposure is desired, repeated measurements should span some length of time sufficient to capture normal high and low exposure events.

6.5.3 Point Source Identification

When the minimum sample set is completed, several exposures may be highlighted for further investigation. Often, at this juncture, one or more point sources are suspected. Confirmation may be obtained through directed area sampling near the suspected source(s), with the intent of capturing the "worst-case" scenario.

6.5.4 Sample Type

The number and type of samples collected depends, to a large extent, upon the operations being studied and the type of TLV involved. A stressor may have a TLV which is a time-weighted average (TWA), a ceiling value, or both.

6.5.4.1 TWA Standards

Exposure variation should be considered when measuring a stressor with an 8-hour TWA Standard, or other full shift standard. Consecutive samples comprising a full period are considered most desirable by NIOSH, from a statistical point of view, and may be required to prevent overloading of the collection media. However, if appropriate sampling and analytical methods are available, one 8-hour sample is essentially as good. Grab sampling is least desirable in estimating an 8-hour TWA exposure.

6.5.4.2 Ceiling Standards

Exposure measurements for Ceiling or Short-Term Exposure Limit (STEL) Standards should differ in several respects. Firstly, all available process knowledge should be utilized to obtain samples during periods of maximum expected concentration of agent under consideration. Secondly, the sampling time should be much shorter with a maximum of 15 minutes. A series of grab samples, totaling 15 minutes, is appropriate.

Occasionally, a STEL may be defined as occurring over an averaging period of 30 minutes by OSHA or ACGIH. If this is the case, a series of grab samples totaling 30 minutes is appropriate.

Grab sampling may be accomplished manually, as with detector tubes, or automatically as with a direct-reading instrument which averages the sum of readings over the 15 or 30 minutes.

6.5.4.3 Bulk Sampling

Bulk sampling is used when the composition of an unknown material must be determined. The size of the sample is determined by the analytical laboratory. A majority of the bulk samples collected are suspected of containing either asbestos

or lead. These samples should only be collected by individuals certified and licensed for asbestos or lead sampling, using commonly accepted sampling protocols and techniques.

7.0 Occupational Health

7.1 Blood Borne Pathogens

By the nature of Allied Environmental Services, Inc work, the probability of employee exposure to blood borne pathogens that cause diseases such as Hepatitis B and Aids is minimal. However, some employees may be subject to exposure when administering first aid or if working at a health care facility, industrial facility or other such facilities. Employees administering first aid shall refer to Subsection 3.2. Whenever a risk is present, employees shall notify their supervisor and may also obtain a copy of the company's Hazard Control Plan. Employees who assist in administering first aid on the job site will be given the opportunity to receive HIV serological testing and/or the opportunity to be vaccinated with Hepatitis B vaccine, at no charge. See Figure 7-2. Training for blood borne pathogens shall be conducted annually. Exposure determinations shall be made on a case by case basis by the Operations Manager. Universal precautions shall be utilized at all times in the event of potential exposure.

The purpose of this exposure control plan is to eliminate or minimize employee occupational exposure to blood or other infectious body fluids. Other potentially infectious body fluids include: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, and any body fluid visibly contaminated with blood.

RESPONSIBILITY:
Supervisors and foremen shall be responsible for ensuring their employees comply with the provisions of this plan. Allied Environmental Services, Inc., is responsible for providing all necessary supplies such as personal protective equipment, soap, bleach, Hepatitis B vaccinations, etc. The Operations Manager shall be responsible for training employees and for arranging for disposal of bio-hazardous waste contained in biohazard bags. It is the responsibility of the employees to follow the procedures outlined in this program.

EXPOSURE CONTROL PROGRAM - ENGINEERING AND WORK PRACTICE CONTROLS:
Universal precautions will be observed by all employees in order to prevent contact with blood or other potentially infectious materials. All blood or other potentially infectious materials will be considered infectious regardless of the perceived status of the source individual.

Engineering and work practice controls will be utilized to eliminate or minimize exposure to employees working at Allied Environmental Services, Inc.

1. Employees must wash their hands or other skin with soap and water, or flush mucous membranes with water, as soon as possible following an exposure incident (such as a splash of blood to the eyes). **
2. Employees must wash their hands immediately (or as soon as feasible) after removal of gloves or other personal protective equipment.**
   Employees shall familiarize themselves with the nearest hand washing facilities for the areas in which they work. **(If hand washing facilities are not available, Allied Environmental will provide either an antiseptic cleanser in conjunction with clean cloth/paper towels or antiseptic towelettes. If these alternatives are used, then the hands are to be washed with soap and water as soon as feasible.)
3. No eating, drinking, smoking, applying cosmetics or lip balm, or handling contact lenses is allowed in a work area where there is a reasonable likelihood of occupational exposure.
4. Employees must perform all procedures involving blood or other potentially infectious materials in such a manner as to minimize splashing, spraying, splattering, and generation of droplets of these substances.

HOUSEKEEPING:
Decontamination will be accomplished by utilizing the following materials:

a. 10% (minimum) solution of chlorine bleach
b. Lysol or other EPA-registered disinfectants

- All contaminated work surfaces, tools, objects, etc. will be decontaminated immediately or as soon as feasible after any spill of blood or other potentially infectious materials. The bleach solution or disinfectant must be left in contact with contaminated work surfaces, tools, objects, or potentially infectious materials for at least 10 minutes before cleaning.
- Equipment that may become contaminated with blood or other potentially infectious materials will be examined and decontaminated before servicing or use.
- Broken glassware will not be picked up directly with the hands. Sweep or brush material into a dustpan.
- When containers of contaminated materials are being moved from the area of use or discovery, the containers shall be closed immediately before removal or replacement to prevent spillage or protrusion of contents during handling, storage, transport, or shipping.
- Reusable containers shall not be opened, emptied, or cleaned manually or in any other manner that would expose employees to the risk of percutaneous injury.

OTHER REGULATED WASTE AND LABELS:
Other regulated waste shall be placed in containers that are closable, constructed to contain all contents and prevent leakage of fluids during handling, storage, transportation or shipping.

The waste must be labeled or color-coded and closed before removal to prevent spillage or protrusion of contents during handling, storage, or transport.

Biohazard bags and labels can be obtained by contacting the Operations Manager. Typical biohazard labels/signs are presented below.

LAUNDRY PROCEDURES:
Laundry contaminated with blood or other potentially infectious material will be handled as little as possible. Such laundry will not be sorted or rinsed in the area of use.

The Operations Manager shall coordinate cleaning or disposal of contaminated laundry.

PERSONAL PROTECTIVE EQUIPMENT:
Where occupational exposure remains after institution of engineering and work controls, personal protective equipment shall also be utilized.

Allied Environmental will provide gloves, face shields, masks, eye protection, and aprons at no cost to employees. Allied will replace or repair personal protective equipment as necessary at no cost to employees.

All personal protective equipment will be chosen based on the anticipated exposure to blood or other potentially infectious materials. The protective equipment will be considered appropriate only if it does not permit blood or other potentially infectious materials to pass through or reach the employee's clothing, skin, eyes, mouth, or mucous membranes under normal conditions of use and for the duration of time for which the protective equipment will be used.
Employees must:
- Utilize protective equipment in occupational exposure situations.
- Remove garments that become penetrated by blood or other potentially infectious material immediately or as soon as feasible.

- Remove all personal protective equipment before leaving the work area.
- Place all garments in the appropriate designated area or container for storage, cleaning, decontamination, or disposal.

HEPATITIS B VACCINE:
The Hepatitis B vaccination shall be made available after the employee has received the training in occupational exposure and within 10 working days of initial assignment. It shall be made available to all employees who have potential occupational exposure unless the employee has previously received the complete Hepatitis B vaccination series, antibody testing has revealed that the employee is immune, or the vaccine is contraindicated for medical reasons.

If the employee initially declines Hepatitis B vaccination, but at a later date decides to accept the vaccination, the vaccination shall then be made available.

All employees who decline the Hepatitis B vaccination offered shall sign the OSHA-required waiver indicating their refusal. (See Section 7.0)

If a routine booster dose of Hepatitis B vaccine is recommended by U.S. Public Health Service at a future date, such booster doses shall be made available at no cost to the employee.

The vaccine shall also be offered to Allied Environmental emergency / first aid responders.

POST-EXPOSURE EVALUATION AND FOLLOW-UP:
All exposure incidents shall be reported, investigated, and documented. When the employee incurs an exposure incident, it shall be reported immediately to their supervisor.
Following a report of an exposure incident, the affected employee should be directed to a medical facility for at least the following elements:

1. Documentation of the route(s) of exposure.
2. A description of the circumstances under which the exposure occurred.
3. The identification and documentation of the source individual. (The identification is not required if the employer can establish that identification is impossible or prohibited by state or local law.)
4. The collection and testing of the source individual's blood for HBV and HIV serological status.
5. Post-exposure treatment for the employee, when medically indicated in accordance with the U.S. Public Health Service.
6. Counseling.
7. Evaluation of any reported illness.

The Healthcare professional evaluating an employee will be provided with the following information:

1. A copy of this plan.
2. A copy of the OSHA Bloodborne Pathogen regulations (29 CFR 1910.1030)
3. Documentation of the route(s) of exposure.
4. A description of the circumstances under which the exposure occurred.
5. Results of the source individual's blood testing, if available.
6. All medical records applicable to treatment of the employee, including vaccination status.

The employee will receive a copy of the evaluating healthcare professional's written opinion within 15 days of the completion of the evaluation.

The healthcare professional's written opinion for Hepatitis B vaccination is limited to the following: (1) whether the employee needs Hepatitis B vaccination; (2) whether the employee has received such a vaccination. The healthcare professional's written opinion for post-exposure evaluation and follow-up is limited to the following information:

1. That the employee was informed of the results of the evaluation.
2. That the employee was informed about any medical conditions resulting from exposure to blood or other infectious materials that require further evaluation or treatment.

All other findings or diagnoses will remain confidential and will not be in a written report.
All medical evaluations shall be made by or under the supervision of a licensed physician or by or under the supervision of another licensed healthcare professional. All laboratory tests must be conducted by an

accredited laboratory at no cost to the employee. All medical records will be kept in accordance with 29 CFR 1910.1020.

TRAINING:
All high-risk employees shall participate in a training program. Training will occur before assignment to a task where occupational exposure may take place and at least annually thereafter. Additional training will be provided when changes such as modification of tasks or procedures affect the employee's occupational exposure.

Any employee who is exposed to infectious materials shall receive training, even if the employee was allowed to receive the HBV vaccine after exposure.
The training program will include at least the following elements:

1. An accessible copy of the regulatory text of 29 CFR 1910.1030 and an explanation of its contents.
2. A general explanation of the epidemiology and symptoms of bloodborne diseases.
3. An explanation of the modes of transmission of bloodborne pathogens.
4. An explanation of the employer's exposure control plan and the means by which the employee can obtain a copy of the written plan.
5. An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood or other potentially infectious materials.
6. An explanation of the use and limitations of methods that will prevent or reduce exposure, including appropriate engineering controls, work practices, and personal protective equipment.
7. Information on the types, proper use, location, removal, handling, decontamination, and disposal of personal protective equipment.
8. An explanation of the basis for selection of personal protective equipment.

7.2 Drinking Water

7.2.1 Requirement

An adequate supply of potable water for drinking and hand washing shall be provided in all places of employment. If hand washing facilities are not available – use of a chemical sanitizer can be utilized. However, employees must wash their hands as soon as feasible when supply is available.

7.2.2 Source

Drinking water and ice shall be obtained from sources approved by federal, state, and local authorities and dispensed in a manner acceptable to the approving authority. Some local authorities require personnel dispensing water to obtain a health certification card.

7.2.3 Portable Dispensers

Portable containers used to dispense drinking water shall be kept tightly closed, equipped with a dispensing tap, labeled as “drinking water”, and maintained in sanitary condition. Water shall not be dipped from any portable water container. Drinking directly from the container is prohibited unless a properly installed bubbler fountain with guarded orifice is provided.

7.2.4 Containers

Containers used to dispense or distribute drinking water shall not be used for any other purpose.

7.2.5 Cups

Use of common cups or glasses is prohibited. Fountain type dispensers or one-use cups shall be provided at each dispenser and a waste receptacle shall also be provided.

7.2.6 Non-potable Water

Outlets dispensing non-potable water shall be conspicuously posted, WATER UNSAFE FOR DRINKING PURPOSES, on a caution sign.

7.3 Toilet Facilities

7.3.1 Requirement

Toilet facilities shall be available to all employees.

Number of Employees	Minimum Number of Units
1 to 20	1 toilet, 1 urinal
21 to 199	1 additional toilet and urinal for each additional 40 employees
200 or more	1 additional toilet and urinal for each additional 50 employees

Under temporary field conditions, provisions shall be made to ensure that not less than one toilet facility is available for all workers. Toilets will be within easy access to the worksite unless it is a mobile crew and transportation is readily available.

7.3.2 Portable Toilet Facilities

When sewage disposal systems are not available, the following types of toilet facilities shall be provided unless prohibited by local codes:

(1) Chemical toilets
(2) Recirculating toilets

7.3.3 Sanitation

Toilets shall be maintained in a clean and sanitary condition with adequate supply of toilet paper and holders for all stools. Provisions shall be made for scheduled routine inspection and maintenance of all toilet facilities.

7.4 Gases, Vapors, Fumes, Dusts, Mists, and Oxygen Deficiency

7.4.1 Requirement

Special consideration shall be given to all operations, materials, and equipment that emit toxic gases, vapors, fumes, dusts, or mists into the working environment. If it is determined that such atmospheric contaminations may be released into areas where persons are employed, the concentration of contaminates shall be brought within safe limits by design and engineering controls, such as ventilation, filtration, or installation of exhaust systems. When contaminates cannot be adequately controlled by design and engineering methods, special operating procedures must be developed that provide the equivalent protection. Acceptable safe limits for contaminants are those recommended in the latest edition of "Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment," published by the American Conference of Governmental Industrial Hygienists (ACGIH), and 29 CFR Parts 1926.55.

7.4.2 Testing

Approved testing devices shall be used for determining concentrations of toxic and flammable gases, vapors, fumes, dusts, mists, and oxygen deficiency. Tests shall be performed and collected data analyzed and evaluated by a competent person(s). Worksite environments should be sampled and evaluated during operations which environmental hazards could be present, (such as confined spaces, trenches or excavations over four feet in depth, enclosed building structures where internal combustion engine equipment is used, etc…). Airborne contaminants exceeding acceptable safe limits created by portable equipment, such as saws, drills, and grinding machines, shall be controlled at the source.

7.4.3 Oxygen Deficiency

Employees shall not be permitted to enter or work in atmospheres containing less than 19.5% oxygen, by volume, unless provided with and trained in the use of applicable respiratory protection devices as specified in Section 8.4.

7.4.4 Asbestos

The hazards associated with employee exposure to airborne asbestos have become very apparent in recent years. Diseases such as asbestosis, mesothelioma, and lung cancer are caused by exposure to airborne asbestos. Asbestos has been used in a large number of commercial materials: papers and felt, floor coverings, insulation, cement, gaskets, wall boards, paints, coatings, and electrical motor components:

1. Where employees are exposed to airborne asbestos dust (in excess of 1.0 fiber per cubic centimeter of air in 30 minutes), the requirements of the following OSHA standards shall apply:
   (a) General Industry 29 CFR 1910.1001.
   (b) Construction 29 CFR 1926.58.
   (c) Operations shall evaluate the job to determine engineering controls and work practices can be made to reduce/maintain the exposure below the TWA.
   (d) If the TWA is exceeded, a program as described in references (a) and (b) above, a written program to reduce employee exposure shall be established.
2. Before an Allied Environmental employee is assigned to work on a project where there is a potential exposure to airborne asbestos, the employee shall:
   (a) Enroll in the Allied Environmental medical monitoring program (refer to Section 7.5).
   (b) Receive the required training on the hazards associated with airborne asbestos.
   (c) Receive the required training on safe work practices and the use of personal protective equipment to avoid exposure to airborne asbestos. (respirators)

3. All Allied Environmental Services supervisors have received training and have extensive experience when working with asbestos and are designated as competent persons for the company. This designation is based upon the supervisor's ability to identify hazardous conditions and has the authority to correct actual or potential hazards in the workplace.
4. Roles and Responsibilities:
   - The designated asbestos competent personal shall:
     - Perform hazard assessment prior to commencement of job
     - Identify existing and potential hazards workers may be exposed to
     - Eliminate or correct identified or potential hazards.

7.4.4.1 TRAINING

Training shall be provided prior to or at the time of initial assignment & at least annually thereafter. The training shall be done in a manner that the employee is able to understand & shall include discussion of health effects associated with exposure to asbestos. The training shall also include information on the relationship between smoking & exposure to asbestos producing lung cancer. Following successful completion of the training program, a certificate of training shall be provided for each employee and a record of the training maintained.

All Employees who will be assigned as abatement workers or are exposed to airborne concentrations of asbestos, shall attend the Asbestos Specialist (Supervisor) or Asbestos Worker formal training scheduled by Allied Human Resources or Operations manager. At this time, Allied utilizes Inservice Training Network, Columbus Ohio for initial and refresher training. This training is required by the Ohio

Environmental Protection Agency who has jurisdiction over Asbestos Abatement in the state of Ohio and will issue certification cards for worker successfully completing the course. These cards must be kept on the worker's person during any asbestos abatement tasks or projects. In addition to annual formal training, Allied Environmental shall provide annual asbestos awareness to all employees (field and staff) to emphasize the potential dangers and long term effects of non-controlled exposure.

7.4.4.2 AIR MONITORING – EXPOSURE MANAGEMENT

In instances where exposure to asbestos is considered possible, air samples shall be collected from the employee breathing zone to ensure that no employee is exposed to an airborne concentration of asbestos in excess of 1.0 fiber per cubic centimeter of air (1 f/cc) in 30 minutes. The samples shall be representative of the 8-hour TWA and 30-minute short-tern exposure. A record of the sample records shall be maintained.

Excursion limit: No employee shall be exposed to an airborne concentration of asbestos in excess of 1.0 fiber per cubic centimeter of air (1 f/cc) as averaged over a sampling period of thirty (30) minutes as determined by the method prescribed in Appendix A to this section, or by an equivalent method.

Determinations of employee exposure shall be made from breathing zone air samples that are representative of the 8-hour TWA and 30-minute short-term exposures of each employee.

Representative 8-hour TWA employee exposures shall be determined on the basis of one or more samples representing full-shift exposures for each shift for each employee in each job classification in each work area. Representative 30-minute short-term employee exposures shall be determined on the basis of one or more samples representing 30 minute exposures associated with operations that are most likely to produce exposures above the excursion limit for each shift for each job classification in each work area.

Access-limited regulated areas shall be established wherever airborne concentrations of asbestos and/or PACM are in excess of the TWA and/or excursion limit.

7.4.4.3 ENGINEERING CONTROLS

Engineering controls and work practices shall be employed to reduce and maintain employee exposure to or below the TWA and/or excursion limit prescribed in paragraph (c) of this section, except to the extent that such controls are not feasible.

Wherever the feasible engineering controls and work practices that can be instituted are not sufficient to reduce employee exposure to or below the TWA and/or excursion limit, such measures shall be used to reduce employee exposure to the lowest levels achievable by these controls and the use of respiratory protection.

For the following operations, wherever feasible engineering controls and work practices that can be instituted are not sufficient to reduce the employee exposure to or below the TWA and/or excursion limit, such measures shall be used to reduce employee exposure to or below 0.5 fiber per cubic centimeter of air (as an eight-hour time-weighted

average) or 2.5 fibers/cc for 30 minutes (short-term exposure). Controls shall be supplemented by the use of any combination of respiratory protection that complies with the requirements of CFR 1910.1001, work practices and feasible engineering controls that will reduce employee exposure to or below the TWA and to or below the excursion limit permissible: Coupling cutoff in primary asbestos cement pipe manufacturing; sanding in primary and secondary asbestos cement sheet manufacturing; grinding in primary and secondary friction product manufacturing; carding and spinning in dry textile processes; and grinding and sanding in primary plastics manufacturing.

Local exhaust ventilation. Local exhaust ventilation and dust collection systems shall be designed, constructed, installed, and maintained in accordance with good practices such as those found in the American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, ANSI Z9.2-1979.

Particular tools. All hand-operated and power-operated tools which would produce or release fibers of asbestos, such as, but not limited to, saws, scorers, abrasive wheels, and drills, shall be provided with local exhaust ventilation systems.

Wet methods. Insofar as practicable, asbestos shall be handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet state sufficient to prevent the emission of airborne fibers so as to expose employees to levels in excess of the TWA and/or excursion limit, unless the usefulness of the product would be diminished thereby.

Particular products and operations. No asbestos cement, mortar, coating, grout, plaster, or similar material containing asbestos, shall be removed from bags, cartons, or other containers in which they are shipped, without being either wetted, or enclosed, or ventilated so as to prevent effectively the release of airborne fibers.

Compressed air. Compressed air shall not be used to remove asbestos or materials containing asbestos unless the compressed air is used in conjunction with a ventilation system which effectively captures the dust cloud created by the compressed air.

Flooring. Sanding of asbestos-containing flooring material is prohibited.

Where the TWA and/or excursion limit is exceeded, a written program shall be established and implemented to reduce employee exposure to or below the TWA and to or below the excursion limit by means of engineering and work practice controls as required above, and by the use of respiratory protection where required or permitted under this section.

Written programs shall be submitted upon request for examination and copying to the Operations Manager, administrators, affected employees and designated employee representatives.

Employee rotation shall not be used as a means of compliance with the TWA and/or excursion limit.

7.4.4.4 RESPIRATORY PROTECTION

Respirators provided to employees shall comply with the requirements of CFR 1910.1001. Respirators shall be provided by the employer at no

cost to the employee and shall be NIOSH approved. Powered air-purifying respirators shall be available at employee request.
Respirators must be used during:

- Periods necessary to install or implement feasible engineering and work-practice controls.
- Work operations, such as maintenance and repair activities, for which engineering and work-practice controls are not feasible.
- Work operations for which feasible engineering and work-practice controls are not yet sufficient to reduce employee exposure to or below the TWA and/or excursion limit.
- In emergency situations.

7.4.4.5 PROTECTIVE WORK CLOTHING AND EQUIPMENT

If an employee is exposed to asbestos above the TWA and/or excursion limit, or where the possibility of eye irritation exists, the employer shall provide at no cost to the employee and ensure that the employee uses appropriate protective work clothing and equipment such as, but not limited to:

- Coveralls or similar full-body work clothing;
- Gloves, head coverings, and foot coverings; and
- Face shields, vented goggles, or other appropriate protective equipment which complies with 1910.133.

NOTE: Employees engaged in housekeeping activities in industrial facilities with asbestos product manufacturing operation, and in public and commercial buildings with installed asbestos containing materials may be exposed to asbestos fibers. Most of these workers are covered by this general industry standard, with the exception of state or local governmental employees in non-state plan states. It should be noted that employees who perform housekeeping activities during and after construction activities are covered by the asbestos construction standard, 29 CFR 1926.1101, formerly 1926.58. However, housekeeping employees, regardless of industry designation, should know whether building components they maintain may expose them to asbestos. The same hazard communication provisions will protect employees who perform housekeeping operations in all three asbestos standards; general industry, construction, and shipyard employment. As noted in the construction standard, building owners are often the only and/or best source of information concerning the presence of previously installed asbestos containing building materials. Therefore they, along with employers of potentially exposed employees, are assigned specific information conveying and retention duties under this section.

PPE LIMITATIONS: Employees shall be presented with information regarding PPE limitations as documented by equipment manufacturers.

7.5 Medical Monitoring Program

All employees involved with operations that expose them to hazardous chemicals, hazardous waste operations, asbestos or lead abatement, or are required to wear a respirator shall enroll in the Allied Environmental Services, Inc medical monitoring program prior to starting such work.

7.5.1 General

Dependent on the type of exposure, the medical monitoring requirements for specific employees may include the following:

1. Medical health history.
2. Pulmonary function.
3. Heavy metal screen.
4. Blood chemistry screen.
5. Urinalysis.
6. Chest x-ray.

7.6 EXPOSURE ASSESSMENT AND MEDICAL SURVEILLANCE

INTRODUCTION

1. This section outlines a comprehensive worker health protection program applicable to all Allied Environmental personnel assigned to work environments where there is a potential for exposure to chemical, biological, ergonomic, and/or physical hazards. Such a program seeks to minimize individual worker's potentials for exposure and to control all exposures to chemical and physical agent to within established occupational exposure limits and as low as reasonably achievable.

2. It is the goal of the Allied Exposure Assessment and Medical Surveillance Program to prevent occupational illness and injury by early detection and identification of exposure risks and exposure-related health effects before they result in disease or injury. Allied will accomplish this utilizing the following strategies:

    a. Accurate assessments of exposures to hazardous stressors or agents in the workplace through comprehensive documented industrial hygiene surveys.

    b. Implementation of effective controls (e.g., engineering, process or material substitution, administrative, personal protection) to eliminate or reduce exposures to hazardous stressors or agents; and

    c. Implementation of a medical monitoring and health surveillance program for employees exposed to potentially hazardous workplace conditions.

    d. Active and sustained communication is essential among the Supervisors, the Safety Manager, Operations Manager and Upper Management.

3. Exposure Determinations

    a. Exposure assessments are performed by qualified personnel or the Allied Industrial Hygienist to measure levels of frequency, duration, route of potential exposure to physical, chemical and, biological stressors to determine if employees are at adverse health risk, capable of safely performing assigned tasks, to verify protective equipment, if controls are effectively providing protection, and to ensure protective measures comply with governmental regulation.

    b. Medical monitoring of employees is performed by qualified personnel (supervisors) and the Industrial Hygienist to detect physiological changes, in an employee, that may be the result of exposure to hazardous levels of physical, chemical or biological stresses that the employee may experience on the job.

4. Current Medical Exposure Surveillance Programs

    a. To be considered for enrollment in a medical surveillance program, the exposure hazard must be identified by the employee, Industrial Hygienist, or supervisor and assessed by the Safety Manager. The Industrial Hygienist and Safety Manager will determine whether personal exposure levels warrant medical surveillance. Currently, medical surveillance programs at Allied, (when required), include the following:

        (1) Asbestos Medical Surveillance

(3) Bloodborne Pathogen Medical Surveillance

(4) Commercial Driver's Medical Certification

(5) DOT Drug Alcohol Testing

(6) Hearing Conservation

(7) Indoor Air Quality

(8) OSHA Regulated Substances

(9) Respiratory Medical Surveillance

5. Eligibility. Exposure assessment and medical surveillance shall be offered to full-time or temporary Allied employees, volunteers, interns and other affiliated staff.

CHAPTER-SPECIFIC ROLES AND RESPONSIBILITIES

1. Safety Manager shall:

   a. With assistance from supervisors, Industrial Hygienist and Operations Manager, identify those employees (including new hires) who are potentially exposed to hazardous substances/stressors which could pose a health risk, and refer those employees for exposure assessment and development of hazard controls.

   b. Assist Supervisors with the implementation of engineering and/or administrative controls as required by the results of exposure assessment and medical monitoring.

   c. Ensure that supervisors report injuries and illnesses in accordance set Allied policy and procedures.

   d. Work with employees and supervisors to identify employees requiring Medical Surveillance Programs. Schedule required medical surveillance evaluations for affected employees.

   e. Monitor to ensure that supervisors have employees keep their appointments for scheduled medical surveillance exams.

   f. Review rosters of medical surveillance program enrollees on a monthly basis to ensure compliance with this Program.

   g. Maintain a copy of training records.

2. Supervisors shall:

   a. Ensure that sufficient time is available for exposure monitoring to assess exposure risk.

   b. Based on results of exposure monitoring, ensure that recommended engineering and/or administrative controls are implemented to reduce exposures to within occupational exposure limits established by this Program. Provide appropriate personal protective equipment (PPE) to all affected employees, as an interim

control per the Safety Manager's recommendations, until exposures are reduced, and ensure that the devices are worn correctly.

c. Ensure that all affected employees are enrolled in the appropriate medical surveillance program through an Occupational Health Clinic within 5 days of employment.

d. Ensure that the employee has allotted time to make the appointment on schedule.

e. Coordinating with the Safety Manager, ensure that all new or transferring employees, who require enrollment in an Allied medical surveillance program, are referred to the Safety Manager for medical appointments within 5 days of employment.

f Report to the Safety Manager any adverse health effects, injuries illnesses or other symptoms potentially associated with the workplace for occupational exposure evaluation.

3. Employees shall:

a. Notify their supervisors when they believe they are being exposed to unsafe or unhealthful substances, stressors, or conditions in their workplace when a change in work practices or their medical status appears to increase their exposure or results in injuries or illnesses believed to be caused by working conditions.

b. Use, inspect, and maintain assigned PPE on a daily basis, as trained. Report problems with PPE effectiveness or personal changes in fit of PPE (such as facial hair, new dentures, weight loss or gain) that may affect the fit of PPE.

c. Keep scheduled appointments for evaluation and documentation of their symptoms or temporary medical condition, or for any mandated medical surveillance examination.

d. Comply with the provisions of this Program governing exposure assessment and medical monitoring.

e. Comply with any additional exam requirements, i.e. ENT referral,

j. Advise supervisors and other management officials with a need to know on performance-of-duty issues related to employee medical conditions as they affect or are affected by the work environment, including work restrictions, reasonable accommodation, and medical removal issues.

HAZARD IDENTIFICATION

1. Initial Assessment

a. Each job task or work area within a facility shall be assessed by the responsible supervisor (with assistance from the Safety Manager) to identify job tasks that have the potential for adverse health effects or involve substances and operations listed in the References section of this Program. This determination may be made using Allied's Job Hazard Analysis (JHA) process, self-assessments/inspections, prior exposure monitoring results, or employee complaints of exposures or health effects. The job hazard analysis would identify any of the following possible exposures:

(1) Confined space entry

(2) Use of equipment such as x-ray machines, lasers and commercial vehicles

(3) Dusty atmospheres and respiratory irritants such as carpentry units, paint and lab chemical exposures

(4) OSHA Regulated substances

(5) Occupational noise exposure

(8) Potential exposure to blood or body fluids

(9) Testing for illegal substances for mandate or cause (e.g., security officer and CDL applicants)

3. Follow-up Assessment. The supervisor, with the assistance of the Safety Manager, shall ensure that exposure hazards are reassessed whenever a change in production, process, equipment, or controls occurs that may alter the initial assessment results. The Safety Manager and supervisor shall arrange through the Industrial Hygienist or qualified person for employee exposure monitoring to be updated.

4. Employee Exposure Monitoring

a. Employee exposure assessment strategies shall be based on established industrial hygiene and occupational medicine protocols and references. Exposures shall be evaluated against established regulatory standards such as the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values and Biological Exposure Indices. Medical Monitoring strategies shall be based on established current standards of medical practice as referenced in the Occupational Safety and Health Administration (OSHA) standards; SI Directives, National Institute for Occupational Safety and Health (NIOSH) credentialing and monitoring standards as well as current National Institutes of Health (NIH) and Centers for Disease Control (CDC) recommendations.

b. In general, the more stringent occupational health exposure standard shall be used as the criteria for assessment.

c. Laboratories employed in the analysis of industrial hygiene environmental or biological samples shall be accredited by the appropriate agency, including but not limited to the American Industrial Hygiene Association and the National Voluntary Laboratory Accreditation Program of the National Institute for Standards and Technology.

d. The Safety Manager shall provide a copy of the noise exposure monitoring report to every employee to whom it applies, within 15 days of receipt of report.

e. The medical monitoring requirements for each of the OSHA-regulated programs are listed in OSHA Publication 3162, “Screening and Surveillance: A Guide to OSHA Standards.” The requirements outlined in this publication shall be considered the "bare minimum" for medical monitoring.

HAZARD CONTROL

1. Engineering or Administrative Controls must be used to minimize or eliminate potential health risks through effective use of permanent controls (engineering, product substitution, or administrative). Until permanent controls can be implemented to reduce exposures below the applicable OSHA, ACGIH, or suitable criterion, (employees shall wear appropriate personal protective equipment and participate in a medical surveillance program when required).

2. Work-Related Health Effects. The health of hazard-exposed workers must be monitored to determine if work-related health problems are occurring or an acute incident has occurred. The Safety Manager and Occupational Health Clinic shall establish medical monitoring content and frequency based on an understanding of the job/task demands, exposures to employees, the medical effects of specific exposures, the impact of specific medical conditions on job/task performance and safety, and legal and regulatory requirements.

    a. Medical Monitoring Evaluation Types

        (1) Pre-placement or Baseline

            (a) This medical monitoring is performed before placement in a specific job to assess (from a medical standpoint):

                i. If the employee will be able to perform the job capably and safely;

                ii. If the employee meets any established physical standards; and

                iii. Obtain baseline measurements for future comparison.

            (b) Ideally, pre-placement/baseline medical monitoring should be performed prior to the commencement of work. However, if the individual already has started work, this medical monitoring shall be completed within 30 days of assignment before exposure to a potential hazard.

        (2) Periodic. This medical monitoring is conducted at scheduled intervals. Periodic medical monitoring may include an interval history, physical examination, and/or clinical and biological screening tests. The scope of periodic medical monitoring shall be determined by the Safety Manager and Occupational Health Professionals after consideration of the information contained in this Program, professional practice standards, regulatory guidance, and any other relevant factors.

        (3) Termination

            (a) There are two kinds of termination monitoring:

i. Termination of Employment – This medical monitoring is designed to assess pertinent aspects of the employee's health when he/she leaves employment. Termination of employment examinations will be offered to employees who were enrolled in a medical surveillance program and who wish to have a termination of employment evaluation. The HR Manager or employee should contact Safety Manager at least 30 days prior to their exit date. Documentation of examination results may be beneficial in assessing the relationship of any future medical problems to an exposure in the workplace, especially for those conditions that are chronic or may have long latency periods. Some Federal regulations require termination of employment examinations (e.g., asbestos – 29 CFR 1910.1001).

ii. Termination of Exposure – This medical monitoring is performed when exposure to a specific hazard has ceased. Exposure to specific hazards may cease when an employee is reassigned, a process is changed, or he/she leaves employment. Termination of exposure medical monitoring is most beneficial when the health effect being screened for is likely to be present at the time exposure ceases. Some Federal regulations require termination of exposure examinations (e.g., HAZWOPER – 29 CFR 1910.120).

(b) In the event an employee declines termination medical monitoring, the employee shall be asked to sign a Waiver of Exit Medical Monitoring form.

b. Enrollment in Medical Monitoring

(1) The Operations Manager and HR Manager with the assistance of the supervisor, shall be responsible for contacting the Safety Manager when baseline, termination, and project/task-specific medical monitoring is required. The Safety Manager shall maintain an employee scheduling database for tracking periodic medical monitoring. The Safety Manager will review the database of employees who are due for periodic medical surveillance exams 1 months prior to the date due.

(2) The supervisor is responsible for ensuring the employee makes and completes his/her medical surveillance appointment.

(3) If medical monitoring becomes due during an employee's pregnancy or while the employee is out on Long Term Disability (LTD), it is advisable to defer the monitoring per personal medical physician request until after delivery or conclusion of treatment and the employee is released to return to work by the personal physician from family/medical leave status.

c. Medical Monitoring Follow-Up

(1) Following each medical monitoring exam, if indicated in the protocol, Occupational Health Clinic shall issue a physician's written opinion of the employee's performance-of-duty abilities to the employee and Safety Manager. The physician's written opinion shall include any medical restrictions and address the employee's ability to use PPE.

(2) The Safety Manager shall be responsible for advising supervisors and management with a need to know on performance-of-duty issues related to employee non-occupational medical conditions as they affect or are affected by the work environment. Performance-of-duty determinations shall fall in one of the following three categories.

(a) Qualified - the employee meets the medical requirements of the position and is (from a medical standpoint) capable of performing the required tasks. Allowing the employee to perform the job will not pose a significant risk to personal health and safety or the health and safety of others.

(b) Qualified with Restriction - the employee meets the medical requirements of the position and is capable of performing the job without risk to personal health or others only with some accommodation or restriction. When this determination is made, the practitioner shall provide a list of recommended accommodations or restrictions, the expected duration of this requirement, and therapeutic or risk-avoiding benefit.

(c) Not Qualified - The employee is incapable of performing essential tasks, will be unsafe, or fails to meet medical requirements for the job.

TRAINING. Employees enrolled in any medical surveillance program specified by this Program, or whose work is covered by requirements of the OSHA regulated substances listed in this Section, will receive safety training as required by OSHA.

REQUIRED INSPECTIONS AND SELF ASSESSMENTS

1. The Safety Manager and supervisors shall review their operations at least annually or when a change in process, employees or materials occur to ensure that employees are properly assessed for exposures per this Program, and enrolled in appropriate medical surveillance program.

2. The Safety Manager shall evaluate the Exposure Assessment and Medical Surveillance Monitoring Program annually and revise the program as needed.

RECORDS AND REPORTS

1. Hazard re-assessment documents (new JHA), whenever a change in production, process, equipment, or controls occurs that may alter the initial employee exposure assessment results, are to be maintained by the Safety Manager and work supervisor whose employees are affected.

2. Industrial hygiene surveys of workplaces that identify all potential exposures and other employee safety and health risks, and establish complete workplace exposure profiles are to be maintained by the Industrial Hygienist and Safety Manager.

3. In the event an employee declines termination medical monitoring, the employee shall be asked to sign a Waiver of Exit Medical Monitoring form. Documentation is to be maintained by the HR Manager, employee, and Safety Manager.

4. Following each medical monitoring exam, The Safety Manager shall issue a physician's written opinion to the employee, Operations Manager and supervisor which will include any medical restrictions and address the employee's ability to use personal protective equipment.

5. Access to Records

    a. Employees and their designated representatives shall have access to medical and exposure records relevant to the employee, in accordance with the requirements of OSHA 29 CFR 1910.1020, "Access to Employee Exposure and Medical Records."

6. Employee Exposure Records. Employee exposure records contain information on the levels of an employee's exposure to potentially hazardous agents. Examples of employee exposure records include:

    a. Personal air samples;

    b. Area and environmental samples of the operations and operational areas;

    c. Safety Data Sheets that indicate the material may pose a health hazard;

    d. Biological monitoring results that directly assess the absorption of a substance/agent by body systems; and

    e. A chemical inventory or other record that shows the identity and use of the material.

7. Employee exposure records, as defined in OSHA 29 CFR 1910.1020, shall be maintained by the HR Manager in the employee's medical file for the duration of the employee's employment plus 30 years (or as otherwise stated in specific OSHA standards.

8. Employee Medical Records. Employee medical records are confidential records concerning the health status of an employee. Medical records shall be available to the employee through the HR Manager. Employees should contact the HR Manager for medical record access procedures. Employee medical records, as defined in OSHA 29 CFR 1910.1020, shall be maintained by HR in the employee's medical file for the duration of the employee's employment plus 30 years.

HIV TESTING/HEPATITIS B VACCINE

DECLINATION STATEMENT
(Post Exposure)

I have been given the opportunity to receive HIV Serological Testing and/or the opportunity to be vaccinated with Hepatitis B Vaccine, at no charge to me. However, I decline at this time. I understand that by declining, I continue to be at risk of acquiring the HIV Virus or Hepatitis B, both serious diseases. I understand that in the future, I can receive the vaccination series at no charge to me.

_____ _____

(Employee Signature) (Date)

_____ _____

(Supervisor Signature) (Date)

***THIS FORM IS TO BE SIGNED BY FIRST AID RESPONDERS WHO DECLINE HIV/HEPATITIS B SEROLOGICAL TESTING OFFERED BY THE COMPANY.**

FIGURE 7-2

8.0 Personal Protective Equipment

8.1 General Requirements

Personal protective equipment (PPE) includes clothing and accessories (such as but not limited to the following): hard hats, safety glasses, hearing protection, fire/chemical resistant clothing, respirators, etc., that are required in the work place to protect the safety and health of employees. Personal protective equipment is essential for employees to effectively guard against the many types of hazards that may be encountered on the job. Employees must be trained, become familiar with and understand the potential hazards in the workplace and know how to correctly use the PPE furnished for their protection. Documentation of this training shall indicate employee understanding and limitations of use.

Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact. Re-training may be necessary when an employee is uncertain about when to use PPE or if through observation, the employee does not wear or utilize the PPE correctly.

Foot Protection –

After the introductory period is completed, team members engaged in field work operations will be allotted up to a maximum of $100.00 annually for the purchase of safety toed work shoes or boots. Toreceive re-imbursement, please show the new boots to a Supervisor, who will initial the receipt. The receipt is then submitted to Accounting for logging the purchase and then processing. Any amount spent beyond $100 annually will be the team member's r esponsibility to pay.

Safety toed shoes fashioned as tennis shoes, hunting boots or having Gor-tex sides are not a cceptable.

The shoe/boot must be all leather. This benefit will renew annually on the employee's anni versary date of the first boot purchase. Any remaining balance from the previous year will n ot be carried forward into the next year's boot allowance.

Allied may have corporate discounts available with select vendors. Please see your supervis or or Human Resources for additional details.

8.1.1 Hazard Assessment

Allied shall assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE). If such hazards are present, or likely to be present, Allied shall document the findings along with the individual qualified to perform the assessment and implement the following:

(1) Select, and have each affected employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment;

(2) Communicate selection decisions to each affected employee; and,

(3) Select PPE that properly fits each affected employee. Note: Non-mandatory Appendix B contains an example of procedures that would comply with the requirement for a hazard assessment.

(4) The employer shall verify that the required workplace hazard assessment has been performed through a written certification that identifies the workplace evaluated; the person certifying that the evaluation has been performed; the date(s) of the hazard assessment; and, which identifies the document as a certification of hazard assessment.

(5) Defective or damaged personal protective equipment shall not be used.

8.2 Head Protection

Allied Environmental Services employees shall wear hard hats when working in areas where there is the potential for injury to the head from falling or moving objects and when they are near exposed electrical conductors, which their head could contact. A waiver of this requirement may be requested from office when overhead hazards are not present. Keep in mind that this requirement is an exception to the rule that must be approved by management.

8.2.1 Hard Hat Areas

Hardhat areas shall include all areas where construction work of any nature, including maintenance or repair, is in progress.

8.3 Eye and Face Protection

The company will furnish to each employee the required eye and face protection for each task. Safety glasses with side shields are required on all company job sites within industrial plants requiring the same and where there is a potential for injury resulting from flying objects, chemical or gases. Prescription glasses meeting American National Standards Institute (ANSI) Z87.1) requirements can be obtained through most opticians. To obtain prescription safety glasses, employees must first obtain a form for glasses from the Human Resource Manager. An optical exam can then be obtained from the employees' own optometrist or from Shawnee Optical at the employee's expense. Allied Environmental will contribute one-half or a maximum amount of $85.00 toward the cost of the prescription safety glasses, once every two (2) years. Allied Environmental will also supply employees with glasses inserts for respirators, if such respirators are required for the job. Allied will pay for the cost of an exam and the glasses insert once every two (2) years.

8.3.1 How to Recognize Safety Glasses

(a) **Lenses**: Safety glasses that meet ANSI Z87.1 requirements have glass, plastic, or polycarbonate lenses. They are stronger than street-wear lenses, are impact-resistant, and come in prescription and nonprescription (plano) forms.

(b) **Frame imprint:** All safety frames that meet ANSI Z87.1 standards have the imprint "Z87" stamped on them.

(c) **Frames**: Safety frames are stronger than street-wear frames. They help prevent lenses from being pushed into your eyes.

(d) **Lens marking**: The manufacturer's logo is marked (or etched) on the top of each safety lens that meets ANSI standards.

8.3.2 Selection Guide

Figure 8-1 "Safety Glasses and Goggles Application", shall be used as a guide in selecting eye and face protection for the hazards and operations noted.

8.3.3 Electric Welding

Employees engaged in electric welding operations shall wear filter lenses in accordance with Figure 8-2.

8.3.4 Welder Helpers

Welder helpers shall wear eye protection with a minimum lens shade of 2 in the welding area. Helpers observing actual welding operations shall wear the same protection as the welder.

8.4 Respiratory Protection Program

In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination. This shall be accomplished as far 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 respirators shall be used pursuant to this section.

The employer shall provide respirators, training, and medical evaluations at no cost to the employee.

8.4.1 Requirement

Prior to any Allied Environmental Services worker using a respirator, a medical evaluation must be completed to ensure the worker is medically qualified to wear the respirator. The following must be followed:

- The medical evaluation must be confidential
- During normal working hours
- At no cost to the worker
- Convenient with regards to location and time
- The worker will be advised of the purpose of the exam and understand the reason and potential hazards associated with respirator use.
- The worker shall have an opportunity to discuss the examination and results with the Health Care Provider.

In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fumes, mists, gases, smokes, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination. This shall be accomplished as far as feasible by engineering control measures (for example, enclosures or confinement) of the operation, general and local ventilation, and substitution of less toxic materials. When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used. Allied Environmental Services shall provide respirators when such equipment is necessary to protect the health of the employee. Respirators shall be suitable for the purpose intended. Employees who wish to use respiratory protection when not required by the standard shall be provided information contained in Appendix "D" (Figure 8-4).

8.4.2 Respiratory Protection Program

Allied Environmental Services has established the following respiratory program:

1. **Policy Statement**. A Respiratory Protection Program is established to coordinate the use and maintenance of respiratory protection as determined necessary to reduce employee exposure to toxic chemical agents and allow employees to work safely in hazardous work environments.

2. **Designation of Program Administration**. Management will designate individuals responsible for the coordination and maintenance of the respiratory program as necessary. These designees will have the authority to make decisions and implement changes in the program as it pertains to their area of responsibility. Program administrators shall be properly trained, knowledgeable of the complexity of the program. The respiratory protection program shall be audited annually to ensure all components of the program remain effective and current.

3. **The designees shall be responsible for the following**:

(a) Field Supervisors

- Supervision of respirator selection procedure.
- Establishment of training sessions about respiratory equipment for employees.
- Establishment of a continuing program of cleaning and inspection of equipment.
- Designation of proper storage areas for respiratory equipment.
- Establishment of issuance and accounting procedures for uses of respiratory equipment.

- Ensuring medical screening program/procedures for employees assigned to wear respiratory equipment.

(b) Project Manager, Allied Environmental Services, Inc.

- Establishment of medical screening program/procedures for employees assigned to wear respiratory equipment.
- Establishment of a periodic inspection schedule of those workplaces/conditions requiring respiratory equipment to determine exposures and/or changing conditions.
- A continuing evaluation of the above aspects to ensure their continued functioning and effectiveness.

4. **Selection Procedure**. Respirators shall be selected on the basis of hazards to which the worker is exposed, and workplace and user factors that affect respirator performance and reliability. Chemical and physical properties of the contaminant as well as the toxicity and concentration of a hazardous material, and the amount of oxygen present must be considered in selecting the proper respirators. The nature and extend of the hazard, work rate, mobility, work requirements and conditions as well as the limitations and characteristics of the respirators also are selection factors. The respirator selection guide (Figure 8-3) presents a simplified version of characteristics and factors used for respirator selection. Proper selection of respirators shall be made according to the material safety data sheet (MSDS) on the contaminant.

The employer shall select a NIOSH-certified respirator. The respirator shall be used in compliance with the conditions of its certification.

The employer shall identify and evaluate the respiratory hazard(s) in the workplace; this evaluation shall include a reasonable estimate of employee exposures to respiratory hazard(s) and an identification of the contaminant's chemical state and physical form. Where the employer cannot identify or reasonably estimate the employee exposure, the employer shall consider the atmosphere to be IDLH.

The employer shall select respirators from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user. Allied provides the following respirator brands and models:

Respirator Type	Brand	Model
Half-face APR	Honeywell	6000 Series
Full-face APR	Honeywell	7000 Series
Full Face SAR/SCBA	Survivair	Panther SAR/SCBA
Full Face SAR/SCBA	3M	With 5 min escape

Refer to the table below for respirator protection factors:

Type of respirator[1], [2]	Quarter mask	Half mask	Full facepiece	Helmet/ hood	Loose-fitting facepiece
1. Air-Purifying Respirator	5	[3]10	50	.....	.....
2. Powered Air-Purifying Respirator (PAPR)	.....	50	1,000	[4]25/1,000	25
3. Supplied-Air Respirator (SAR) or Airline Respirator					
• Demand mode	.....	10	50	.....	.....
• Continuous flow mode	.....	50	1,000	[4]25/1,000	25
• Pressure-demand or other	.....	50	1,000	.....	.....

positive-pressure mode					
4. Self-Contained Breathing Apparatus (SCBA)					
• Demand mode	.....	10	50	50	.....
• Pressure-demand or other positive-pressure mode (e.g., open/closed circuit)	.....	.....	10,000	10,000	.....

[1]Employers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.

[2]The assigned protection factors in Table 1 are only effective when the employer implements a continuing, effective respirator program as required by this section (29 CFR 1910.134), including training, fit testing, maintenance, and use requirements.

[3]This APF category includes filtering facepieces, and half masks with elastomeric facepieces.

[4]The employer must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators, and receive an APF of 25.

[5]These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 subpart Z, employers must refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)(2)(ii).

5. **Training.** Every user shall be instructed and trained in selection and use of respiratory protection and their limitations. Training shall include the following:
   (a) Instruction in the nature of the hazard, whether acute, chronic, or both, and an honest appraisal, in terms the worker can understand, of what may happen if the respirator is not used.
   (b) Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator.
   (c) How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions.
   (d) How to inspect, put on and remove, use, and check the seals of the respirator.
   (e) Training shall provide the employee an opportunity to handle the respirator, have it fit properly, test its face piece-to-face seal, and wear it in a test environment.
   (f) Discussion of why this is the proper type of respirator for a particular purpose.
   (g) Discussion of the respirator's capabilities and limitations. (IDLH atmospheres)
   (h) Instruction, training, and actual use of the respirator and frequent supervision to ensure that it continues to be used properly.
   (i) Explanation of proper maintenance and storage of the respirator.
   (j) Other special training as needed for a special use. (Breathing Supplied Air – Grade D)
   (k) How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators.

An employer who is able to demonstrate that a new employee has received training within the last 12 months that addresses the elements specified in paragraph 29 CFR 1910.134 (k)(1)(i) through (vii) is not required to repeat such training provided that, as required by paragraph 29 CFR 1910.134 (k)(1), the employee can demonstrate knowledge of those element(s). Previous training not repeated initially by the employer must be provided no later than 12 months from the date of the previous training.

Retraining shall be administered annually, and when the following situations occur:

(1) Changes in the workplace or the type of respirator render previous training obsolete;
(2) Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill; or
(3) Any other situation arises in which retraining appears necessary to ensure safe respirator use.

6. Fit testing.

(a) Every respirator wearer shall receive fitting instruction including demonstrations and practice in how to adjust it, and how to determine if it fits properly.
(b) Conditions that can affect the fit of a face piece are prohibited and include the following:
- Beard growth
- Sideburns
- A skull cap
- Temple pieces on glasses
- Dentures

(c) To assure proper protection, the wearers shall check the face piece fit each time they put on the respirator.
(d) The employee must be fit tested with the same make, model, style, and size of respirator that will be used.
(e) Employees using a tight-fitting facepiece respirator must pass an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT) per OSHA-accepted QLFT or QNFT protocol.
(f) Employees using a tight-fitting facepiece respirator shall be fit tested prior to initial use of the respirator, whenever a different respirator facepiece (size, style, model or make) is used, and at least annually thereafter.
(g) The employer shall conduct an additional fit test whenever the employee reports, or the employer, PLHCP, supervisor, or program administrator makes visual observations of, changes in the employee's physical condition that could affect respirator fit. Such conditions include, but are not limited to, facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight.
(f) Fit testing described in this section shall apply to Supplied Air Respirators (SAR) as well.

7. **Respirator Cleaning**. Routinely used respirators shall be collected, cleaned, and disinfected as frequently as necessary to ensure that proper protection is provided. Those respirators used by more than one employee shall be thoroughly cleaned and disinfected after each use. Cleaning shall include the following:

(a) Remove component parts.
(b) Wash and rinse assemblies.
(c) Air dry.
(d) Visually inspect during cleaning.
(e) Reassemble and test.
(f) Place in proper storage.

8. **Respirator Storage**. Respirators shall be stored in a convenient, clean, and sanitary location following procedures outlined in CFR 1910.134 App. B, or equally effective manufacturer’s procedures. Protection shall be against dust, sunlight, heat, extreme cold, excessive moisture, or damaging chemicals. Respirators shall be packed or stored to prevent deformation of the facepiece and exhalation valve.

In addition to the requirements above, emergency respirators shall be:

(1) Kept accessible to the work area;
(2) Stored in compartments or in covers that are clearly marked as containing emergency respirators; and
(3) Stored in accordance with any applicable manufacturer instructions.

9. **Inspection and Maintenance**. Routine use respirators shall be inspected routinely before and after each use, and during cleaning. Emergency respirators shall be inspected monthly, and before and after each use. Escape only respirators shall be inspected before being carried into the workplace. Inspection shall include the following:

(a) Tightness of connections.
(b) Check of face piece, valves, tubing, and canisters or cartridges.
(c) Rubber parts shall be inspected for pliability and signs of deterioration. Replacement or repairs by experienced persons shall be done with parts designed for that specific respirator.

10. **Program Evaluation – Continued Effectiveness**. There shall be regular inspection and evaluation of the program and workplace to determine the continued effectiveness of the program by the Allied Environmental Services Operations Manager. To assure that respirators are properly selected, used, cleaned, and maintained, the Operations Manager shall conduct frequent, random inspections.

Appropriate surveillance shall be maintained of work area conditions and degree of employee exposure or stress. When there is a change in work area conditions or degree of employee exposure or stress that may affect respirator effectiveness, the employer shall reevaluate the continued effectiveness of the respirator.

The employer shall ensure that employees leave the respirator use area:

(1) To wash their faces and respirator facepieces as necessary to prevent eye or skin irritation associated with respirator use; or
(2) If they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece; or
(3) To replace the respirator or the filter, cartridge, or canister elements.
(4) If the employee detects vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece, the employer must replace or repair the respirator before allowing the employee to return to the work area.

The employer shall regularly consult employees required to use respirators to assess the employees' views on program effectiveness and to identify any problems. Any problems that are identified during this assessment shall be corrected. Factors to be assessed include, but are not limited to:

(1) Respirator fit (including the ability to use the respirator without interfering with effective workplace performance);
(2) Appropriate respirator selection for the hazards to which the employee is exposed;
(3) Proper respirator use under the workplace conditions the employee encounters; and
(4) Proper respirator maintenance.

11. **IDLH Procedures** - For all IDLH atmospheres, the employer shall ensure that:

(1) One employee or, when needed, more than one employee is located outside the IDLH atmosphere;
(2) Visual, voice, or signal line communication is maintained between the employee(s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere;
(3) The employee(s) located outside the IDLH atmosphere are trained and equipped to provide effective emergency rescue;
(4) The employer or designee is notified before the employee(s) located outside the IDLH atmosphere enter the IDLH atmosphere to provide emergency rescue;
(5) The employer or designee authorized to do so by the employer, once notified, provides necessary assistance appropriate to the situation;
(6) Employee(s) located outside the IDLH atmospheres are equipped with:

- Pressure demand or other positive pressure SCBAs, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA; and either
- Appropriate retrieval equipment for removing the employee(s) who enter(s) these hazardous atmospheres where retrieval equipment would contribute to the rescue of the employee(s) and would not increase the overall risk resulting from entry; or
- Equivalent means for rescue where retrieval equipment is not required under paragraph 29 CFR 1910.134 (g)(3)(vi)(B).

12. **Breathing Air Quality and Use -** Employees using atmosphere-supplying respirators (supplied-air and SCBA) shall be provided with breathing gases of high purity. The employer shall ensure that compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration accords with the following specifications:

(1) Compressed and liquid oxygen shall meet the United States Pharmacopoeia requirements for medical or breathing oxygen; and
(2) Compressed breathing air shall meet at least the requirements for Grade D breathing air described in ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-1989, to include:
(3) Oxygen content (v/v) of 19.5-23.5%;
(4) Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less;
(5) Carbon monoxide (CO) content of 10 ppm or less;
(6) Carbon dioxide content of 1,000 ppm or less; and
(7) Lack of noticeable odor.

The employer shall ensure that compressed oxygen is not used in atmosphere-supplying respirators that have previously used compressed air. The employer shall ensure that oxygen concentrations greater than 23.5% are used only in equipment designed for oxygen service or distribution. The employer shall ensure that cylinders used to supply breathing air to respirators meet the following requirements:

(1) Cylinders are tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 173 and part 178);
(2) Cylinders of purchased breathing air have a certificate of analysis from the supplier that the breathing air meets the requirements for Grade D breathing air; and
(3) The moisture content in the cylinder does not exceed a dew point of -50 deg.F (-45.6 deg.C) at 1 atmosphere pressure.

The employer shall ensure that compressors used to supply breathing air to respirators are constructed and situated so as to:

(1) Prevent entry of contaminated air into the air-supply system;
(2) Minimize moisture content so that the dew point at 1 atmosphere pressure is 10 degrees F (5.56 deg.C) below the ambient temperature;
(3) Have suitable in-line air-purifying sorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters shall be maintained and replaced or refurbished periodically following the manufacturer's instructions.
(4) Have a tag containing the most recent change date and the signature of the person authorized by the employer to perform the change. The tag shall be maintained at the compressor.

For compressors that are not oil-lubricated, the employer shall ensure that carbon monoxide levels in the breathing air do not exceed 10 ppm. For oil-lubricated

compressors, the employer shall use a high-temperature or carbon monoxide alarm, or both, to monitor carbon monoxide levels. If only high-temperature alarms are used, the air supply shall be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm.

The employer shall ensure that breathing air couplings are incompatible with outlets for nonrespirable worksite air or other gas systems. No asphyxiating substance shall be introduced into breathing air lines. The employer shall use breathing gas containers marked in accordance with the NIOSH respirator certification standard, 42 CFR part 84.

13. **Medical Requirements**. Persons should not be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. A local physician shall determine what health and physical conditions are pertinent. The respirator user's medical status should be reviewed periodically. Refer to Section 7.5, Medical Monitoring Program.

14. **Recordkeeping.** The employer shall retain written information regarding medical evaluations, fit testing, and the respirator program. This information will be used to facilitate employee involvement in the respirator program, assist the employer in auditing the adequacy of the program, and provide a record for compliance determinations by OSHA.

Records of medical evaluations required by this section must be retained and made available in accordance with 29 CFR 1910.1020. The employer shall also establish a record of the qualitative and quantitative fit tests administered to an employee including:

(1) The name or identification of the employee tested;
(2) Type of fit test performed;
(3) Specific make, model, style, and size of respirator tested;
(4) Date of test; and
(5) The pass/fail results for QLFTs or the fit factor and strip chart recording or other recording of the test results for QNFTs.

Fit test records shall be retained for respirator users until the next fit test is administered. A written copy of the current respirator program shall be retained by the employer. Written materials required to be retained under this paragraph shall be made available upon request to affected employees or designee for examination and copying.

8.5 Air Support

8.5.1 Definitions

(1) Airline

- An airline respirator provides a continuous supply of air to the user via a hose connected to stationary source of breathable air. Some airline respirators also integrate a small cylinder of compressed air into the system for emergency escape from a dangerous environment in case the airline hose is blocked or severed.
- An airline respirator (also called an air-supplied respirator or supplied air respirator, SAR) is a respirator that is connected to a source of compressed breathing air (such as an air cart or stationary system) via a high-pressure hose. The air is delivered continuously or intermittently in a sufficient volume to meet the wearer's breathing requirements.

(2) Air Sources

- External sources of air utilize compressed air cylinder(s) to provide an external source of air to the wearer of supplied air respirators. Air sources

can be fixed stationary units or mobile for use on remote locations or in confined spaces with an SCBA or airline respirators.

- Typically, employers use a large compressor system as the air source for SARs, although other sources can be incorporated, such as Free-Air pumps or cascade systems of bottled air.

(3) Filtration system/CO monitor:

- To maintain Grade D breathable air as required by OSHA, employers should use an in-line filtration system to filter the air coming from the compressor. When properly maintained, these systems prevent any contaminants from being transported through the compressor system and on to the worker. Carbon monoxide monitoring provides an essential safeguard to alert users and employers if an excessive amount of CO is being generated by the oil-lubricated compressor.

(4) Distribution system:

- From the compressor, the air has to be transported to the work area where the workers can use it. Air distribution manifolds are a common way of aiding employers with this task. These manifolds (referred to as "points of attachment" in the regulations) consist of 1) a coupling that connects the respirator breathing air supply hose to the source of breathing air, 2) a pressure regulator, and 3) a pressure gauge. Often, these points of attachment will be an integral part of the filtration system and CO monitor. NIOSH and OSHA require that everything from the point of attachment to the worker be part of the approved respirator assembly and from the same manufacturer.

(5) Air supply hose:

- The air supply hose connects to the point of attachment and transports breathable air to the worker. The air supply hose must be from the same manufacturer as the respirator being used, and it must be approved for use with the specific respirator being worn.

(6) Breathing tube and headpiece:

- The breathing tube transports the air from the blower unit to the headpiece, which is worn by the worker. Employers must select a headpiece appropriate for the contaminants and the level of protection needed on the job.

8.5.2 Safe Operating Procedure

(1) Use and Maintenance of Supplied Air Respirators (Air Line)

- Supplied air respirators may be used when the level of contaminants exceed the capability of an air-purifying respirator, and/or employees cannot use an air-purifying respirator due to medical restrictions. Installed and used correctly, this type of equipment provides a high level of protection against respiratory hazards. Other advantages of airline supplied air respirators are mentioned below under the heading facepiece choices. Information provided in this SOP is general in nature, and is not a substitute for respirator-specific information and instructions provided by the manufacturer.

(2) Limitations

- In general, air-line respirators are not suitable for use in oxygen-deficient or immediately dangerous to life and health (IDLH) atmospheres. The only exception is when the air-line respirator is designed as a full-facepiece, pressure demand system supplemented with a self-contained breathing air supply, such as an emergency escape pack (SCBA). The emergency escape pack must be appropriately sized to allow the user time to retreat to a safe atmosphere.

- All supplied air respirators require high quality breathing air, as described below. Supplied air respirators do not protect the skin. Half-mask supplied air respirators do not provide eye protection. Movement is restricted by the air line hose; and the hose can become pinched, twisted, or otherwise compromised.
- All respirators must be used in accordance with the manufacturer's instructions and in compliance with the conditions of the respirator's NIOSH certification.

(3) Quality of Supply Air

- Measures must be taken to assure the breathing air provided is of high quality.
- Compressed breathing air must meet or exceed the requirements for Grade D breathing air, as described in the ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-1989.
- Oxygen content must be 19.5 - 23.5%.
- Hydrocarbon content must be 5 milligrams per cubic meter of air or less.
- Carbon monoxide content must be 10 ppm or less.
- Carbon dioxide content must be 1,000 ppm or less.
- No noticeable odors.
- (Created 8/03; Revised 2/07) UNL Environmental Health and Safety · (402) 472-4925 · http://ehs.unl.edu
- Compressors used to supply breathing air to respirators must be constructed and situated so as to:
  - Prevent entry of contaminated air into the air-supply system.
  - Minimize moisture content so that the dew point at 1 atmosphere pressure is 10° F below the ambient temperature.
  - Provide suitable in-line air purifying adsorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters must be maintained and replaced or refurbished periodically following the manufacturer's instructions. A tag indicating the date of the most recent sorbent bed change and the signature of the person performing the change should be affixed at or near the compressor.
  - Have a carbon monoxide monitor and alarm to assure carbon monoxide levels do not exceed 10 ppm.
- Escape Packs must be:
  - NIOSH certified for escape from the atmosphere in which they will be used.
  - Be fully charged prior to use.
  - Tested, certified, and maintained in accordance with applicable Department of Transportation regulations.
- Couplings for equipment used to supply breathing air must be incompatible with outlets for non-respirable air or other gas systems at the work site.

8.5.2 Facepiece Choices

(1) Following is a description of the common types of facepieces available as supplied air respirators.

- Loose-fitting hoods are light-weight, low-maintenance, and offer a wide field-of-vision. A loose-fitting hood is not fitted to a particular user and allows the user to have a beard or wear eyeglasses without compromising the effectiveness of the respirator. It also provides the greatest cooling.
- Tight-fitting facepiece models typically provide the highest level of protection. To ensure effectiveness of the respirator, a user cannot have a beard or other facial hair that interferes with the seal between the facepiece and face. Users must be fit-tested to use this type of equipment.
- Loose-fitting facepieces are equipped with either a flip-up visor attached to a helmet or a face shield attached to softer material that

covers the user's head and face. Fit testing is not required to use this type of facepiece. The user may have facial hair and wear glasses.

8.5.3 Equipment Inspection

(1) Respirators must be inspected before and after each use. Equipment found or suspected to be deficient or defective must be removed from service until repaired or verified as functional. Inspection must follow all manufacturer's recommendations. and include but not limited to the following checks:

- Cleanliness.
- Signs of deterioration. Parts to check include the facepiece, head straps, valves, and airline hoses. Repair or replace components, as necessary.
- Tightness of connections.
- Adequacy of the air supply, including system filters and charge on escape pack bottles.
- Proper functioning of monitoring and alarms systems.

8.5.4 Donning the Equipment

(1) Put on the respirator before entering the hazardous environment or beginning a task that will generate an airborne hazard.

(2) Loose-fitting hoods and facepieces:

- Place the hood/facepiece over the head.
- Adjust the position of the hood/facepiece to fit the support on the forehead comfortably.
- There should be no large gaps around the chin if using a loose-fitting facepiece. If wearing a hood, the skirt of the hood should cover the shoulders.
- Attach the air supply to the coupling on the hood/facepiece.

(3) Tight-fitting Facepieces

- Loosen all straps; pull the harness over the head and place the chin in the chin cup.
- Pull the head harness firmly down on the back of the head.
- Tighten the harness gently, starting with the bottom straps and then the middle and top straps.
- Perform a positive seal check by closing off the exhalation valve with the palm of the hand or a flat piece of paper and blowing gently into the respirator. The respirator should gently push away from the face without leakage of air.
- Perform a negative seal check by sealing off the filters or cartridges (using the method recommended by the manufacturer) and inhaling gently. The mask should collapse slightly around the face without leakage of air into the facepiece.
- Make adjustments, as needed, to assure a good fit.
- Attach the air supply to the coupling on the facepiece.

8.5.5 Working While Wearing the Equipment

(1) Know the hazards of the airborne contaminants and the signs and symptoms of exposure. Discontinue work, leave the area, and notify your supervisor and EHS immediately if experiencing signs or symptoms of exposure. Seek medical attention, if necessary. Make sure the airlines do not get tangled or compromised during work.

8.5.6 Cleaning the Respirator

(1) Follow the manufacturer's cleaning and disinfection recommendations. This generally involves washing the hood or helmet with mild soap and water, followed by disinfection; and wiping of the exterior surfaces of air line hoses, couplings, and other system parts.

8.5.7 Storage of the Respirator

(1) Store the equipment in a manner that will prevent the facepiece from becoming damaged or misshapen and in a clean designated environment away from chemicals, dust, sunlight and/or temperature extremes.

(2) Refer to the manufacturers recommendations for additional storage considerations.

8.5.8 Respirators and Powered Air Purifying Respirators

8.5.9.1 Definitions

(1) Supplied air (or air supplied SARs)
- Refers to respirators that provide the user with clean, breathable air from a self-contained source, such as a cylinder, or via an airline from a source outside the contaminated atmosphere. Supplied air respirators are used in atmospheres that are determined to be IDLH or Immediately Dangerous to Life and Health.

(2) SCBA
- A self-contained breathing apparatus or SCBA is a device worn by rescue workers, firefighters, and others to provide portable, breathable air in a hostile, IDLH-environment. An SCBA can be either an open or closed circuit.

(3) Escape
- Escape respirators are designed for use only to egress from hazardous atmospheres within 5, 10 or 15 minutes. Some escape respirators are used in conjunction with an airline to provide a small source of air in emergencies where an airline air source is severed.

(3) NIOSH-approved respirator:
- OSHA requires that employers use NIOSH-approved respirators in areas where respiratory protection is required. The NIOSH-approved respirator must be used in an approved configuration specified by the manufacturer. Any deviation from the approved configuration voids NIOSH approval.

(5) Filters/cartridges:
- The filter(s)/cartridge(s) attach to the blower unit, filtering the air that is drawn through them by the blower unit's motor. Different filters and cartridges are available for different contaminants. Employers must identify and measure the contaminants before selecting the appropriate type. A change-out procedure for chemical cartridges must be established by the employer to help ensure continued respirator effectiveness.

8.5.9.2 Selecting A Respirator

(1) Most personal protective equipment manufacturers and distributors offer recommendations on choosing respirators. These recommendations may be available as an online or published guide or may even take the form of an on-site analysis of the workplace. Regardless of these recommendations, ultimately it is the responsibility of the employer to ensure the proper respirators are being used for worker protection and that they meet all local, state, and federal regulations.

(2) The OSHA Web site, www.osha.gov, offers a wealth of information that is useful in the selection process. One of the more recent additions to the site is the Respirator Selection eTool. This eTool steps you through the decision-making process of selecting a respirator, according to the NIOSH Respirator

Decision Logic (RDL) and the OSHA standard for respiratory protection (29 CFR 1910.134).

(3) Certain applications and/or situations will limit the types of respirators that may be used, and this is the first consideration that should be made when selecting a respirator. For example, in abrasive blasting, a Type CE respirator must be used not only to provide respiratory protection, but also to provide protection to the neck and torso from the rebound of the blast media. Another example involves respirators that are used in atmospheres deficient in oxygen content (less than 19.5 percent), contain concentrations of a contaminant that would be considered immediately dangerous to life or health, or have the potential for either of these to occur because of the nature of the work being performed. In all of these instances, workers would not be allowed to wear a PAPR but would be required to wear a self-contained breathing apparatus (SCBA) or pressure-demand supplied air respirator with auxiliary escape cylinder.

8.5.9.3 Factors To Be Considered

(1) Many distinguishing factors influence the appropriateness of an SAR or PAPR for a given work application. Each type of respirator has a distinct set of advantages and disadvantages that must be considered as they relate to workers' comfort, productivity, and protection. Below is an outline of some of the more prevalent tradeoffs found between SARs and PAPRs. The table below provides a more detailed view.

- Mobility
  Worker mobility is a key concern in certain job functions. The ability, or inability, of a worker to move about can create both productivity and safety concerns. Worker mobility in a supplied air respirator is somewhat more restricted because of the limit on the length of the air supply hose. (As specified on the NIOSH approval label, air supply hoses are not to exceed 300 feet). The supply hose can present a "slip, trip, and fall hazard" to the worker wearing the respirator, as well as to those working in the same area.
- Operating Costs
  There are various costs associated with SARs. Recurring costs associated with SARs include replacement supply hose, replacement filter elements for any filtration system on the compressor system, replacement headpieces and other parts, and any operating costs associated with the compressor (electricity, maintenance, etc).
- Administrative Costs
  Often overlooked are the administrative costs associated with having a particular type of respirator in use. While all respirators require the establishment of a written program that includes training (29 CFR 1910.134 (k)), there are other requirements specific to the type of respirator being used.
- Comfort
  Comfort can be directly correlated with worker productivity and job satisfaction.. Because SARs operate at high pressures, they are able to operate climate control (vortex) tubes to heat or cool the air entering the

worker's respirator headpiece by as much as 30 degrees F. In work environments that are exceptionally hot or cold, vortex tubes can have a significant impact on worker comfort and productivity.

8.5.9.4 Equipment Inspection

(1) Respirators must be inspected before and after each use. Equipment found or suspected to be deficient or defective must be removed from service until repaired or verified as functional. Inspection must follow all manufacturer's recommendations and include but not limited to the following checks:

- Cleanliness.
- Signs of deterioration. Parts to check include the facepiece, head straps, valves, and airline hoses. Repair or replace components, as necessary.
- Tightness of connections.
- Adequacy of the air supply, including system filters and charge on escape pack bottles.
- Proper functioning of monitoring and alarms systems.

8.5.9.5 Donning the Equipment

(1) Put on the respirator before entering the hazardous environment or beginning a task that will generate an airborne hazard.

(2) Loose-fitting hoods and facepieces:

- Place the hood/facepiece over the head.
- Adjust the position of the hood/facepiece to fit the support on the forehead comfortably.
- There should be no large gaps around the chin if using a loose-fitting facepiece. If wearing a hood, the skirt of the hood should cover the shoulders.
- Attach the air supply to the coupling on the hood/facepiece.

(3) Tight-fitting facepiece

- Loosen all straps; pull the harness over the head and place the chin in the chin cup.
- Pull the head harness firmly down on the back of the head.
- Tighten the harness gently, starting with the bottom straps and then the middle and top straps.
- Perform a positive seal check by closing off the exhalation valve with the palm of the hand or a flat piece of paper and blowing gently into the respirator. The respirator should gently push away from the face without leakage of air.
- Perform a negative seal check by sealing off the filters or cartridges (using the method recommended by the manufacturer) and inhaling gently. The mask should collapse slightly around the face without leakage of air into the facepiece.
- Make adjustments, as needed, to assure a good fit.
- Attach the air supply to the coupling on the facepiece.

8.5.9.6 Working While Wearing the Equipment

(1) Know the hazards of the airborne contaminants and the signs and symptoms of exposure. Discontinue work, leave the area, and notify your supervisor and EHS immediately if experiencing signs or symptoms of exposure. Seek medical attention, if necessary. Make sure the airlines do not get tangled or compromised during work.

8.5.9.7 Cleaning the Respirator

(1) Follow the manufacturer's cleaning and disinfection recommendations. This generally involves washing the hood or helmet with mild soap and water, followed by disinfection; and wiping of the exterior surfaces of air line hoses, couplings, and other system parts.

8.5.9.8 Storage of the Respirator

(1) Store the equipment in a manner that will prevent the facepiece from becoming damaged or misshapen and in a clean designated environment away from chemicals, dust, sunlight and/or temperature extremes.
(2) Refer to the manufacturers recommendations for additional storage considerations.

8.6 Hearing Protection

8.6.1 General

Employees shall be protected from the effects of harmful noise levels. This responsibility shall include provisions for determining the presence of harmful noise levels and the implementation of an effective hearing conservation program when noise levels exceed the values set forth herein.

8.6.2 Noise Levels

Protection against the effects of noise exposure shall be provided when the sound levels exceed those shown below when measured on the A scale of a standard sound level meter at a slow response:

Duration per day, hours	Sound Level, DBA' Slow Response
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25 or less	115

8.6.3 Measurement

Sound levels shall be measured by qualified personnel using sound level meters meeting current ANSI S1.4 "Specification for Sound Level Meters," or dosimeters meeting current ANSI S1.25, "Specification for Personnel Noise Dosimeters."

8.6.4 Engineering Control

Insofar as practical, exposure to excessive noise shall be eliminated by engineering and/or administrative controls.

8.6.5 Hearing Conservation Program

When sound levels exceed 90 decibels measured in the 'A' weighting and engineering or administrative controls are not practical or effective, hearing protection devices shall be provided and used, and an effective hearing conservation program shall be administered. This program is to incorporate the following minimum provisions:

(a) Audiologist. A recognized audiologist is to be employed to serve as a consultant in establishing and carrying out an effective hearing conservation program. Exceptions may be granted to this requirement when conditions warrant a lesser degree of protection.

(b) Hearing Protectors. Employees are to be provided and required to use hearing protection devices that reduce employee exposure to at least the levels indicated in Subsection 8.5.2.

(c) Education. Employees shall be informed of hazardous areas through appropriate signage and instruction. Training on the proper use and maintenance of hearing protectors is also to be provided.

8.7 Protective Clothing

8.7.1 Welding Leathers

Personnel engaged in overhead welding or burning where severe burn hazards exist should wear leather gloves, leather apron, and coats or a combination of coats, sleeves, and pants providing equal protection. Leather gloves and apron should be worn during routine welding and burning. Appropriate clothing required for any welding operation will vary with the size, nature, and location of the work.

8.7.2 Gloves

Hand protection must be worn by employees, and be suitable to withstand the hazard, when certain types of hazards are present. These include hazards from skin absorption of hazardous chemicals, severe abrasions, punctures, chemical burns, thermal burns, and harmful temperature extremes. Safety Data Sheets or Material Safety Data Sheets can provide the necessary information on the type of glove to be used when handling chemicals.

8.7.3 Foot Protection

Foot protection in the form of substantial leather shoes shall be worn on all Allied Environmental Services, Inc. project sites. Tennis type canvas shoes are not acceptable. Employees engaged in field work operations will be allotted a maximum of $100.00 annually for the purchase of work shoes or boots. To receive re-imbursement, please show the new boots to the Operations Manager or your Supervisor and provide a copy of your receipt as proof of purchase. For new employees, re-imbursement will be issued after 90 days of employment.

8.7.4 Chemical Protective Clothing

Chemical protective clothing is available in the form of TYVEK coveralls and rain suits for special tasks. Should the need for greater protection be established, the company shall provide such clothing with documentation of required training.

8.7.5 Fire Resistant Clothing

Heat and/or fire resistant clothing or "NOMEX" is available for related heat/flame work, for welding protection "welder's jackets" and/or "leather sleeves" will be available. Due to the extreme fire hazards found at some industrial sites, fire resistant clothing may be required. Allied Environmental Services shall furnish employees fire resistant clothing as a condition of employment on these sites. Refer to Subsection 8.6.1.

8.7.6 Employee-owned Equipment

Where employees provide their own protective equipment, Allied shall be responsible to assure its adequacy, including proper maintenance, and sanitation of such equipment.

8.7.7 Training

Allied Environmental Services shall provide training, including re-training where appropriate, to each employee who is required to use PPE. Each such employee shall be trained to know the following:

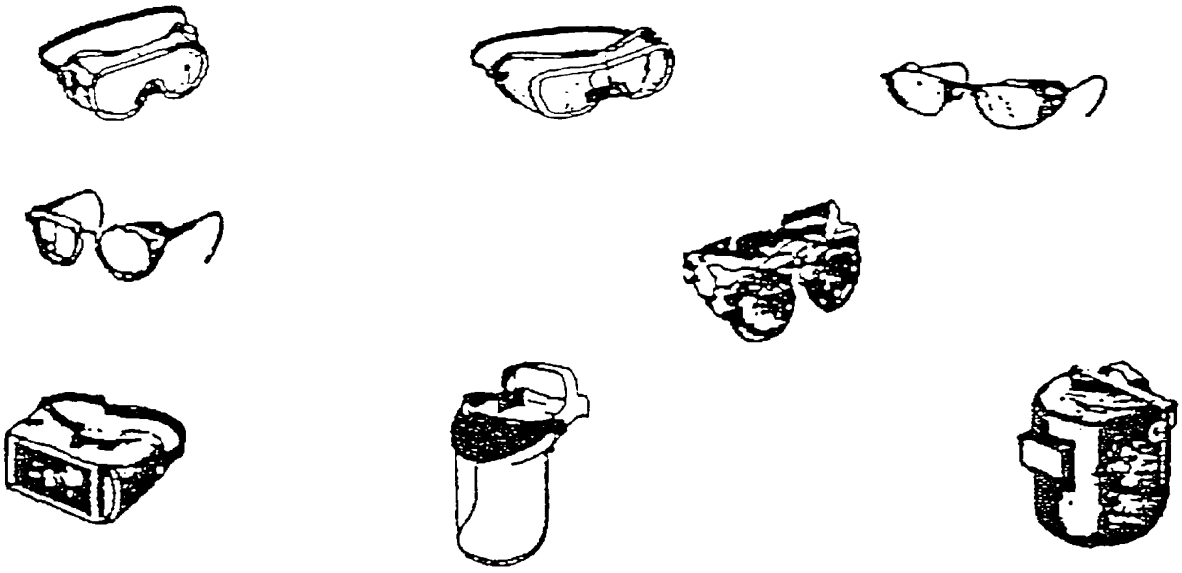
(a) When PPE is necessary.
(b) What PPE is necessary.
(c) How to properly don, remove, adjust, and wear PPE.
(d) The limitations of the PPE.
(e) The proper care, maintenance, useful life, and disposal of the PPE.

Retraining of the employee is required when the workplace changes, making the earlier training obsolete; the type of PPE changes; or when the employee demonstrates lack of use, improper use, or insufficient skill or understanding. The certification must include the employee name, the dates of training, and the certification subject.

8.8 Standard Sources

Detailed requirements for personal protective equipment can be found in the following OSHA standards for Construction:

-29 CFR 1926.100 Head Protection.
-29 CFR 1926.101 Hearing Protection.
-29 CFR 1926.102 Eye and Face Protection.
-29 CFR 1926.103 Respiratory Protection.



SAFETY GLASSES AND GOGGLES APPLICATION

OPERATION	HAZARDS	SELECTION
Acetylene burning, cutting, welding	Sparks, harmful rays, molten metal, flying particles	Safety glasses with side shields, shaded face shield
Chemical handling	Splash, acid burns, fumes	Chemicals safety goggles, clear face shield
Chipping	Flying particles	Safety glasses with side shields, clear face shield
Electric (arc) welding	Sparks, intense rays, molten metal	Safety glasses with side shields, welding hood (see shade chart)
Furnace operations	Glare, heat, molten metal	Safety glasses with side shields, heavy duty face shield
Grinding - heavy	Flying particles	Safety glasses with side shields, clear face shield or full-face respirator (Supervisor's discretion)
Grinding - light	Flying particles	Safety glasses with side shields, clear face shield or full-face respirator (Supervisor's discretion)
Laboratory	Chemical splash, glass breakage	Chemicals safety goggles, clear face shield
Machining	Flying particles	Safety glasses with side shields, clear face shield
Molten metals	Heat, glare, sparks, splash	Safety glasses with side shields, heavy duty face shield
Spot welding	Flying particles, sparks	Safety glasses with side shields, welding hood (see shade chart)

FIGURE 8-1

Selection of Shade Number for Welding Filters	
Welding Operation	**Suggested Shade Number***
Shielded Metal-Arc Welding, up to 5/32 inch electrodes	10
Shielded Metal-Arc Welding, 3/16 to 1/4 inch electrodes	12
Shielded Metal-Arc Welding, over 1/4 inch electrodes	14
Gas Metal-Arc Welding (Nonferrous)	11
Gas Metal-Arc Welding (Ferrous)	12
Gas Tungsten-Arc Welding	12
Atomic Hydrogen Welding	12
Carbon Arc Welding	14
Torch Soldering	2
Torch Brazing	3 or 4
Light Cutting, up to 1 inch	3 or 4
Medium Cutting, 1 to 6 inches	4 or 5
Heavy Cutting, over 6 inches	5 or 6
Gas Welding (Light) up to 1/8 inch	4 or 5
Gas Welding (Medium) 1/8 to 1/2 inch	5 or 6
Gas Welding (Heavy) over 1/2 inch	6 or 8

*The choice of a filter shade may be made on the basis of visual acuity and may, therefore, vary widely from one individual to another, particularly under different current densities, materials, and welding processes. However, the degree of protection from radiant energy afforded by the filter plate or lens, when chosen to allow visual acuity, will still remain in excess of the needs of eye filter protection. Filter plate shades as low as shade 8 have proven suitably radiation-absorbent for protection from the arc-welding processes.

Note: In gas welding or oxygen cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium light in the visible light of the operation (spectrum.)

FIGURE 8-2

RESPIRATOR SELECTION GUIDE

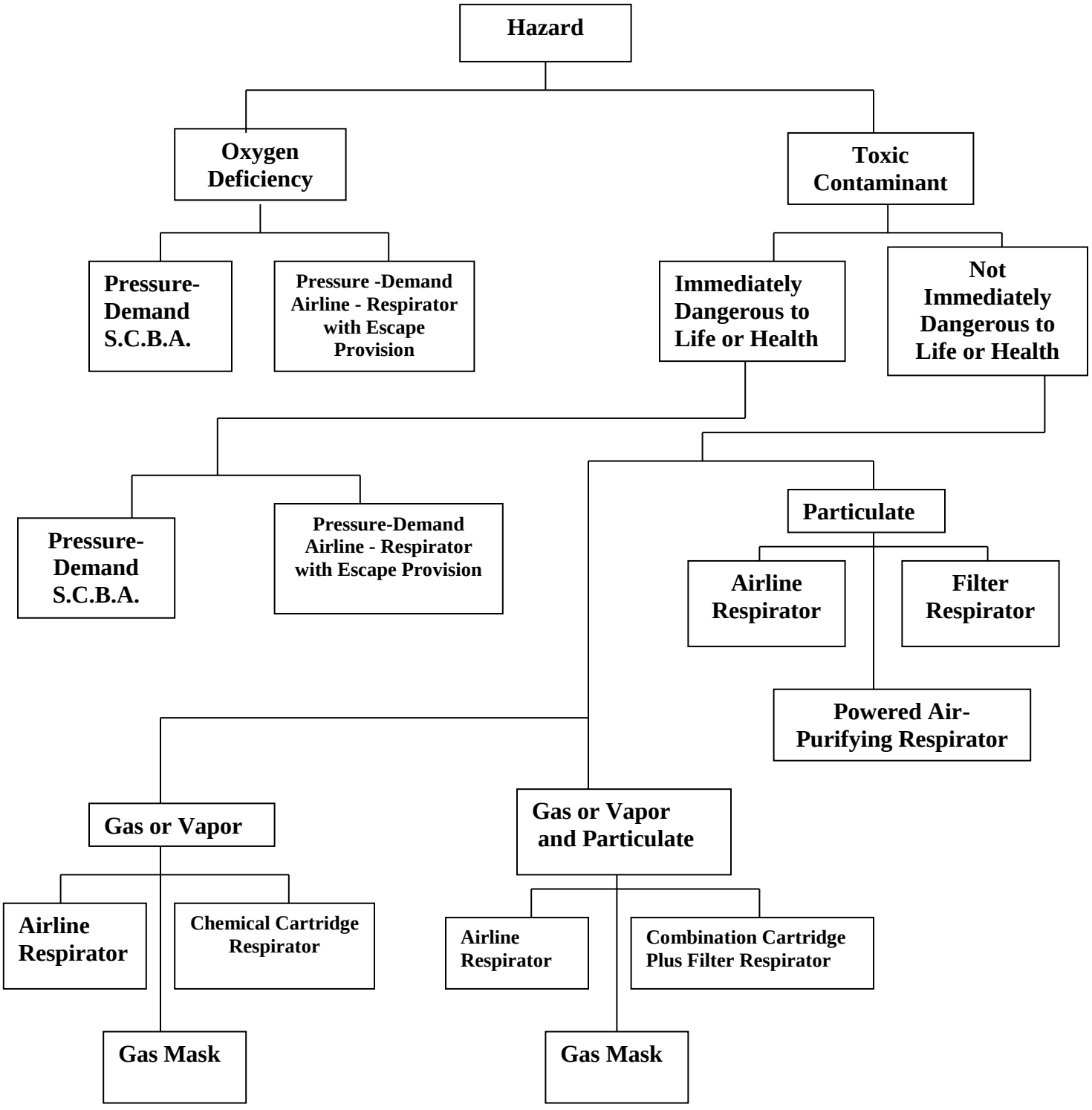


FIGURE 8 – 3

APPENDIX D TO 1910.134 (Mandatory)
Information for Employees Using Respirators when not Required Under the Standard

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present hazards.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.

2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.

3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.

4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

My signature indicates that I have been instructed in the limitations and proper use of respiratory equipment including the use of disposable dust masks.

Signature_____

Date_____

FIGURE 8-4

9.0 Fall Protection

9.1 Requirements to Have Fall Protection

9.1.1 Requirement

This subsection sets forth the type of fall protection systems required for specific areas and operation. Fall protection required by this subsection shall conform to the requirements of Section 9.2 Fall Protection Systems Criteria and Practices and shall include, at a minimum, 29 CFR 1926, Subpart M – Fall Protection.

Allied Environmental Services, Inc. shall provide fall protection equipment for all employees whenever employees are potentially exposed to falls from heights of six feet or greater to lower levels. This includes work near and around excavations. Use of guard rails, safety net, or personal or fall arrest systems should be used. When the standard methods of protection are not feasible or a greater hazard would be created, the exposure determination shall be made without regards to the use of PPE. Employer shall discuss the extent to which scaffolds, ladders or vehicle mounted work platforms can be used.

A fall protection plan shall be prepared by a qualified person/supervisor for each specified worksite.

9.1.2 Unprotected Sides and Edges

Employees on floors, low-pitched roofs, and other walking/working surfaces with unprotected sides and edges 6 feet or more above lower levels, shall be protected as follows:

(1) By the use of guardrail systems when the floor or other walking/working surface is 18 inches or more in width.

(2) By the use of guardrail systems, personal fall arrest systems, or safety net systems when the floor, roof, or other walking/working surface is less than 18 inches in width.

9.1.3 Leading Edges

Employees constructing leading edges 6 feet or more above lower levels shall be protected by guardrail systems, personal fall arrest systems, or safety net systems:

(1) Employees on floors, low-pitched roofs, and other walking surfaces where leading edges are under construction 6 feet or more above lower levels, but who are not constructing the leading edge, shall be protected by guardrail systems or control zone systems along the leading edge.

9.1.4 Hoist Areas

Employees in hoist areas 6 feet or more above lower levels shall be protected by guardrail systems or personal fall arrest systems:

(1) During hoisting operations, employees leaning through the access opening or out over the edge, to guide or receive materials or equipment, shall be protected by the use of personal fall arrest systems.

9.1.5 Holes

Employees on floors, low-pitched roofs, and other walking/working surfaces with holes 2 inches or more in its least dimension, shall be protected by covers or guardrails. Hole covers shall be labeled and securely fastened down.

9.1.6 Formwork and Reinforcing Steel

Employees on the face of formwork or reinforcing steel 6 feet or more above lower levels shall be protected by personal fall arrest systems, safety net systems, or positioning device systems.

9.1.7 Ramps, Walkways, Bridges, Runways, and Accessways

Employees on ramps, walkways, bridges, and runways 6 feet or more above lower levels shall be protected by guardrail systems. Stairs, ladders, or ramps shall be provided for all accessways where there is a change in elevation greater than 19inches.

9.1.8 Excavations

Employees at the edge of excavations 6 feet or more in depth shall be protected by guardrail systems, fences, signs, or barricades when the excavations are not readily seen because of plant growth or other visual barrier:

(1) Employees at the edge of pits, shafts, and similar excavations 6 feet or more above in depth shall be protected by guardrail systems, fences, barricades, or covers.

9.1.9 Dangerous Equipment

Employees working 6 foot or more above dangerous equipment shall be protected by guardrail systems, personal fall arrest systems, or safety net systems.

9.1.10 Wall Openings

Employees working on, at, or near wall openings (including those with chutes attached) where the outside bottom edge of the wall opening is more than 6 feet above lower levels and the inside bottom edge of the wall is less than 39 inches above the walking/working surface, shall be protected from falling through or into the wall opening by the use of guardrail systems, personal fall arrest systems, or a safety net system.

9.1.11 Protection From Falling Objects

In addition to wearing hard hats, employees shall be protected from falling objects by toe-boards, screens, or guardrail systems erected to prevent objects from falling from higher levels, or they shall be protected by a canopy structure erected to deflect falling objects, or the area to which objects could fall shall be marked with signs or barricaded and employees prohibited from entering the area, or the potential fall objects shall be placed away from the edge a distance sufficient to prevent them from going over the edge should they be accidentally displaced.

9.2 Fall Protection Systems Criteria and Practices

9.2.1 General

9.2.2 Guardrail Systems

Guardrail systems and their use shall comply with the following provisions:

(1) Top edge height of top-rails, or equivalent guardrail system members, shall be 42 inches plus or minus 3 inches above the walking/working level.

(2) Mid-rails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members shall be installed between the top edge of the guardrail system and the walking/working surface when there is no wall or parapet at least 21 inches high. Mid-rails, when used, shall be installed at a height midway between the top edge of the guardrail system and the walking/working level. Screen and mesh, when used, shall extend from the top rail to the walking/working level and along the entire opening between top-rail supports.

(3) Guardrail systems shall be capable of withstanding, without failure, a force of at least 200 pounds applied within 2 inches of the top edge, in any outward or downward direction, at any point along the top edge. When the 200 pound test load is applied in a downward direction, the top edge **shall not deflect** to a height less than 39 inches above the walking/working surface.
(4) Guardrail systems shall be so surfaced as to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing, which could cause an employee to fall. Wooden guardrails shall have all nails driven flush with the surface of the wood.
(5) The ends of all top rails and mid-rails shall not overhang the terminal posts except where such overhang does not create a projection hazard.
(6) Steel and plastic banding shall not be used as top rails or mid-rails.
(7) Top-rails and mid-rails shall be at least ¼ inch nominal diameter or thickness.
(8) When guardrail systems are used at hoist areas, a chain, gate, or removable guardrail section shall be placed across the access opening between guardrail sections when hoisting operations are not taking place.
(9) Guardrail systems on ramps and runways shall be erected along each unprotected side or edge; however, when operating conditions preclude installation of a guardrail system along both sides, the guardrail system may be omitted along one side provided a ramp or runway at least 18 inches wide is used.

9.2.3 Personal Fall Arrest Systems

Personal fall arrest systems and their use shall comply with the provisions of this subsection. Body belts are prohibited on Allied Environmental Services projects. Full body harnesses properly fitted and adjusted shall be used. No employee, supervisor, or craft is exempt from this requirement.

Damaged or unserviceable personal fall arrest equipment shall be removed from service and destroyed and immediately replaced. Personal fall arrest systems shall include, but not limited to, a full body harness, lanyards with double locking snap-hooks, and an adequate anchorage point (5000 lb per employee). In addition, employees may use a double lanyard system (for point-to-point movement), vertical and/or horizontal lifelines, retractable lifelines, or other such approved devices that meet the criteria set forth in 29 CFR 1926.502(b).

(1) Personal fall arrest systems and components shall be used only for employee fall protection.
(2) Personal fall arrest systems or components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection unless inspected and determined by a competent person to be undamaged and suitable for reuse.
(3) Lifelines shall be protected against being cut or abraded.
(4) Personal fall arrest systems shall be rigged to minimize free fall distance with a maximum free fall distance allowed of 6 feet, and such that the employee will not contact any lower surface.
(5) Personal fall arrest systems shall decelerate and bring the employee to a complete stop within 42 inches, including lifeline elongation, after any free fall distance.
(6) Full body harnesses shall be worn with lanyard or deceleration device attachment point positioned at one of the following locations: in the center of the wearer's back near shoulder level or above the wearer's head.
(7) When vertical lifelines are used, not more than one employee shall be attached to any one lifeline.
(8) It is required that Allied Environmental Services employees use a shock-absorbing lanyard with double locking snap-hooks or a self-retracting lanyard to limit fall distance. If these types of equipment are not available, the following conditions shall be avoided:
    (a) Two or more snap-hooks connected to one d-ring.
    (b) Two snap-hooks connected to each other.

(c) A snap-hook connected back on its lanyard.

(9) All other components of personal fall arrest systems shall be capable of supporting a minimum fall impact load of 5,000 pounds applied at the lanyard point of connection.

(10) Personal fall arrest systems shall be inspected prior to each use for mildew, wear, damage, and other deterioration, and defective components shall be removed from service if their function or strength has been adversely affected. Refer to Section 9.1 for inspection guidelines. Defective components shall be removed from service.

(11) When personal fall arrest systems are used at hoist areas, they shall not be attached to hoist or guardrail systems. They shall be rigged to allow the movement of employees only as far as the edge of the walking/working surface.

(12) Personal fall arrest systems are for employee protection and are NOT to be used for hoisting equipment or materials.

(13) When purchasing equipment and raw materials for use in fall protection systems, applicable ANSI & ASTM requirements should be met.

9.2.4 Positioning Device Systems

Positioning device systems and their use shall conform to the following provisions:

(1) Positioning devices shall be rigged such that an employee cannot free fall more than 24 inches.

(2) Positioning device systems shall be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall.

(3) All snap-hooks shall be double locking type.

(4) Positioning device systems shall be inspected prior to each use for mildew, wear, damage, and other deterioration, and defective components shall be removed from service if their function or strength has been affected.

9.2.5 Warning Line Systems

Warning line systems and their use shall comply with the following provisions:

(1) The warning line shall be erected around all sides of the work area.

(2) When mechanical equipment is not being used, the warning line shall be erected not less than 6 feet from the roof edge.

(3) When mechanical equipment is being used, the warning line shall be erected not less than 6 feet from the roof edge which is parallel to the direction of mechanical equipment operation, and not less than 10 feet from the roof edge which is perpendicular to the direction of mechanical equipment operation.

(4) Points of access, material handling areas, storage areas, and hoisting areas shall be connected to the work area by an access path formed by two warning lines.

(5) When the point of access path is not in use, a rope, wire, chain, or other barricade, equivalent in strength and height to the warning line, shall be placed across the path at the point where the path intersects the warning line erected around the warning line area, or the path shall be offset such that a person cannot walk directly into the work area.

(6) Warning lines shall consist of ropes, wires, chains, and supporting stanchions. The rope, wire, or chain shall be flagged at not more than 6 foot intervals with high visibility material.

(7) The rope, wire, or chain shall be rigged and supported in such a way that its lowest point (including sag) is not less than 34 inches from the walking/working surface and its highest point is not more than 39 inches from the walking/working surface.

(8) Employees not performing built-up roofing work shall not be allowed in the area between a roof edge and a warning line.

9.2.6 Controlled Access Zone Systems

When conventional fall protection is not used these locations must be identified and classified as controlled access zones. Control zone systems and their use shall conform to the following provisions:

(1) For leading edges on floors, low-pitched roofs, and other walking/working surfaces, the control zone shall be defined by a line erected not less than 6 feet nor more than 25 feet from the leading edge. The line shall extend along the entire length of the leading edge and be parallel to the leading edge. The line shall be connected on each side to a guardrail system or wall.

(2) Control zone access path lines shall consist of ropes, wires, tapes, or equivalent materials. Each line shall be flagged or otherwise clearly marked at not more than 6 foot intervals with high visibility material.

(3) For leading edge work, each line shall be rigged and supported in such a way that its lowest point (including sag) is not less than 39 inches from the walking/working surface and its highest point is not more than 45 inches from the walking/working surface.

(4) On floors and roofs where guardrail systems are not in place, employees performing leading edge work shall not be allowed outside of the control zone unless protected by a personal fall arrest system or safety net system.

(5) Employees not performing leading edge work shall not be allowed in the control zone.

9.2.7 Safety Monitoring Systems

Where no other alternate methods have been implemented, a safety monitoring system shall be implemented per [1926.502(h)]. Safety monitoring systems and their use shall conform to the following provisions:

(1) Persons monitoring the safety of others:
   (a) Shall be competent in recognizing fall hazards.
   (b) Shall have an accurate count of persons to be working in the area before starting the work.
   (c) Shall warn the employees when it appears that the employees are unaware of a fall hazard;
   (d) Or are acting in an unsafe manner.
   (e) Shall be on the same walking/working surface and within visual sighting distance of the employees being monitored.
   (f) Must be close enough to orally communicate with the employees.
   (g) Must not have other responsibilities that impair the monitoring function.

(2) Employees not involved in the work protected by a safety monitoring system shall be prohibited from entering that work area.

(3) Employees in the controlled access zone shall comply promptly with fall hazards warnings from the safety monitor.

9.2.8 Covers

Covers for holes in floors, roofs, and other walking/working surfaces shall comply with the following provisions:

(1) Covers located in roadways and vehicular aisles shall be capable of supporting, without failure, at least twice the maximum axle load of the largest vehicle expected to cross over the cover.

(2) All other covers shall be capable of supporting, without failure, twice the maximum total anticipated load of employees, equipment, and materials to be applied to the cover at any one time.

(3) All covers shall be installed so as to prevent accidental displacement and shall be plainly marked with the word “HOLE” or “COVER”

9.3 Training Requirements

9.3.1 Training Program

Employees who might be exposed to falls shall be trained to recognize and avoid fall hazards, and in the procedure to minimize these hazards. Training shall be by a competent person qualified in the following:

(1) The nature of fall hazards.
(2) Proper assembly, use, disassembly, maintenance, inspection, and storage of fall protection system components.
(3) The different types of fall protection systems (i.e., guardrails, personal fall arrest systems, safety nets, warning lines, safety monitors, controlled access, etc.).
(4) The Safety Monitoring System and each employee's role in it.
(5) The physical limitations of mechanical fall protection equipment.
(6) The correct procedures for handling and storing materials and the erection of overhead protection.
(7) The information contained in this Section 9.0 Fall Protection, as well as 29 CFR 1926, Subpart M – Fall Protection.

9.3.2 Certification and Retraining

1. Written certification shall be maintained to verify compliance with this Subsection. Certification shall contain:
   (a) Employee's name or Identification number.
   (b) Date of the training.
   (c) Name and signature of person conducting the training or the signature of the employer.
   (d) Latest certification shall be maintained in records.
2. Employees shall be retrained under the following circumstances:
   (a) Employer believes the employee has not grasped the necessary ideas and procedures of the training.
   (b) Changes in the workplace render the training obsolete.
   (c) Changes in fall protection equipment render training obsolete.
   (d) Improper use of fall protection equipment indicates employee has not retained the skill.

9.4 Accident Investigations

All accidents and serious incidents (near accidents) must be investigated, implementing changes to the fall protection plan as necessary.

9.5 Personal Fall Arrest System Inspection

9.5.1 Requirement

Personal fall arrest systems shall be inspected prior to each use. Use Inspection Form Fig. 9-1 to document inspections. The following guidelines should be used to conduct the inspection. Any component of the system found to be defective should be replaced.

9.5.2 **Full Body Harness** Inspection

Beginning at one end of the full body harness, holding the body side of the harness toward you, grasp the harness with your hands 6 to 8 inches apart. Bend the harness in an inverted "U". The surface tension resulting makes damaged fibers or cuts easier to see. Follow this procedure the entire length of the harness. Broken webbing strands generally appear as tufts on the webbing surface. Hardware should also be inspected closely:

(1) Rivets – Check for tightness. They should be unmovable with fingers. Bent rivets will fail under stress. Especially note condition of d-ring rivets and d-ring metal wear pads. Discolored, pitted, or cracked rivets indicate chemical corrosion.

(2) Tongue – The tongue of the belt receives heavy wear from buckling and unbuckling. Inspect for loose, distorted, or broken grommets. Belts using punched holes without grommets should be checked for torn or elongated holes causing slippage of the buckle tongue.
(3) Tongue Buckle – Should be free of distortion in shape and motion. They should overlap the buckle frame and move freely back and forth in their socket. Roller should turn freely on the frame. There should be no sharp edges anywhere on the buckle.

9.5.3 Lanyard Inspection

When inspecting lanyards, begin at one end and work to the opposite end. Slowly rotate the lanyard so that the entire circumference is checked. Spliced ends require particular attention. Hardware should also be checked closely:

(1) Steel Lanyards – While rotating the steel lanyard, look for cuts, frayed wires, or unusual wear patterns on the wire. Broken strands will separate from the body of the lanyard.
(2) Webbing Lanyards – While bending the lanyard over a pipe or other surface, check each side of the webbed lanyard. This will reveal any cuts or breaks. Discoloration, cracks, and charring are obvious signs of chemical or heat damage. Check closely for any breaks in the stitching.
(3) Rope Lanyards – Rotation of the rope lanyard while inspecting from end to end will bring to light any fuzzy, worn, broken, or cut fibers. Weakened areas from extreme loads will appear as a noticeable change in original diameter. The rope diameter should be uniform throughout, following a short break-in period.
(4) Snaps – Inspect closely for hook and eye distortion, cracks, corrosion, or pitted surfaces. The keeper should seat into nose without bending and should not be distorted or obstructed. The keeper spring should exert sufficient force to firmly close the keeper.
(5) D-rings – Check D-ring and D-ring metal wear pad for distortion, cracks, breaks, and rough or sharp edges. The D-ring bar should be at a 90 degree angle with the long axis of the belt and should pivot freely.
(6) Thimbles – The thimbles should be unmovable in the eye of the splice and the splice should have no loose or cut strands. The edges of the thimble must be free of sharp edges, distortion, or cracks.

9.6 Standard Sources

Detailed requirements for fall protection can be found in the following OSHA standards:

*Construction:

- -29 CFR 1926.501 Requirements to Have Fall Protection
- -29 CFR 1926.502 Fall Protection Systems
- -29 CFR 1926.104 Safety Belts, Lifelines, and Lanyards
- -29 CFR 1926.105 Safety Nets

*General Industry

- -29 CFR 1910.23 Guarding Floor and Wall Openings and Holes.

Pre-Use Rigging and Fall Protection Equipment Inspection Form

Project Name: Week of:

Instructions: Check box for each item inspected and day(s) inspected prior to use. Note any deficiencies in comment section

ID NO.	RIGGING							HARNESS							LADDER					DAY OF WEEK						
	Broken Wires	Broken/worn Stitching	Kinkking/crushing/bird caging	Wear/elongated links	Reduction in dia., due to wear	Broke clutch/locking device	Heat/Mech./Chemical damage	Double locking snap hook	All Stitching	Rivets/eyelets	Belt webbing	Data tag	D-Rings/buckle/tongue	Lanyard	Cracks	Condition of rungs	Dents/bends	Safety feet	Tie-off rope	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday

Comments:

Figure 9-1

10.0 Fire Prevention and Protection

10.1 General

The danger to employees, financial loss to our clients as well as ourselves, and the hazards posed to the general public, make the prevention of fire one of the most important safety responsibilities on any project. It is the policy of Allied Environmental Services, Inc., that every employee become familiar with and practice good fire prevention habits in all phases of his or her daily activities. This section sets forth requirements for field activities and provides some discussion of fire prevention and protection in general industry. In addition to the requirements of this section, additional fire prevention and fire protection requirements relating to specific hazards and operations, welding and cutting, etc., are set forth in the appropriate sections. All employees shall be familiar with the type, use and operation of fire extinguishers used on jobsites. Training will be required for pre-placement and annually thereafter.

10.1.1 Training Requirements

- All employees shall be trained and familiar with the type, use and operation of fire extinguishers, and the hazards involved in incipient stage fire fighting.
- Training will be required for pre-placement and annually thereafter.

10.2 Fire Prevention

Good housekeeping, with provisions for prompt removal and disposal of accumulations of combustible scrap and debris, shall be maintained in all areas of the workplace, whether it be a construction site, industrial, or office setting. On all job sites, combustible scrap and debris shall be removed at regular intervals during the course of the project or job. Safe means shall be provided to facilitate such removal. Containers shall be provided for the collection and separation of waste, trash, oily and used rags, and other refuse. Self-closing metal containers shall be used for disposal of waste saturated with flammable liquids.

10.2.1 Smoking

Smoking or other sources of ignition shall not be permitted in areas where flammable or explosive materials are stored or are present. All such areas shall be posted: NO SMOKING OR OPEN FLAMES. Smoking regulations are to be obeyed.

10.2.2 Cleaning and degreasing

Gasoline and liquids with a flash point below 100 degrees F shall not be used for cleaning and degreasing.

10.2.3 Building Exits

All buildings, shops, and plant facilities in which employees are required to work shall have at least two well marked and lighted exits. The two exits shall be arranged to minimize the possibility of both exits being rendered inaccessible by one fire or emergency condition.

10.2.4 Open yard Storage

Combustible materials shall be piled with due regard to the stability of the piles and in no case higher than 20 feet. Driveways between and around combustible storage piles are to be at least 15 feet wide and maintained free from accumulation of rubbish, equipment, or other articles or materials. No combustible materials shall be stored within 10 feet of a building or structure. Portable fire extinguishing equipment suitable for the fire hazard involved shall be provided at convenient, conspicuously accessible locations in the yard area. Portable fire extinguishers, rated not less than 2A, shall be placed so that the maximum travel distance to the nearest unit shall not exceed 100 feet.

10.2.5 Indoor Storage

Storage shall not obstruct or adversely affect means of exit. All materials shall be stored, handled, and piled with due regard to their fire characteristics.

Incompatible materials which create a fire hazard shall be separated by a barrier rated for 1-hour resistance. Material shall be piled to minimize the spread of fire internally and to permit convenient access for firefighting. Clearance of at least 36 inches shall be maintained between the top level of the stored material and sprinkler deflectors. Clearance shall be maintained around lights and heating units to prevent ignition of combustible materials.

10.3 Fire Protection

Access to available firefighting equipment shall be maintained at all times. All firefighting equipment shall be inspected at least monthly, maintained, and conspicuously located. Defective equipment shall be immediately replaced.

10.3.1 Fire Extinguishers

The following is a brief description of the classification of fires and the recommended extinguisher to be used on each:

(1) Class "A" Fires – Wood, paper, rags, rubbish. Recommended extinguishers: water through the use of hose, pump type water cans, or pressurized extinguishers having an A or ABC rating.

(2) Class "B" Fires – Flammable liquids, gasoline, oil, paints, greases, etc., Recommended extinguishers: Carbon Dioxide or dry chemical having a BC or ABC rating.

(3) Class "C" Fires – Electrical equipment. Recommended extinguishers: Carbon Dioxide or dry chemical having a BC or ABC rating.

(4) Class "D" Fires – Combustible metals. Class D extinguishers are to be used in those instances where combustible metal powders, flakes, shavings, or similarly sized products are generated. These extinguishing agents are to be approved by recognized testing laboratories.

(5) Carbon tetrachloride or other toxic vaporizing liquid extinguishers are prohibited.

(6) Portable fire extinguishers are subject to monthly vision checks and an annual maintenance check. The annual maintenance date will be recorded & retain the inspection record for 1 year after the last entry of life of the shell, whichever is less.

10.3.2 Jobsites

Fire Extinguishers shall be inspected with the tag dated and initialed on a monthly basis. An annual maintenance inspection of all portable fire extinguishers shall be performed by qualified personnel. On all jobsites, portable firefighting equipment shall be suitably placed as follows:

(1) A fire extinguisher, rated not less than 2A, shall be provided for not less than each 3,000 square feet of building area, or major fraction thereof. Travel distance from any point of the protected area to the nearest fire extinguisher shall not exceed 100 feet. A ½ inch diameter garden type hose line, not to exceed 100 feet in length and equipped with a nozzle, may be substituted for a 2A fire extinguisher, providing it is capable of discharging a minimum 5 gallons per minute with a minimum hose stream range of 30 feet horizontally. One or more fire extinguishers, not rated less than 2A, shall be provided on each floor. In multistory buildings, at least one fire extinguisher shall be located adjacent to stairways.

(2) A fire extinguisher, not rated less than 10B, shall be provided within 50 feet of wherever more than 5 gallons of flammable or combustible liquids, or 5 pounds of flammable gas, are being used on the jobsite. This requirement does not apply to integral fuel tanks of motor vehicles.

(3) Each site shall have a Fire Protection Plan which outlines the methods and equipment to be used for protecting the building and identifies the responsibilities of subcontractors who, by nature of there work, have a role in the plan. See Figure 10-1.

Multipurpose (ABC) fire extinguishers are the preferred fire extinguishers to be used.

10.3.3 Company Vehicles

It is recommended that Allied Environmental Services, Inc., owned vehicles be equipped with a 2 ½ pound ABC dry chemical fire extinguisher.

10.3.4 Restricted Use

Firefighting equipment shall be operative at all times and shall not be used for any purpose other than extinguishing fires. Only persons trained in usage of an extinguisher should attempt to put out a fire.

10.4 Temporary Heating Devices

The following requirements apply to the use of temporary heating devices:

(1) Data Plates – each heater should have permanently attached to it a data plate providing the following information:

(a) Required clearance.
(b) Ventilation requirements.
(c) Fuel type and input pressure.
(d) Lighting and extinguishing instructions.
(e) Electrical power supply characteristics.

(2) Clearance – Temporary heating devices shall be installed to provide clearance of not less than 12" side and rear and 36" side and rear for both circulating and radiant type heaters.

(3) Combustible Covering – Heaters used in the vicinity of combustibles; tarpaulins, canvas, or similar coverings, shall be located at least 10 feet from the coverings.

(4) Stability – Heaters, when used, shall be set on level surfaces and located so as to minimize danger of upset.

(5) Venting – Solid fuel, gas, or liquid-fuel used in an enclosed building or structure shall be vented outside.

10.4.1 Restricted Use

The following restrictions shall apply to the use of temporary devices:

(1) Solid Fuel Salamanders - Solid fuel salamanders are prohibited in buildings and on scaffolds.

10.5 Standard Sources

Detailed requirements for fire prevention and protection can be found in the following OSHA standards:

*Construction:

- 29 CFR 1926.150 Fire Protection
- 29 CFR 1926.151 Fire Prevention
- 29 CFR 1926.152 Flammable and Combustible Liquids
- 29 CFR 1926.153 Liquefied Petroleum Gas
- 29 CFR 1926.154 Temporary Heating Devices

*General Industry:

- 29 CFR 1910.106 Flammable and Combustible Liquids
- 29 CFR 1910.110 Storage and handling of LP Gas
- 29 CFR 1910.157 Fire Extinguishers

JOB PHONE:
JOB SUPERVISOR:

FIRE PROTECTION PROGRAM

AT

_____

The following are the methods and equipment to be used for protecting the building, materials and personnel from fire damage for this project.

_____, Allied Environmental Services, Incorporated, project supervisor, is responsible for implementing the fire protection program and making it known to all contractors on the project.

No fires are to be fought where there is an imminent danger to the life of employees. The local fire department is to be notified immediately in the event of a fire. Emergency numbers are to be posted at all phones on the job site.

In the event of a serious fire, employees are instructed to evacuate the building via the nearest exit and assemble at the job site trailers in order that a head count can be taken. Each contractor is responsible for conducting the head count of his employees and notifying _____ of the results of the count.

A copy of the evacuation plan and the alarm code (copy attached) will be conspicuously posted at each employee entrance and at all phones.

All exit doors will be identified as such.

FIGURE 10-1

Site Fire Protection Program
Page 2

One fire extinguisher (minimum 2A type) or equivalent will be provided for each 3,000 square feet of the protected building area. Travel distance from any point of the protected area to the nearest extinguishing device will not exceed 100 feet.

Equivalent devices to an extinguisher are:

1. **A 55 gallon drum of water with 2 fire pails.**

2. **A half inch garden type hose line not to exceed 100 feet in length and equipped with a nozzle capable of discharging a minimum of 5 gallons per minute with a minimum hose stream range of 30 feet horizontally.**

At least one extinguisher will be provided on each floor adjacent to the stairway.

A fire extinguisher rated not less than 10B will be provided within 50 feet whenever more than 5 gallons of flammable or combustible liquids or 5 lbs. of flammable gas are being used on the job site.

The above fire fighting devices will be conspicuously located, periodically inspected and employees trained in their use. The devices will be kept clear of debris and readily accessible at all times.

In case of fire, the plumbing contractor, _____will be responsible for shutting off the natural gas supply to the building and the electrical contractor, _____, will be responsible for shutting off the electricity to the building. This is to be done only if these actions pose no danger to the personnel performing these functions.

Containers will be provided for the collection of rubbish, debris, etc. Each contractor, or subcontractor, is responsible for cleaning up his own debris as necessary to maintain a clean work area. Failure to do so will result in Allied Environmental Services, Incorporated doing the clean up and back charging the contractor that non-performed.

11.0 Scaffolding and Work Platforms

11.1 Training Requirements

Each employee who performs work while on a scaffold shall be trained by a person qualified in the subject matter to recognize the hazards associated with the type of scaffold being used and to understand the procedures to control or minimize those hazards. The training shall include the following areas, as applicable:

(1) The nature of any electrical hazards, fall hazards and falling object hazards in the work area;
(2) The correct procedures for dealing with electrical hazards and for erecting, maintaining, and disassembling the fall protection systems and falling object protection systems being used;
(3) The proper use of the scaffold, and the proper handling of materials on the scaffold;
(4) The maximum intended load and the load-carrying capacities of the scaffolds used.

When the employer has reason to believe that an employee lacks the skill or understanding needed for safe work involving the use of scaffolds, the employer shall retrain each such employee so that the requisite proficiency is regained. Retraining is required in at least the following situations:
(1) Where changes at the worksite present a hazard about which an employee has not been previously trained; or
(2) Where changes in the types of scaffolds, fall protection, falling object protection, or other equipment present a hazard about which an employee has not been previously trained; or
(3) Where inadequacies in an affected employee's work involving scaffolds indicate that the employee has not retained the requisite proficiency.

11.2 General Requirements

Scaffolds, platforms, or temporary floors shall be provided for employees engaged in work that cannot be performed safely from the ground or from solid construction. Scaffolding shall be erected, dismantled, or altered under the supervision of a competent person. Ladders and makeshift devices shall not be used to increase height of scaffolding. Scaffolding work surfaces shall be essentially level.

11.2.2 Inspection

Before any Allied Environmental Services, Inc. employee accesses any type of scaffold he/she shall first inspect the scaffold to ensure it has been erected according to the requirements of this section. In addition, the scaffold equipment must be inspected by a competent person prior to use and periodically during use. To facilitate the inspection process, some projects may use a scaffold tagging procedure. Scaffolds that are incomplete and not safe to use shall be tagged with a red “Danger Do Not Use” tag. Scaffolds that are complete and properly erected with guardrails, midrails, and toeboards shall be tagged with a green “Safe To Use” tag. Scaffolds that do not have guardrails or are incomplete but can be used safely shall be tagged with a yellow “Caution Use Personal Fall Arrest System” tag. Use Figure 11-3 for documentation of daily inspections. Modifications can only be made by a competent person designated by Allied Environmental Services or sub-contractor.

11.2.3 Safety Factors

Scaffolds and their components, except for wire or fiber rope suspension, shall be capable of supporting at least four times the maximum intended load. Any scaffold or part of scaffolding, including accessories such as braces, trusses, screw jacks, brackets, ladders, wire or fiber rope, etc., that is damaged or weakened will be immediately repaired or replaced.

Only qualified and competent personnel are allowed to modify scaffolding systems. Modifications made by non-qualified personnel may create additional hazards. Non-qualified personnel making modifications to any scaffold equipment will be subject to Allied's disciplinary policy.

11.2.4 Access

Access to scaffolding can be by separate or integral ladders or stairways meeting the requirements of Section 13.0 of this manual. Structural members shall not be used for means of access.

11.2.5 Guardrails

Except for floats and needle beam scaffolds, work platforms and scaffolds more than 10 feet above the ground or floor level shall be provided with standard guardrails, midrails, and toeboards on all open sides and ends. Scaffolds 4 to 10 feet in height, erected above machinery or other hazard, or having minimum horizontal dimension in either direction less than 45 inches, shall also be provided with standard guardrails installed on all open sides and ends.

11.2.6 Footing

The footing or anchorage for scaffolds shall be sound, rigid, and capable of carrying the maximum intended load without settling or displacement. Unstable objects such as concrete blocks, bricks, or barrels shall not be used to support scaffolds or planks.

11.2.7 Poles, Legs, and Uprights

Poles, legs, and uprights shall be plumb, secure, and rigidly braced to prevent swaying and displacement. Scaffolds shall be secured to the wall or structure by guys or ties every 26 feet or less horizontally and every 30 feet or less vertically. Scaffolds 3 feet wide or less must be secured every 20' or less horizontally and 30' vertically.

11.2.8 Scaffold Lumber

Load carrying timber members of scaffolding framing shall be a minimum of 1,500 lb/in. (stress grade) construction grade lumber.

11.2.9 Restrictions

Scaffolds shall not be altered or moved horizontally while being used or occupied except when specifically designed for such use.

11.3 Scaffold Planks

Planking used as working surfaces on scaffolds, platforms, runways, or ramps shall not be less than 2 inches nominal thickness and scaffold grade or equivalent. Scaffold planks shall be, as conditions permit, laid flush and planking secured in place to prevent displacement.

11.3.1 Lapped Planking

Planking, when lapped, shall overlap each member a minimum of 12 inches. Scaffold planks shall extend over their bearers not less than 6 inches, unless cleated, and no more than 12 inches.

11.3.2 Intermediate Support

When necessary to prevent dislodgment or excessive deflection, intermediate support shall be provided.

11.3.3 Changing Levels

When moving platforms or planking to another level, the old planking shall be left in place until the new bearers have been installed.

11.4 Standard Guardrails

11.4.1 Design

A standard guardrail shall consist of a top rail, intermediate rail, toe board, and posts. The vertical height of the guardrail shall be approximately 42 inches, with posts spaced not to exceed 8 feet on centers. Intermediate rails shall split the difference between the top rail and the platform or floor. Toe boards shall be a minimum height of 4 inches installed flush with the planking or floor.

11.4.2 Guardrail Strength

Regardless of material used, the guardrail shall be capable of withstanding a minimum loading of 200 pounds in any direction at any point on the top rail with minimum deflection.

11.5 Hazardous Conditions

11.5.1 Falling objects

When persons are required to work under scaffolding or the scaffolding is above an access way, the scaffold shall be enclosed on the open side and ends. The protective enclosure shall be No. 18 gauge wire, or equivalent.

11.5.2 Hoisting Equipment

Material hoists shall not be mounted on scaffolds or elevated work platforms unless the scaffold or work platform is designed or strengthened to withstand the additional loading.

11.6 Scaffold Maintenance

11.6.1 Requirement

Scaffold and work platforms, including access thereto, shall be inspected and tagged by competent personnel prior to each shift and maintained in a safe condition. Scaffolding or elevated work platforms damaged or weakened in any manner shall be removed or repaired immediately.

11.6.2 Unsafe Conditions

Scaffolds, platforms, and access ways shall be maintained free of ice, snow, grease, mud, and other materials or equipment, which could create a slipping or falling hazard. Tools, materials, equipment, or debris shall not be permitted to accumulate on scaffolds, work platforms, or access ways.

11.7 Tubular Welded Frame Scaffolds

(1) **Design** – Metal tubular frame scaffolds, including all load-bearing components, shall be designed and constructed safely to support four times the maximum intended load. The frames shall be placed one directly over the other using coupling or pigtail pins to provide vertical alignment of the posts.

(2) **Height Limitation** – A licensed professional engineer shall prepare drawings and specifications for metal frame scaffolds exceeding 125 feet in height.

(3) **Typical Design** – Refer to Figure 11-1 for an example of a tubular welded frame scaffold and Figure 11-2 for Manually Propelled Mobile Scaffold.

11.7.1 Mobile Scaffolds

(1) **Maximum Height** – The height of free-standing mobile scaffolds shall not exceed four times the minimum base dimension.

(2) **Casters** – Wheels and casters shall be equipped with a positive locking device to prevent accidental movement of the scaffold.

(3) **Moving** – the force necessary to move mobile scaffolds shall be applied as close to the base of the scaffold as possible. Provisions shall be made to stabilize the scaffold during movement. The scaffolds shall only be used on firm and level surfaces.

(4) **Riding** – No persons shall be permitted to ride on a manually propelled mobile scaffold.

(5) **Typical Design** – Refer to Figure 11-2 for an example of a typical manually propelled mobile scaffold.

11.8 Standard Sources

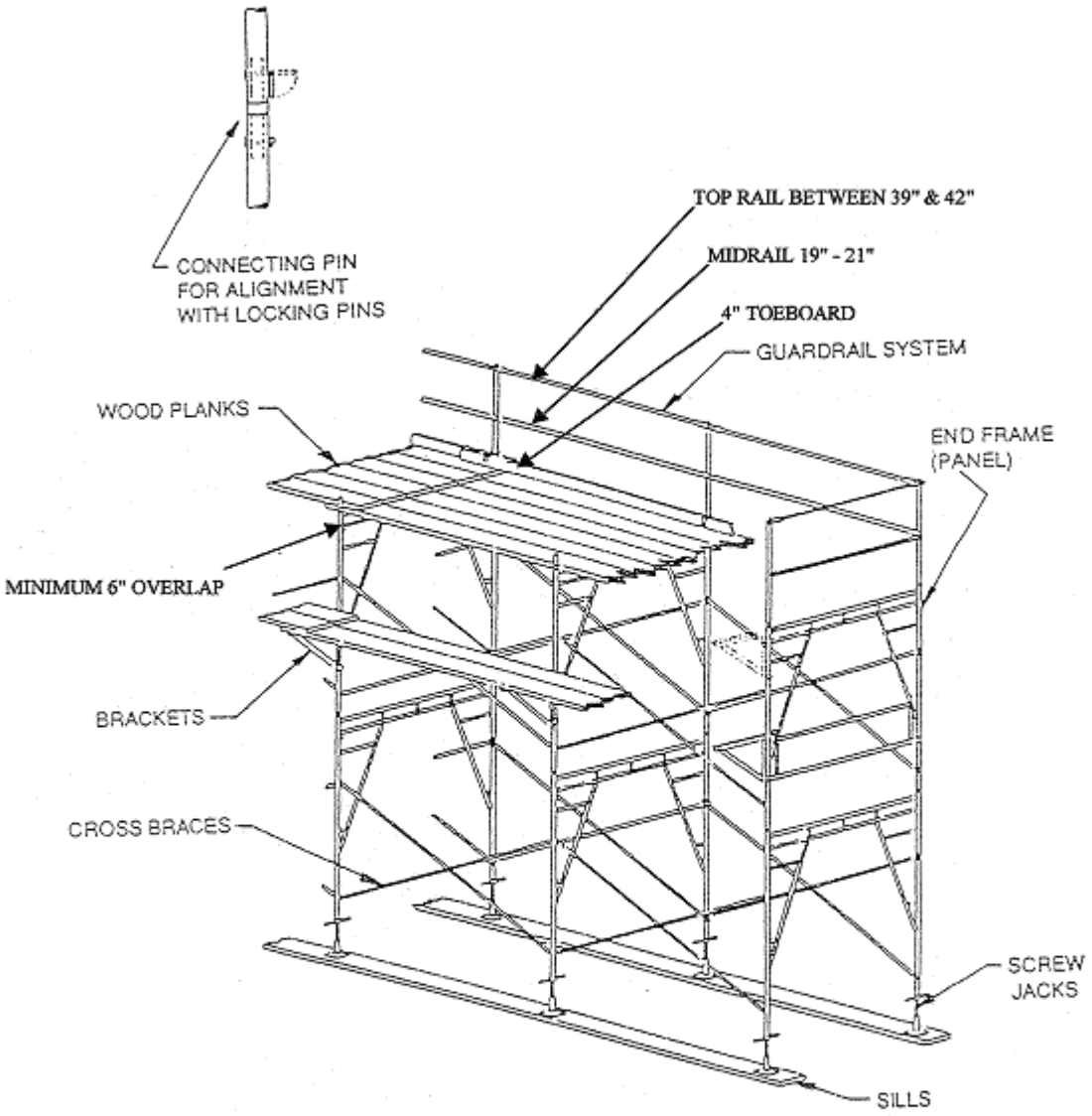
Detailed requirements for scaffolding can be found in the following OSHA standards:

*Construction:

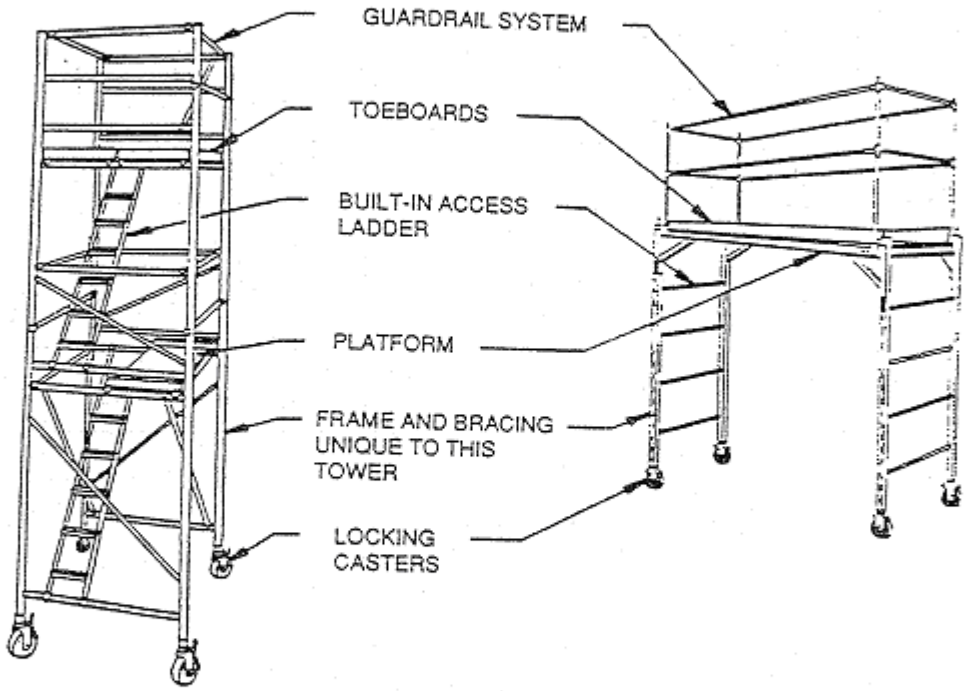
- -29 CFR 1926.451 Scaffolding

*General Industry:

- -29 CFR 1910.28 Scaffolding
- -29 CFR 1910.29 Manually propelled mobile ladder stands and scaffolds.



Fabricated Tubular Frame Scaffold
Figure 11-1



Manually Propelled Mobile Scaffold
Figure 11-2

SCAFFOLDING INSPECTION CHECKLIST

TO BE COMPLETED PERIODICALLY
BY THE COMPETENT PERSON(S) ON SITE

Job Location:	Sup./Competent Person:	Date:

Items:	Mon		Tue		Wed		Thu		Fri		Sat		Actions/Comments
	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	
Are scaffold components and planking in safe conditions for use?													
Have competent persons been in charge of erection?													
Is the tower plumb?													
Is the tower height less than 4 times the minimum base with?													
Are casters of proper size with locking device?													
Are screw jacks extended less then 12”?													
Has proper access been provided?													
Is tower fully braced on both sides?													
Have freestanding towers been guyed or tied off every 26 feet in height?													
Has scaffold been tied to structure at least every 30 feet in length and 26 feet in height?													
Have horizontal diagonal bracing been positioned properly at base and intermediate levels of 20 feet?													
Has proper guard railing been installed?													
Have hazardous conditions been provided for? 1. Power Lines 2. Wind Loading													
Is platform fully planked and toe boards installed?													
Are planks secured to prevent movement or uplift?													
Have personnel been instructed in the safe use of the scaffolding?													

Other issues:

Figure 11-3

12.0 Electrical Safety

12.1 General

Electrical installations, temporary or permanent, shall comply with the applicable provisions of the National Electrical Code. Electrical wiring, conduit, and equipment shall be approved or listed by the Underwriters' Laboratories, Inc., or Factory mutual Laboratories, for the specific application.

Safety-related work practices shall be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts, when work is performed near or on equipment or circuits which are or may be energized. The specific safety-related work practices shall be consistent with the nature and extent of the associated electrical hazards.

12.1.1 Training

(1) Employees who face a risk of electric shock but who are not qualified persons shall be trained & familiar with electrically related safety practices.
(2) Employees shall be trained in safety related work practices that pertain to their respective job assignments.
(3) Employees shall be trained in safe clearance distances associated with electrically related work practices.

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12.1.2 Protection of employees

Personal Protective Equipment and provisions of NFPA 70 E shall apply to all employees working on or near electrical installations. This section covers 'unqualified' personnel. (Those what may face a risk of electrical shock, but are not qualified electricians designated to work on electrical systems)

(1) Proximity – Employees shall not work in such proximity to an electrical circuit that contact may be made in the course of their work, unless the employee is protected against electrical shock by de-energizing the circuit and use of a lock-out/tag-out procedure (refer to SubSection 12.5.2) or by guarding it by effective insulation or other means. Unless the circuit has been de-energized and locked out, it shall be considered a live circuit.
(2) Underground Lines – No drilling, auguring, or excavating operation should be performed within 6 feet of underground lines unless the lines have been de-energized and rendered inoperative.
(3) Overhead Lines - Overhead lines shall be de-energized and grounded or other protective measures shall be provided before work is started.
(4) Prior to Work – Prior to starting work in the area, it shall be determined by inquiry, direct observation, or by instruments whether any part of an electrical power circuit, exposed or concealed, is so located that the performance of the work may bring any person, tool, or machine into physical contact with the circuit or within prescribed clearance distances set forth in 1926.403 (tables K-1, K-2, K-3). Employees shall be protected by isolation, insulation, warning signs, or other methods whenever the circuit(s) can not be de-energized or grounded.
(5) Energized Parts - Only qualified persons may work on electric circuit parts or equipment that has not been de-energized. Such persons shall be capable of working safely on energized circuits and shall be familiar with the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools.
(6) Confined or Enclosed Work Spaces - When an employee works in a confined or enclosed space (such as a manhole or vault) that contains exposed energized parts, the employer shall provide, and the employee shall use, protective shields, protective barriers, or insulating materials as

necessary to avoid inadvertent contact with these parts. Doors, hinged panels, and the like shall be secured to prevent their swinging into an employee and causing the employee to contact exposed energized parts.

12.1.3 Work Qualifications

Work on electrical circuits and equipment shall be performed only by qualified personnel familiar with code requirements and experienced in the type of work assigned.

12.1.4 Protective Equipment

When it is necessary to work on energized lines and equipment, only qualified persons may perform the tasks and must wear rubber gloves and other approved protective equipment or approved tools as provided in NPFA 70 E shall be used. Conductive items of jewelry or clothing shall not be worn during work on or around electrical equipment unless the items are rendered non-conductive by covering, wrapping or other insulating means.

12.1.5 Passageways

Barriers and other means shall be provided to ensure that areas containing electrical circuits or equipment will not be used as passageways when energized lines or equipment are exposed. Passageways, walkways, workspaces, and similar areas shall be kept clear of cords so as not to create a hazard to employees.

12.1.6 High Voltage Equipment

Transformer banks, open breakers, and similar exposed high voltage equipment shall be isolated to prevent unauthorized access. Isolation shall consist of locked rooms, fence or screen enclosures, walls or partitions. Entrance to these isolated areas shall be kept locked when not under constant observation. "Danger – High Voltage" warning signs shall be posted at entrances to these areas.

12.1.7 Work Areas

High voltage electrical wiring passing through work areas shall be covered, barricaded, or elevated to protect it from contact by vehicular or foot traffic.

12.1.8 Marking and Posting

Power lines, switches, breakers, metal cabinets, and protective enclosures, which are rated at 220 volts or greater, shall be plainly marked to indicate maximum operating voltages.

12.1.9 Illumination

Employees may not enter spaces containing exposed energized parts, unless illumination is provided that enables the employees to perform the work safely. Where lack of illumination or an obstruction precludes observation of the work to be performed, employees may not perform tasks near exposed energized parts. Employees may not reach blindly into areas which may contain energized parts.

12.2 Temporary Wiring

12.2.1 Installation

Temporary wiring shall be guarded, buried, or isolated by elevation to prevent accidental contact by personnel or equipment. Vertical clearance above

walkways shall not be less than 7 feet for circuits rated 600 volts or less. All temporary wiring shall be supported by means of a non-metallic type support.

12.2.2 Weatherproof

Conductors used in tunnels, shafts, trenches, and wet or damp locations shall be of a type approved for the purpose as listed in Article 310 of the National Electrical Code.

12.2.3 Lighting Strings

Temporary lighting strings shall consist of nonconductive lamp sockets and connections permanently molded to the conductor insulation. Bulbs attached to lighting strings and extension cords shall be protected by lamp guards. Broken or defective bulbs shall be promptly replaced.

12.2.4 Extension Cords

Extension cords shall be a 3 wire grounded type listed by the Underwriters Laboratories, Inc. Rated loads shall not be exceeded. Extension cords shall not be suspended by wire, hung from nails, or fastened by staples. Worn, frayed or damaged cords shall be removed from service.

12.3 Ground- Fault Protection

12.3.1 Requirement

All 115, 120, and 220 volt, single-phase receptacle outlets used for construction and maintenance operations shall be protected by a ground fault circuit interrupter (GFCI) or the use of an "assured equipment grounding conductor program". This requirement includes receptacles on stationary and portable systems. Such systems shall be installed in strict compliance with the manufacturer's specifications and shall be tested prior to initial use and at the beginning of each shift. Equipment found to be defective shall be immediately tagged and removed from service until repaired or replaced.

12.4 Wet Locations

12.4.1 Requirement

Only the following type electrical systems are permissible for use in wet areas where there is danger of electrical shock:

(1) Ground Fault Interrupter – Electrical circuits for lighting and hand tools shall not exceed 120 volts and shall be protected by UL listed GFCI's.

(2) Stationary Portable Equipment – Stationary portable electrically powered equipment, such as pumps, heaters, blowers, welders, etc., shall be connected to a circuit protected by a GFCI or shall be grounded with both an internal grounding system and a visible flexible copper ground wire.

(3) Substitute Equipment – Whenever practical, air, battery, or hydraulic powered tools shall be substituted for electrically powered tools.

12.4.2 Portable and Plug Connected Equipment

The noncurrent carrying metal parts or portable and/or plug connected equipment not protected by a UL approved system of double insulation shall be grounded. Grounding shall be by a multi-conductor cord having an identified grounding conductor and a multi-contact polarized plug-in receptacle.

The primary variable for determining the severity of electric shock is the electric current which passes through the body. This current is of course dependent upon

the voltage and the resistance of the path it follows through the body. An approximate general framework for shock effects is as follows:

Electric Current (1 second contact)	Physiological Effect
1 mA	Threshold of feeling, tingling sensation.
10-20 mA	"Can't let go!" current - onset of sustained muscular contraction.
100-300 mA	Ventricular fibrillation, fatal if continued.

One instructive example of the nature of voltage is the fact that a bird can sit on a high-voltage wire without harm, since both of its feet are at the same voltage. You can also see that the bird is not "grounded" -- you will not be shocked by touching a high voltage if there is no path for the current to reach the Earth or a different voltage point. Typically if you touch a 120 volt circuit with one hand, you can escape serious shock if you have insulating shoes which prevent a low-resistance path to ground. This fact has led to the common "hand-in-the-pocket" practice for engineers and electrical workers. If you keep one hand in your pocket when touching a circuit which might provide a shock, you are less likely to have the kind of path to ground which will result in a serious shock.
OSHA requires that employers shall use either ground-fault circuit interrupters or an assured equipment grounding conductor program to protect employees on construction sites.

The requirements of this program will be available at all jobsites involving work being performed by Allied Environmental Services personnel. Allied Environmental Services will adhere to the requirements of this standard through performance of the following guidelines.

12.5 Ground-Fault Circuit Interrupters

All 120-volt, single-phase 15- and 20-ampere receptacle outlets on construction sites, which are not part of the permanent wiring of the building or structure and which are in use by employees, shall have approved ground-fault circuit interrupters for personnel protection.
Receptacles on a two-wire, single-phase portable or vehicle-mounted generator rated not more that 5kV, where the circuit conductors of the generator are insulated from the generator frame and all other grounded surfaces, need not be protected with ground-fault circuit interrupters.

12.6 Assured Equipment Grounding Conductor Program

Allied Environmental has established and implemented an assured equipment grounding conductor program on sites covering all cord sets, receptacles which are not a part of the building or structure, and equipment connected by cord and plug which are available for use or used by employees. This assured equipment grounding conductor program shall comply with the following minimum requirements:

- Allied Environmental Services shall designate one or more competent persons to implement this program. "Competent person" means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. This individual will be documented by name for each jobsite.
- Each cord set , attachment cap, plug and receptacle of cord sets, and any equipment connected by cord and plug, except cord sets and receptacles which

are fixed and not exposed to damage, shall be visually inspected before each day's use for external defects, such as deformed or missing pins or insulation damage, and for indications of possible internal damage. Equipment found damaged or defective shall not be used until repaired.

- The following tests shall be performed on all cord set, receptacles which are not a part of the permanent wiring of the building or structure, and cord-and plug-connected equipment required to be grounded.
  - All equipment grounding conductors shall be tested for continuity and shall be electrically continuous.
  - Each receptacle and attachment cap or plug shall be tested for correct attachment of the equipment grounding conductor. The equipment grounding conductor shall be connected to its proper terminal.

All required tests shall be performed:

1. Before first use.
2. Before equipment is returned to service following any repairs.
3. Before equipment is used after any incident which can be reasonably suspected to have caused damage (for example, when a cord set is run over).
4. At intervals not to exceed 3 months, except that cord sets and receptacles which are fixed and not exposed to damage shall be tested at intervals not exceeding 6 months.

Allied Environmental superintendents shall not make available or permit the use by employees of any equipment which has not met these four requirements.

Tests performed as required in the preceding paragraph shall be recorded. This test record shall identify each receptacle, cord set, and cord- and plug-connected equipment that passed the test and shall indicate the last date it was tested or the interval for which it was tested. This record shall be kept by means of logs, color coding, or other effective means and shall be maintained until replaced by a more current record. The record shall be made available on the jobsite for inspection by OSHA and any affected employee.

The table below lists a color code that is in wide use by electricians and contractors. Allied Environmental Services has adopted this color code system and will perform quarterly inspections of cords and electrical equipment. Colored plastic or vinyl electrical tape is placed on one or both ends of cords and cord- and plug-connected equipment to denote the quarter that the tests were performed.

Assured Equipment Grounding Conductor Program Color Code		
Month #	**Month**	**Color of tape(s) to apply to cord**
1	January	White
2	February	White
3	March	White
4	April	Green
5	May	Green
6	June	Green
7	July	Red
8	August	Red
9	September	Red
10	October	Orange

11	November	Orange
12	December	Orange

As an easy reminder of the color of the tape to place on the newly tested cord, remember the color for the start of each calendar quarter by the season:

White in January for Winter
Green in April for Spring
Red in July for Summer, or the 4th of July
Orange in October for Fall, or pumpkins.

If an item fails the inspection criteria, it shall be immediately taken out of service and red-tagged 'DO NOT USE'. It is the responsibility of the site superintendent to have the equipment replaced or repaired.

12.7 Conductive Materials and Equipment

Conductive materials and equipment that are in contact with any part of an employee's body shall be handled in a manner that will prevent them from contacting exposed energized conductors or circuit parts.

If an employee must handle long dimensional conductive objects (such as ducts and pipes) in areas with exposed live parts, the employer shall institute work practices (such as the use of insulation, guarding, and material handling techniques) which will minimize the hazard.

APPROACH DISTANCES FOR QUALIFIED EMPLOYEES—ALTERNATING CURRENT

Voltage range (phase to phase) Minimum approach distance

300V and less ..... Avoid contact.
Over 300V, not over 750V ..... 1 ft. 0 in. (30.5 cm).
Over 750V, not over 2kV ..... l ft. 6 in. (46 cm).
Over 2kV, not over 15kV .....2 ft. 0 in. (61 cm).
Over 15kV, not over 37kV .....3 ft. 0 in. (91 cm).
Over 37kV, not over 87.5kV ….3 ft. 6 in. (107 cm).
Over 87.5kV, not over 121kV…4 ft. 0 in. (122 cm).
Over 121kV, not over 140kV….4 ft. 6 in. (137 cm).

12.7.2 Vehicular and Mechanical Equipment

Any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines shall be operated so that a clearance of 10 ft. (305 cm) is maintained.

If the voltage is higher than 50kV, the clearance shall be increased 4 in. (10 cm) for every 10kV over that voltage. However, under any of the following conditions, the clearance may be reduced:

(1) If the vehicle is in transit with its structure lowered, the clearance may be reduced to 4 ft. (122 cm). If the voltage is higher than 50kV, the clearance shall be increased 4 in. (10 cm) for every 10kV over that voltage.

(2) If insulating barriers are installed to prevent contact with the lines, and if the barriers are rated for the voltage of the line being guarded and are not a part of or an attachment to the vehicle or its raised structure, the clearance may be reduced to a distance within the designed working dimensions of the insulating barrier.

(3) If the equipment is an aerial lift insulated for the voltage involved, and if the work is performed by a qualified person, the clearance (between the uninsulated portion of the aerial lift and the power line) may be reduced to the distance given in the table above.

(4) Employees standing on the ground may not contact the vehicle or mechanical equipment or any of its attachments, unless:
   i. The employee is using protective equipment rated for the voltage; or
   ii. The equipment is located so that no uninsulated part of its structure (that portion of the structure that provides a conductive path to employees on the ground) can come closer to the line than permitted in paragraph 12.5.2.1 of this section.

(5) If any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines is intentionally grounded, employees working on the ground near the point of grounding may not stand at the grounding location whenever there is a possibility of overhead line contact. Additional precautions, such as the use of barricades or insulation, shall be taken to protect employees from hazardous ground potentials, depending on earth resistivity and fault currents, which can develop within the first few feet or more outward from the grounding point.

(6) Illumination.
   i. Employees may not enter spaces containing exposed energized parts, unless illumination is provided that enables the employees to perform the work safely.
   ii. Where lack of illumination or an obstruction precludes observation of the work to be performed, employees may not perform tasks near exposed energized parts. Employees may not reach blindly into areas which may contain energized parts.

12.7.3 Confined or Enclosed Work Spaces

When an employee works in a confined or enclosed space (such as a manhole or vault) that contains exposed energized parts, the employer shall provide, and the employee shall use, protective shields, protective barriers, or insulating materials as necessary to avoid inadvertent contact with these parts.

Doors, hinged panels, and the like shall be secured to prevent their swinging into an employee and causing the employee to contact exposed energized parts.

Conductive materials and equipment that are in contact with any part of an employee's body shall be handled in a manner that will prevent them from contacting exposed energized conductors

12.8 Portable Ladders

Portable ladders shall have nonconductive side rails if they are used where the employee or the ladder could contact exposed energized parts.

ALLIED ENVIRONMENTAL SERVICES, INC.
ELECTRICAL EQUIPMENT INSPECTION LOG

This form is to be used to document inspections of rigging equipment, ladders & harnesses.

Item Inspected	# Inspected	# OK	# Defective	# O/S	# Repaired
Example: 100' Extension Cord	4	3	1	1	0
Floor Fan	5	5	0	0	0
GFCI	6	5	1	1	0

Use the following color code for each month(s) as indicated:

JAN, FEB, MAR = WHITE
APR, MAY, JUNE = GREEN
JULY, AUG, SEPT = RED
OCT, NOV, DEC = ORANGE

Location: _____

Month & Color Code: _____

Date of Inspection: _____

Next Inspection Date: _____

Inspector Name & Title: _____

13.0 Control of Hazardous Energy / Lock-out Tag-out

13.1 Requirement

Whenever service, maintenance, or inspection is performed on machines, equipment, or electrical circuits, it must be done with the machine, equipment, electrical circuit stopped and isolated from all sources of energy. The energy isolating device(s) for that machine or electrical circuit must be locked out or tagged out in accordance with a documented procedure. The Owner's lock-out/tag-out procedure shall be followed when required. Employees involved in the energy control program must be given training. When Allied Environmental Services, Inc, employees are performing work within a plant or facility, we must coordinate with the Owner and any other employer to ensure that no employees are at risk. When a group of employees are performing a servicing, maintenance, or inspection activity, each employee must be afforded protection equivalent to the utilization of individual lockout or tag-out. Lock-out/tag-out procedures shall be adhered to for all sources of energy such as (but not limited to) pneumatic, gravitational, pressure, mechanical and electrical.

The main program focus of Allied Environmental Services Lock-out/Tag-out Program contains the following elements:

- Lock-out devices:
  - Consist of a lock or set of locks where each employee is responsible for their own lock-out. Only one key will be available to open a lock and that key must be maintained by the employee who places the lock.
  - May consist of a lock-out box where the superintendent locks out a process or piece of equipment and each employee places their own lock on the box to lock out the superintendent's lock.
  - A tag shall be used in conjunction with the lockout device on equipment. The tag shall indicate 'DANGER DO NOT OPERATE' and identified with the worker who placed the lock name, phone and company.
- Tag-out Devices:
  - Consist of a tagging system used in conjunction with a lock-out program or,
  - If equipment cannot be feasibly locked out, the equipment shall be tagged with a tag indicating 'DANGER DO NOT OPERATE'
  - The worker placing the tag shall have the tag identified with his/her name, phone number and company.
- All workers at Allied Environmental Services shall receive initial and annual refresher training on the Lock-Out/Tag-Out Program.
- All Allied Environmental Services personnel shall be provided with a good lock. The lock shall have the individual workers' name and other identification on it. Each worker shall have the only key to the lock.
  - A majority of owners will require Allied Environmental Services to follow the procedures set forth in their own Lock-Out/Tag-Out Program.
    - The program may be a group lock-out/tag-out process or may be individual lock-out/tag-out program.
    - Whatever is required by the job site, it is the responsibility of the worker performing the work to ensure that all energy sources are locked or tagged out.
    - There must be controls in place to prevent any other worker or craft from energizing equipment being worked on.
      - This includes:
        - Tanks and vessels
        - Pumps

- Air
- Electrical machinery
- Gravity and spring loaded sources
- Piping systems
- Steam
- Hydraulic systems

- The worker shall check to be sure that no one is operating the machinery before turning off the power. The machine operator shall be informed before the power is turned off. Sudden loss of power could cause an accident.
- Steam, air and hydraulic lines shall be bled, drained, and cleaned out. There shall be no pressure in these lines or in reservoir tanks.
- Any mechanism under tension or pressure, such as springs, shall be released and blocked.
- Each person who will be working on the machinery shall put a lock on the machine's lock-out device(s).
- Each lock shall remain on the machine until that worker's work is complete.
- All energy sources that could activate the machine shall be locked out (blocked/tagged).
- The main valve or main electrical disconnect shall be tested to be sure that the power to the machine is off.
- Electrical circuits shall be checked with proper and calibrated electrical testing equipment. An electrical failure could energize the equipment even if the switch is in the off position. Stored energy in electrical capacitors shall be safely discharged.
- When working on machinery such as power presses and welding presses that have a ram that could fall, the ram shall be supported with safety blocks or pins. Fully interlocked safety blocks are the safest.

13.2 Hazardous Energy Control Procedures

Effective hazardous energy control procedures will protect employees during machine and equipment servicing and maintenance where the unexpected energization, start up or release of stored energy could occur and cause injury, as well as while working on or near exposed de-energized electrical conductors and parts of electrical equipment. Hazards being guarded against include being caught in, being crushed by, being struck by, being thrown from, or contacting live electrical circuits/parts.

The procedure herein established will insure that machines and equipment are properly isolated from hazardous or potentially hazardous energy sources during servicing and maintenance and properly protect against re-energization as required by 29 CFR 1910.147.

While any employee is exposed to contact with parts of fixed electrical equipment or circuits that have been de-energized, the circuits energizing the parts shall be locked out and tagged in accordance with the requirements of 29 CFR 1910.333 (b) (2). Review this standard to ensure compliance.

Only when disconnecting means or other devices are incapable of being locked out, and until lock-out capability is provided, a tag-out procedure (without lock-out) will be utilized.

13.2.1 Enforcement

Any employee who fails to follow these procedures will face disciplinary action in accordance with those listed in Allied Environmental Services Safety Manual.

13.2.2 Definitions

Authorized employee - A person who locks out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected

employee becomes an authorized employee when that employee's duties include performing servicing or maintenance that exposes him/her to potentially hazardous energy.

Affected employee - an employee whose job requires him/her to operate /use a machine or equipment or work in an area in which servicing or maintenance is being performed under lock-out.

Energy isolating device - A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches, and other control circuit type devices are not energy isolating devices.

Other employee - An employee whose work operations are or may be in an area where energy control procedures may be utilized.

For additional definitions see 29 CFR 1910.147 (b).

13.2.3 Authorization / Responsibility

Allied Environmental Services employees will be instructed in the safety significance of the lockout procedures.

Rules

- Locks, chains, wedges, or other hardware which meet the requirements defined in 1910.147 (c) (5) (ii) shall be provided by the company.
- Lock-out devices shall be singularly identified. They shall be the only devices used for controlling energy and shall not be used for other purposes.
- The lock-out devices shall indicate the identity of the employee applying the devices.
- All machines/equipment shall be locked out to protect against accidental or inadvertent operation when such operation could cause injury to personnel. Lock-out will also apply when working on or near exposed de-energized electrical circuits / parts.
- No employee shall attempt to operate any switch, valve, or other energy - isolating device which is locked out.
- Each lock-out device shall only be removed by the employee who applied the device. (Review removal of lock protocol later in this program if that worker's lock must be removed and the worker is not available.)

13.3 Lock-out Procedures and Techniques

Preparation for Shutdown.

- In preparation for lock-out, an initial survey must be made to locate and identify all energy isolating devices to be certain which switch, valve, or other energy isolating devices apply to the machine / equipment to be locked out. More than one energy source (electrical, hydraulic, pneumatic, chemical, thermal, or others) may be involved.
- Before an authorized or affected employee turns off a machine or piece of equipment, the authorized employee must have knowledge of the type and magnitude of the energy to be controlled, and the methods or means to control the energy

Note: If work to be performed involves employees working on or near exposed de-energized electrical parts *see 29 CFR 1910.333.*

13.3.1 Machine or Equipment Shutdown

- All affected employees shall be notified that a lock-out system is to be utilized, and the reason for it, before the controls are applied.
- If the machine or equipment is operating, shut it down by normal stopping procedure. (Depress stop button, open toggle switch, etc.)

13.3.2 Machine or Equipment Isolation

Physically locate and operate the switch, valve, or other energy isolating devices so that the equipment is isolated from its energy sources and apply adequate hardware.

13.3.3 Lockout Device Application

- Authorized employees shall lock-out the energy isolating devices with assigned individual locks.
- Lock-out devices shall be applied so that they will hold the energy isolating devices in a "Neutral" or "Off" position.

13.3.4 Stored Energy

- All stored or residual energy in rams, flywheels, springs, pneumatic, or hydraulic systems, etc. shall be blocked or dissipated.
- If there is a possibility of re-accumulation of stored energy, verification of isolation must be continued until servicing or maintenance is completed.

13.3.5 Verification of Isolation

- Prior to starting work on machines or equipment that have been locked and after ensuring that no personnel are exposed, the authorized employee shall operate the push button or normal operating controls to verify that the appropriate equipment or machine has been de-energized and make certain it will not operate.
- **CAUTION:** Return Operating Controls to the "Neutral" or "Off" Position after the Test.
- The machine / equipment is now locked out. Servicing or maintenance may now occur.

13.3.6 Removal of Lock-out Devices

After the servicing and/or maintenance is completed and before the lock-out devices are removed and energy is restored, follow the sequence of activities noted below:

- Check the machine to be sure it is operationally intact, tools have been removed, and guards have been replaced.
- Check to be sure all employees are safely positioned.
- Notify all affected employees that locks/tags are going to be removed and the machine is ready for operation.
- Remove all locks, blocks, or other energy restraints.
- Restore all energy to the machine.

If the authorized employee who applied the lock is not available, the supervisor shall take the following steps:

- Clear the machine or equipment of tools and materials.
- Remove employees from the machine or equipment.
- Remove the lockout device.

- Energize and proceed with testing or positioning.
- De-energize all systems and reapply energy control

13.3.7 Additional Requirements

In the proceeding steps, if more than one individual is required to lockout machines/equipment (group lockout), the following procedures shall be implemented to provide protection to all employees.

- A primary authorized employee will be designated and responsible for the number of people working under the protection of the group lockout device.
- The primary authorized employee will ascertain the exposure status of the individual member participating in the group lockout to ensure continuity of protection for each individual.
- In addition, this primary authorized employee will be responsible for notifying affected employees before and after lockout procedures are performed.
- Each authorized employee will place his/her own personal lockout device on the energy isolating device(s).
- When an energy-isolating device cannot accept multiple locks, a multiple lockout system must be used.

- ***Shift or Personnel Changes***
  - If a lock-out procedure will extend into the following shift, the authorized employee who originally placed the lock will remove it and it will immediately be replaced with the lock of the authorized employee who is to continue the repair or maintenance on that equipment or machine for the following shift.

- ***Cord and Plug Connected Equipment***
  - If servicing or maintenance is performed on cord and plug connected equipment the following procedure shall be performed to protect employees.
    - Unplug equipment from its electrical socket.
    - Place a lockable cover over the plug and a lock on the plug cover during machine / equipment servicing or maintenance.

- ***Sub Contractors***
  - If outside contractors perform servicing or maintenance that requires lockout, the Allied Environmental Services Site Superintendent shall take the following steps.
  - Inform the outside contractor of our company's lock-out procedures and supply them with a copy.
  - Obtain and review a copy of the outside contractor's lock-out procedures.
  - Ensure that our employees understand and comply with the responsibilities and prohibitions of the outside contractor's lock-out procedure.

- ***Training***
  - Authorized employees shall receive training covering:
    - Recognition of hazardous energy sources.
    - Types and magnitude of hazardous energy in the workplace.
    - Methods, devices, and procedures used to lockout, verify lockout, and otherwise control hazardous energy on all pieces or types of equipment (including cord and plug connected equipment).
    - Procedures for removing locks and returning a machine or piece of equipment to operation.
    - Transfer of lock-out responsibilities.

        - Group lock-out procedures.
        - Affected and all "other" employees shall receive training so that they are able to:
        - Recognize when energy control procedures are being implemented, and understanding the purpose of the procedures and the importance of not attempting to start up or use the machine/equipment that has been locked out.

- ***Re-training***
    - Allied Environmental Services and affected employees shall receive retraining in proper application of lock-out procedures when there is a change in:
        - Job assignment(s) that expose an authorized employee to new hazards or lock-out procedures.
        - Machines, equipment, or processes that present a new hazard or require modified lock-out procedures.
        - Energy control procedures for a piece or type of equipment.
        - Or when it becomes known that an employee incorrectly performs lock-out procedures.
        - Retraining will re-establish employee proficiency in lock-out, and ensure that employees are knowledgeable of new or revised procedures. All retraining will be certified.

- ***Periodic Inspections***
    - An inspection of the energy control procedures will be conducted annually.
    - Energy control procedures for each machine or type of machine must be inspected.
    - The inspection shall include a review of lockout responsibilities with each individual authorized to lock-out the machine / equipment.
    - The person who performs the inspection must be authorized to perform the lock-out procedures being inspected. The inspector cannot, however, review his/her own use of lock-out procedures.
    - Any deviations or inadequacies identified shall be immediately addressed.

13.4 TAG-OUT PROCEDURES

- When a disconnecting means or other energy isolating device is incapable of being locked out, a tag-out system shall be utilized. A tag used without a lock, shall be supplemented by at least one additional safety measure that provides a level of safety equivalent to that obtained by use of a lock such as opening an additional disconnecting device, removal of an isolating circuit element, blocking of a controlling switch or the removal of a valve handle to reduce the likelihood of inadvertent energization.
- Only tags furnished by the company which meet the requirements of 1910.147 (c) (5) (ii) and (iii) shall be used.
- All employees shall be trained in the use and limitations of tags as described in 1910.147 (c) (7) (ii) and (d) (4) (iii).
- **All** employees must be able to understand the hazard warning written on the tags such as:

DO NOT START, DO NOT OPEN, DO NOT CLOSE, DO NOT ENERGIZE, DO NOT OPERATE.

- On machines and equipment where tag-out is used in lieu of lock-out, the Periodic Inspection required by 1910.147 (c) (6) shall include the affected as well as the authorized employee(s). The periodic inspection shall be certified.

- If tag-out is used all other lock-out rules and procedures apply.

NOTE: Should the machine/equipment require upgrade or modification, it will have lockable switches, fittings, valves, etc. added so that it becomes possible to lock-out.

If any Allied Environmental Services worker has questions or concerns regarding a particular Lock Out or Tag Out process at a job site, the site superintendent shall immediately address and correct the concern. To ensure a clear understanding of the process for all Allied Environmental Services workers, these concerns and clarifications shall be communicated to all workers on site.

14.0 Ladders and Stairways

14.1 Ladders

14.1.1 Requirement

Except where either permanent or temporary stairways, ramps, or runways are provided, ladders meeting the provisions of this subsection shall be used to provide access to all elevations.

14.1.2 Electrical Hazards

Portable metal ladders shall not be used for any electrical work or permitted in any area where contact can be made with energized circuits. Portable metal ladders are not permitted on any Allied Environmental Services, Inc. job site.

14.1.3 Maintenance

Provisions shall be made for routine inspections and maintenance of all ladders. Use Inspection Form Fig. 9-1 to document findings. Broken or structurally damaged ladders shall be promptly repaired or removed.

14.1.4 Securing Ladders

All ladders shall be secured at the top and/or at the bottom and intermediate positions necessary to maintain them rigidly in place and to support the loads imposed upon them.

14.1.5 Location

Ladders shall not be placed in access ways or other locations where they may be displaced unless protected by barricades or guards. The area immediately adjacent to the top and bottom of a ladder shall be kept free of debris, materials, equipment, or other obstructions.

14.1.6 Restrictions

Ladders will not be used as work platforms or scaffolding or as structured members of scaffolds, work platforms or walkways.

14.1.7 Use

Employees are to face ladders and keep both hands free when ascending or descending ladders. Three points of contact (both feet and one hand, or both hands and one foot) shall be maintained at all times.

14.1.8 Portable Ladders

(1) The slope or pitch (angle of inclination) shall not exceed 1 foot horizontal distance for each 4 feet of vertical rise.
(2) Portable step ladders shall not exceed 20 feet in height.

(3) Employees shall not work on ladders at heights exceeding 20 vertical feet from the ladder base.
(4) Portable ladders used for access in lieu of fixed ladders shall be secured against accidental displacement at the top and bottom. They shall extend a minimum of 36 inches (3 feet) above the upper landing. Step ladders shall not be used for this purpose.
(5) Portable ladders shall rest on a firm foundation capable of supporting the load without displacement in any direction.
(6) Extension ladder sections shall not be used as independent ladders.
(7) Job made ladders shall be tailored for intended use, but not used as portable ladders.
(8) Portable ladders are approved for one-man use only.
(9) Ladders shall be equipped with safety shoes or other slip-resistant devices at the base section of each rail.

14.2 Stairways

14.2.1 Requirement

Temporary or permanent stairways shall be provided to work areas of buildings or structures 20 feet or more in height. This provision applies to access of work areas such as scaffolds and other work platforms that exceed 35 feet in height.

14.2.2 Construction

Temporary stairways and handrails shall be constructed of materials free of hazardous projections and shall be rigidly supported. Stair treads shall be securely fastened in place.

14.2.3 Standard Handrail

A standard handrail shall be securely mounted on the wall or partition, enclosing the stairs, and shall be the same height as the top rail or a standard stair railing. Hand rails shall be mounted at least 3 inches from the wall or partition. All stairwells and platforms shall be protected on all open sides and ends with standard guardrails and toe boards.

14.2.4 Metal Pan Stairs

Where permanent metal pan stairs are set for temporary use, treads of wood filler pieces shall be installed flush with the pan rims.

14.2.5 Maintenance

Stairways shall be routinely maintained and debris and materials shall not be permitted to accumulate on stairs. Slippery conditions shall be eliminated as they occur.

14.3 Standard Sources

Detailed requirements for ladders, stairways and ramps can be found in the following OSHA standards:

*Construction:

-29 CFR 1926.45 Ladders
-29 CFR 1926.50 Stairways

15.0 Hand and Power Tools

15.1 General

All tools and equipment shall be inspected before being sent to a project. Equipment being shipped back to the yard must be in good working condition or it must be tagged with a red tag showing the nature of the damage or defect. Allied Environmental Services, Inc., shall have the right to remove from service any tool it deems defective or damaged, regardless of ownership of the tool. All jobsite equipment shall be formally inspected on a quarterly basis utilizing Figure 15-1.

15.1.1 Maintenance

Hand tools and power tools shall be maintained in safe operating condition and used only for the purpose for which they were designed. Damaged and defective tools shall be repaired, replaced or removed from service.

15.1.2 Storage

Tools shall not be left on scaffolds or elevated work spaces, and containers shall be provided for hand tools at the job site.

15.1.3 Guarding

Tools designed to accommodate guards shall be operated with such guards in place. Belts, gears, pulleys, sprockets, spindles, drums, and other type moving drives shall be guarded.

15.1.4 Grounding

Electric-powered tools shall be the double-insulated type or effectively grounded as set forth in Section 12.0.

15.1.5 Switches

On-off switches controlling the operation of hand-held powered tools shall conform to the following:

(1) Hand-held powered sanders and grinders with 2 inch or less diameter wheels may be equipped with only a positive “on-off” switch.

(2) Hand-held powered drills, tappers, fastener drivers, horizontal, vertical, and angle grinders with wheels exceeding 2 inches in diameter, disk sanders, belt sanders, reciprocating saws, and similar tools shall be equipped with a momentary contact “on-off” control. They may have a lock-on control provided the power can be shut off by a single motion of the same finger(s) that turn it on.

(3) Jackhammers, and similar pneumatic-powered tools, except concrete vibrators, shall be equipped with a constant pressure switch that shuts off power when pressure is released.

15.1.6 Personal Protective Equipment

Hand tool and power tool operators shall be provided with and use respective types of PPE as set forth in Section 8.0.

15.1.7 Hazardous Conditions

Only non-sparking tools shall be used in locations where sources of ignition may cause an explosion or fire. Gasoline powered tools shall not be used underground or in locations where toxic exhaust gases can accumulate. Impact tools including drift pins, wedges, and chisels shall be kept in a dressed condition or equipped with non-mushrooming heads. Employees shall not work under areas where handheld tools are being used unless the tools are equipped with restraining straps, or appropriate decking or planking is provided for employee protection.

15.2 Pneumatic Tools

15.2.1 Impact Tools

Pneumatic tools shall be operated with safety clips or retainers installed to prevent tools from being accidentally discharged from the chuck.

15.2.2 Air Hoses

All connections, couplings, and splices in air lines exceeding 0.5 inch inside diameter shall be equipped with clips, and wire rope or chain lashings. The clips and lashings shall be installed in a manner that prevents whipping of the loose line should that connection coupling or splice fail.

15.2.3 Compressed Air

Compressed air shall not be directed at any part of the body and shall not be used for cleaning purposes except when reduced to less than 30 psi and the operator is protected by PPE as set forth in Section 8.0.

15.2.4 Nailers

Pneumatically driven nailers, staplers, and similar equipment provided with automatic fastener feed, which operate at more than 100 psi shall have a safety device on the muzzle to prevent the ejection of the fasteners unless the muzzle is in contact with the work surface.

15.3 Grinding Tools

15.3.1 Requirement

Grinding tools shall not be used without the proper guards, protective flanges, and tool rests installed and maintained in proper adjustment.

15.3.2 Abrasive Wheels

Abrasive wheels and scratch brushes shall not be operated in excess of their rated safe speed. Cracked or defective abrasive wheels shall be removed from service immediately. Ring tests shall be performed as recommended by the manufacturer.

15.4 Woodworking Tools

15.4.1 Switches

Switches shall be located to enable the operator to cut off the power without leaving his operating position. Fixed power driven tools shall be provided with a disconnect switch that can be locked in the off position.

15.4.2 Automatic Feed

Whenever the nature of the work will permit, automatic feeding devices shall be installed on fixed power driven woodworking tools. Feeder attachments shall have the feed rolls and/or other moving parts guarded to protect the operator.

15.4.3 Push Sticks

A push stick, or similar safe means shall be used for all operations close to high-speed cutting edges.

15.4.4 Planers and Joiners

Planers and joiners shall be equipped with cylindrical cutting heads and fully guarded.

15.4.5 Bandsaws

Bandsaw blades shall be fully enclosed except at the point of operation.

15.4.6 Cleanup

Work areas shall be kept clean and a brush provided to remove sawdust, chips, and shavings.

15.5 Power Saws

Power saws shall have all guards in place prior to use. Work area shall be kept clean.

15.5.1 Circular saws

Bench type circular saws shall be equipped with spreaders, anti-kickback devices, and guards that automatically enclose the exposed cutting edges. Portable handheld circular saws shall be equipped with guards above and below the baseplate.

15.5.2 Unattended

Power saws shall not be left running unattended. Portable power saws shall be unplugged from their power source when unattended.

15.6 Hydraulic Powered Tools

15.6.1 Safe Operating Pressures

The manufacturer's safe operating pressure for hoses, valves, pipes, filters, and fittings shall not be exceeded.

ALLIED ENVIRONMENTAL SERVICES, INC.
GENERAL EQUIPMENT INSPECTION LOG

This form is to be used to document inspections of rigging equipment, ladders & harnesses.

Item Inspected	# Inspected	# OK	# Defective	# O/S	# Repaired
Example: 3/8" wire rope chokers	4	3	1	1	0
20' extension ladders	5	5	0	0	0
safety harnesses	6	5	1	1	0

Use the following color code for each month(s) as indicated:

JAN, FEB, MAR = WHITE
APR, MAY, JUNE = GREEN
JULY, AUG, SEPT = RED
OCT, NOV, DEC = ORANGE

Location: _____
Month & Color Code: _____
Date of Inspection: _____
Next Inspection Date: _____

Inspector Name & Title: _____

Figure 15-1

16.0 Abrasive Blasting

16.1 General

All Allied Environmental Services workers who are or may be exposed to abrasive blasting activities, shall be trained utilizing the following procedure to prevent injury or occupational illness associated with silica, lead, zinc or other hazardous coatings.

Sandblasting equipment is used extensively throughout the industry for the purpose of cleaning or preparing a variety of surfaces, using various types of abrasive materials. Workers who perform the sandblasting operation can be exposed to toxic materials, such as lead or zinc, while removing existing coatings from material surfaces. They are also exposed to hazards from the sandblasting agent, usually silica sand, therefore there are a number of safety precautions that must be undertaken by blast operators and other crew personnel

Sandblasting operations are noisy and where exposure to noise levels exceed 85 dBA the employer and employees are to comply with the requirements OSHA 29 CFR 1910.95.

16.2 Respiratory Protection

Supplied-air hood respirators (NIOSH Approved) operated on continuous flow mode, or a self-contained breathing apparatus in pressure-demand mode, are required. Respiratory protection at jobsites must meet the requirements of 29 CFR 1910.134. Air-supplied respirators must be used (1) when working inside of blast cleaning rooms, (2) when using portable units in areas without enclosure, and (3) under any circumstances where the operator is not physically separated from the abrasive material by an exhausted enclosure. If airline respirators and compressors are used, make sure the intake hose is placed in an area that provides clean air. An attendant should be in the area at all times, monitoring breathing air and assuring the blaster's safety.

- The air supplied to the approved respirator must be free from contaminants.
- **NIOSH-approved air lines and subassemblies must be used to deliver contaminant-free** air to the user. NIOSH approvals are invalidated if an air line or subassembly has been replaced with any other than the respirator manufacturers.
- Sandblast operators must wear an air-supplied hood that protects the head, neck and shoulders.
- This equipment must be inspected on a regular basis.
- Operators must only remove their supplied air breathing equipment when they are well away from the work location as silica dust and other contaminants can remain suspended in air for long periods of time.

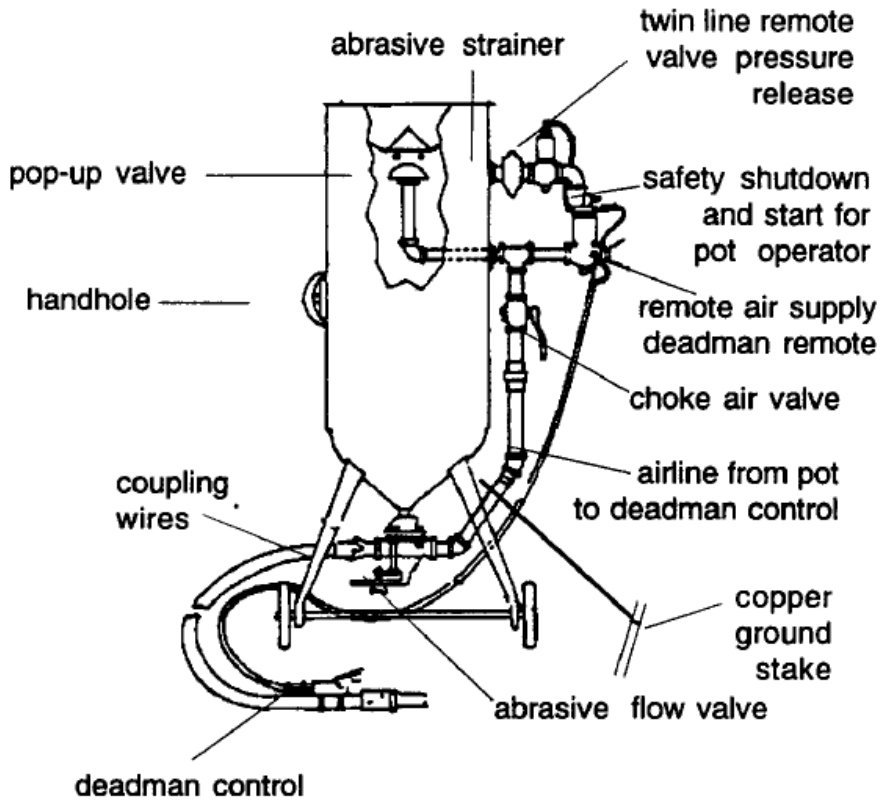
16.3 Other PPE and Procedures

Blasting operations create high noise levels, so hearing protection is a must--for both the operator and nearby workers! Operators should also use heavy canvas or leather gloves, aprons, or leggings when appropriate, as well as safety shoes.

- Coveralls that provide suitable protection from rebounding abrasives are a necessity.
- Work gloves must protect the full forearm.
- Operators must wear American National Safety Institute approved safety footwear.
- If an electrostatically conductive blast hose is not available the blast nozzle must be grounded.
- Sandblasting operations shall be carried out so that the abrasive materials and other particulate materials are contained, and pose no hazards to workers or the public.

- The sandblast pot must be grounded at all times.
- The sandblast pot must be provided with a safety shut down and the sandblast pot must be shut off while being filled with abrasives.
- The operator must blow out all air lines and hoses. The entire sandblasting unit must be carefully examined for defects before any work commences.
- Sandblasting nozzles must be equipped with a remote control (dead man) switch that allows the operator to control the sandblast at the nozzle.
- When sandblasting is to be conducted in a confined area the employer must comply with requirements of Allied Environmental Services Confined Space Entry Program.

Example of a common sandblasting setup:



16.34 Associated Hazards

Sand blasting operations can be overlooked when preparing safety plans because they are generally a small part of a larger project such as cleaning and refinishing or painting. As a result, many workers are exposed to the hazards of sand blasting without adequate protection. Even if all sandblasting equipment is properly designed and regularly inspected, users must always be alert to the hazards of these operations and take precautions against harmful exposures.

Airborne dust: This is one of the most serious hazards associated with blasting operations. When evaluating this hazard, it's important to consider the concentration of dust and the size of particles. Larger particles, considered "nuisance" dust, are normally filtered out in the nose and throat. Smaller particles (10 microns or smaller) can bypass the lung's filtering system and penetrate deep into the respiratory system, where they may

cause serious damage. Safeguards are needed when smaller particles are present in the working environment.

Metal dust, in addition to the abrasive being used, contributes to the generation of airborne dust. Metals such as lead, cadmium, and manganese, can be extremely toxic when inhaled. Many existing paints have a lead base. Regulations require special handling, trained personnel, and medical monitoring when lead is present.

Silica sand: This product is a potentially serious health hazard and should not be used as an abrasive. If silica containing (quartz) materials are selected for any reason, workers must wear a positive pressure or pressure demand respirator with an assigned protection factor (APF) of either 1000 or 2000. Silica must be contained and disposed of properly. Even if a wet blasting method is selected, silica that is allowed to migrate by either wind or water, will eventually become an airborne contaminant.

Manual cabinet blast cleaners should never be exhausted into an area where workers can breathe dusts. These fully enclosed cabinets are designed to filter out dust and re-use blasting medium.

Handling and storing abrasives: Dust is nearly always created at any point where abrasives are transferred, whether by hand or shovel. Therefore, all points of transfer must be properly exhausted and workers who handle abrasives manually should wear particulate filter respirators.

- Potential Hazards Associated with Abrasive Blasting and Cleaning

Flying Particles	Dust	Lifting
Hazardous Material	Moving Traffic	High Pressure Hoses

- Silica exposure occurs when dust that contains crystalline silica particles is inhaled. It is estimated that approximately 1,200,000 workers are exposed to silica each year. Silica, or silicon dioxide, is a naturally occurring mineral that is composed of one silicon atom and two oxygen atoms. When silica molecules line up and create a repeating pattern they form a crystal (crystalline silica). Different crystal patterns are given different names; the most common is quartz. Silica is a major component of sand and granite.

- There are three types of silicosis: *chronic silicosis, accelerated silicosis, and acute silicosis*.

    - *Chronic silicosis* - occurs due to long-term exposure to low amounts of silica (10 to 20 years).

    - *Accelerated silicosis* - also known as progressive massive fibrosis; occurs more quickly than chronic silicosis, usually due to exposure to larger amounts of silica over a shorter period of time (five to 10 years).

    - *Acute silicosis* - occurs due to short-term exposure to extremely large amounts of silica. Acute silicosis can develop within several weeks or up to five years after exposure.

- Silicosis is characterized by:

    - Shortness of breath

    - Fever

- Bluish skin
- It could be diagnosed as pulmonary edema (fluid in lungs), pneumonia or tuberculoses. Silica dust causes severe fungal infections to develop. This condition could be fatal. Silicosis has also been linked to adverse health effects such as tuberculosis and lung cancer.

- In order to limit exposure to silica and prevent silicosis, employers and workers should:
  - Plan ahead to control dust at a work site.
  - Eliminate the use of abrasive blasting materials that contain more than 1% crystalline silica.
  - Consider the option of utilizing a substitute material which is less hazardous.
  - Determine if the abrasive blasting task can be performed in an enclosed cabinet to minimize and control dust
  - Use dust control methods such as blast cabinets and wet drilling or sawing.
  - Maintain dust control systems to make sure they are working properly.
  - Wear disposable or washable protective clothing.
  - If possible, shower and change clothes before leaving the worksite.
  - Conduct regular air monitoring to ensure that control systems are working.
  - Use respirators approved for protection against crystalline silica-containing dust when levels cannot be kept below the Permissible Exposure Limit (PEL).
  - Provide medical checkups for workers who are exposed to crystalline silica.
  - Post warning signs around areas contaminated with silica dust.
  - Provide workers with training materials about the health effects of silica exposure and the protective equipment that is available to prevent exposure.
  - Avoid eating, drinking, or smoking in areas where silica dust is present.
  - Report all cases of silicosis

- **Materials that contain crystalline silica:**
  - The following is a list of construction materials that contain crystalline silica:
    - Brick
    - Blasting abrasives

        - Concrete
        - Cement mortar
        - Granite
        - Sandstone
        - Slate
        - Mineral deposits
        - Rock and stone
        - Sand
        - Topsoil
        - Asphalt

- **Occupations at high risk of silica exposure**
    - Occupations that put workers at an increased risk of silica exposure include:
        - Construction
        - Demolition
        - Mining
        - Sandblasting
        - Stone masonry
        - Abrasives manufacturing
        - Glass manufacturing
        - Pottery
        - Railroad track setting, laying, and repair
        - Painting

- **Equipment Setup and Use:**
    - **Sand Reservoir and Hose Assembly**
        - Review Safe Operating Practices for applicable equipment and perform pre-operational checks.
        - Check all fittings for leaks and alignments.
        - Muffler should be firmly attached to the compressor to reduce blowback noise.
        - Check position of all valves before activating blaster. Nozzle should have a "Dead Man" shutoff valve.
        - Drain water from the separator.

        - Stand clear and do not face sand reservoir after filling. Be careful not to overfill.
        - Keep unauthorized personnel out of immediate sandblast area.
        - Check blasting hoses for rips, tears and soft spots. Do not use defective hoses.
        - Check nozzle shutoff mechanism prior to use and check nozzle for wear.
        - Do not allow vehicles to run over hoses. Avoid kinks and sharp turns in hoses.
        - Avoid dragging hoses over concrete or any surface that could induce wear.
    - **Sandblasting Hood**
        - Adjust helmet headband and chin strap to proper size. Clean and disinfect hood after each use.
        - Make sure hood-skirting is fitted down over shoulder and snaps are fastened.
        - The waist belt for the air hose should be worn outside of skirting to allow easy adjustment.
        - Check the air supply system.
        - Long sleeve shirts, safety glasses, safety shoes and hearing protection are required.
        - A positive pressure air hood is required. The supplied air must be at least Grade D breathable air.

- Grade D air has the following characteristics:
    - Oxygen content from 19.5 to 23.5 percent
    - Condensed oil at 5 mg/m3
    - Carbon monoxide (CO) not to exceed 10 parts per million (ppm)
    - Carbon dioxide (CO2) not to exceed 1000 (ppm)
    - No odor
- **Signage**
    - Signs shall be posted to warn workers about the hazard and specify any protective equipment required in the area of the abrasive blasting process.
- **Personal Hygiene**
    - All sandblasters should wash their hands & faces before eating, drinking or smoking.
    - No eating, drinking or tobacco products in the blasting area.
    - Workers should shower before leaving worksite.

- Vehicles should not be parked in contaminated area.

- **Training**
  - Prior to any Allied Environmental Services worker being assigned to perform abrasive blasting, the worker shall receive training to ensure an understanding of the dangers associated with this procedure and potential hazardous exposures.

    - At a minimum, the following shall be addressed:
    - Silicosis
    - Lead
    - Zinc
    - Equipment Operation and Proficiency
    - Respiratory Protection
    - Supplied and Pressure Demand Respiratory Protection
    - Personal Protective Equipment
      - Hood
      - Gloves
      - Body Protection
        - Disposable outer garments
      - Foot Protection
      - Hearing Protection
    - Symptoms of exposure to suspect chemical hazard
      - The training requirement for operators of abrasive blasting equipment shall be the same for those workers assisting or in the immediate vicinity of the operation.

17.0 Motorized Equipment

17.1 Authorized Operators

Mobile equipment shall be operated only by authorized employees who are qualified to operate the piece of equipment assigned. They shall comply with all operating instruction, limitations, and regulatory requirements in these standards. Also, operators will not place or continue in service any equipment found to be in an unsafe condition.

17.1.1 Speeds

Equipment shall not be operated at speeds greater than are reasonable and safe considering weather conditions, traffic, road conditions, type and condition of equipment, etc. The operator must have the equipment under control at all times and able to stop within the clear site distance.

17.1.2 Unattended at Night

Equipment left unattended at night, or on or near roadways or in areas where work is in progress, shall have lights, reflectors, or barricades to identify the location of the equipment.

17.1.3 Unauthorized Riding

Unauthorized personnel shall be prohibited from riding in or upon mobile equipment unless there is a designated seat for them.

17.1.4 Seats and Seatbelts

Except for standup type operation, no operator or passenger shall ride upon or in equipment unless seated with installed seatbelt fastened.

17.2 Inspection Requirements

17.2.1 General

Mobile equipment shall be performance inspected by qualified personnel to ensure it is in safe condition. Equipment found to be defective or otherwise unsafe should be repaired and re-inspected prior to being placed into service.

17.2.2 Periodic

Equipment in service shall be inspected by a responsible employee at the beginning of each shift. The inspected unit will not be placed into service unless the following applicable equipment and accessories are in safe operating condition: service brake, emergency brake, parking brake, tires, warning devices, steering mechanism, operating controls, wipers, defrosters and other critical components. Figure 17-1 is to be used to document equipment and forklift inspections.

17.3 Maintenance Requirements

17.3.1 Removal From Service

Equipment shall be removed from service whenever an unsafe condition is detected. It shall not be placed back into service until repaired. When equipment is found with a defect, it shall be red-tagged with the defect clearly identified on the tag to prevent inadvertent use.

17.3.2 Repair Shutdown

Equipment shall be shut down and rendered inoperative while repairs or adjustments are being made unless operation is essential to making the adjustments or repairs.

17.3.3 Blocking

Equipment or parts thereof suspended or held aloft by cables, hydraulic cylinders, slings, ropes, or jacks shall be blocked, cribbed, or lowered to an appropriate supporting surface designed for this purpose, prior to permitting employees to work in, under, or between them.

17.4 On-Highway Type Equipment

17.4.1 Lights and Mirrors

All equipment or combinations of equipment shall have all headlights, taillights, and directional signal lights on each side, both front and rear. Mirrors and warning devices shall be operable.

17.4.2 Towing

Towing devices used on any combination of vehicles shall be structurally adequate for the load imposed and securely and properly mounted. A locking device shall be provided on fifth wheel and tow bar systems which prevent accidental separation of the units. Safety chains will be provided for towed units up to 3,000 pounds gross weight.

17.4.3 Dump Trucks

Dump trucks of all description shall be equipped with the following safety devices:

(1) Trip Handles – Trip handles or dump body operating levers which control hoisting or dumping shall be equipped with a latch or similar device which

will prevent accidental starting or tripping of mechanism. Trip handles will be located so the operator remains clear of the load or dumping device.

(2) Holding Device – A manually operated device will be permanently attached to the truck body for use in preventing accidental lowering of the dump body or bed during inspection and/or maintenance activities.

(3) Cab Protection – Trucks loaded or unloaded by means of crane, power shovels, loaders, or similar equipment shall have a cab shield and/or protective steel canopy adequate to protect the operator from falling or shifting material. When such protection is not installed, the operator shall leave the cab during loading or unloading operations.

17.4.4 Fenders and Mudflaps

All equipment whose maximum speed exceeds 15 mph shall be equipped with fenders or equivalent protective structures. Haul trucks shall be equipped with rear mudflaps.

17.4.5 Emergency Equipment

Trucks and combinations of vehicles operated on public roads shall be equipped with the following emergency equipment:

(1) Flags and Reflectors – One red flag and at least 12 inches square and three reflective markers to be used in event of emergency stops.

(2) Fire Extinguishers – One 2A BC dry chemical extinguisher. When transporting flammable or explosive cargo, at least two 2A BC extinguishers.

17.4.6 Seat Belts

Seatbelts shall be installed in all equipment for the operator and all passengers. Seatbelt use is mandatory for operator and all passengers when the equipment is in motion.

17.5 Off-Highway Type Equipment

17.5.1 Rollover Protection Structures

Rollover protective structures (ROPS) shall be installed on all crawler tractors and crawler loaders. When used in operations that expose the operator to falling objects, falling object protective structures shall also be installed.

17.5.2 Accessories

All crawler type equipment shall be equipped with the following accessories:

(1) Lights – All machines operated at night shall be equipped with lights that illuminate the forward working area and one for the rear working area. Also, one bucket lamp shall be provided on all shovels and excavators.

(2) Warning Devices – An automatic backup alarm will be installed on all bi-directional equipment except zero turning radius type equipment. The alarm will be functional when the equipment is working in close proximity to foot traffic or congested equipment areas.

17.5.3 Seatbelts

Seatbelts shall be installed on all equipment protected by rollover protection systems. Where seatbelts are installed, their use is mandatory.

17.6 Standard Sources

Detailed requirements for mobile equipment can be found in the following OSHA standards:

-29 CFR 1926.600 Equipment
-29 CFR 1926.601 Motor Vehicles

MOBILE EQUIPMENT SAFETY INSPECTION

Week of_____

Job Location_____

Description_____Capacity_____

Operator is to initial each inspection in the appropriate space

ITEMS	SUN	MON	TUES	WED	THURS	FRI	SAT
Check Radiator							
Check Battery							
Check Engine Oil							
Check Hydraulic Oil							
Inspect Hydraulic Lines							
Check Hoses							
Check Lights							
Check Horn							
Check Brakes							
Is Back-up Horn Operational?							
Test Operations (for Forklifts)							
Up-Down							
Tilt							
Brakes							
Steering							
Seat Belt							
Tires							

This is to certify that I have inspected this piece of equipment and it is in good condition except as noted.

Signature of Inspector of Operator

COMMENTS:_____

_____

_____

**Any time this equipment is found to be unsafe to operate,
tag it, take the keys out and give it to the foreman
or supervisor in charge of the project.**

Figure 17-1

17.7 Heavy Equipment

17.7.1 Improper procedures used by employees can cause injury, disability, or death. By outlining and following safe operating procedures for use of heavy equipment, injuries and accidents can be prevented.

17.7.2 General Safety for Heavy Equipment

Only trained and authorized operators shall be permitted to operate the designated equipment.

(1) Personal protective equipment is **mandatory** and may include the following:
- boots or safety shoes
- eye/face protection
- long pants
- hard hat
- hearing protection
- gloves

(2) Pre-start/Walk around inspection:
- Check for loose or worn parts and repair or replace immediately.
- Check all fluid/coolant levels.
  Caution: Open the radiator cap only when the engine is cooled.
- Inspect hydraulic line connectors and hoses for leaks before applying pressure to the system. Use paper or cardboard, not your hands, to search for leaks.
  Caution: Hydraulic fluid escaping under pressure can penetrate skin and cause serious bodily harm.
- Check tires for cuts, bulges, irregularities, abnormal wear and proper inflation.
- A fire extinguisher and first aid kit shall be mounted in the cab.

(3) Machine Maintenance:
- When servicing equipment, fasten a **Do Not Operate** tag on the steering wheel. Review *Lock Out/Tag Out Procedures* prior to servicing any equipment.
- Ensure the cab area is clean and free of debris and tools.
- Clean windshield, mirrors and lights.
- Remove all oil, grease or mud and snow from grab irons, hand rails, steps, pedals, and floor to prevent slips and falls.
- Remove or secure any loose items such as tools, chains, or lunch boxes from the cab.

(4) Work Site:
- Check and mark the area for underground cables, gas lines, and water mains.
- Know work area clearances - watch for overhead or underground objects, holes, drop-offs, and partially hidden obstacles and wires.

(5) Mount properly:
DO NOT GET ON OR OFF A MACHINE THAT IS IN MOTION
- Maintain a 3-point contact with the steps and hand rails while getting on/into the machine
- **do not** use the controls or steering wheel as a handhold.

• Do not operate the machine with wet, greasy, or muddy hands or shoes.

(6) Starting and Testing:

EXHAUST FUMES ARE DANGEROUS - ALWAYS HAVE A RUNNING MACHINE IN A WELL VENTILATED AREA.

• Fasten your seat belt and adjust the seat prior to starting.
• Controls should be in neutral and the parking brake set before starting engine.
• Start the engine only from the operator's seat.
• Warn personnel in the area that you are starting the engine.
• Check all gauges, light, instruments and warning devices to assure that they are functioning properly and the readings are within normal range.
• Test steering right and left.
• Test brakes against ground speed to be certain there is no malfunction.
• Ensure all implement controls are operating properly.

(7) Machine Operation

SMOKING IS PROHIBITED AT ALL TIMES.

• Acquaint yourself with the controls before operating the machine.
• Only the operator is permitted to ride on the machine.
• While backing up use extra care and sound the horn to clear the area.
• If a malfunction is observed, "DO NOT OPERATE" until the proper repairs have been made.
• Drive at speeds compatible with working conditions.
• Do not coast downhill. Select a gear that will prevent excessive speed when going downhill. Do not park on a steep incline.
• Know the stopping distance at any given working speed.
• Do not permit anyone to stand or pass under the bucket or lift arms.
• Follow the manufacturer's load capacity limits. Identification plates are attached to all machines.
• If the machine is stuck, back it out or stop engine and get help.
• Do not make mechanical adjustments while the unit is in motion.
• Always follow the manufacturer's recommendations for pulling or towing.
• Lower all the hydraulic equipment before shutting down or getting off the machine.
• During snow removal, be alert for any obstructions covered by snow.

(8) Ether - Cold Start Precautions

• Diesel cold start systems contain ether which is explosive. Keep away from heat, sparks, and open flames. Work in a well-ventilated area.
• If swallowed, breathed or contacted on skin or eyes seek medical attention immediately. Follow recommendations on the MSDS sheets.
• Point the openings of the valve, tube or atomizer away from yourself and others while testing the diesel cold start system.
• Store replacement ether cylinders in a cool dry place away from direct sunlight. Do not keep them in the operator’s compartment.

(9) Operating a PTO

• Shut off the engine and wait until the PTO stops completely before getting off, disconnecting or servicing the PTO unit.
• Wear snug fitting clothing when operating the power take-off, or when near rotating equipment.
• When operating stationary PTO equipment, always apply the parking brake and block the rear wheels front and back to prevent any unnecessary movement.
• PTO shields are mandatory on all PTO-driven equipment.

(10) Refueling

- Shut off and cool the engine and any electrical equipment before fueling.
- Ensure the fueling area is well ventilated.
- Do not smoke while refueling. Keep open flames and sparks away from area.
- Ground the funnel or fuel nozzle against the filler neck to avoid sparks when refueling.
- Do not use gasoline or diesel fuel for cleaning parts.
- Check the battery and electrolyte levels according to manufacturers instructions.
- Know where the fire extinguishers are located.

(11) Road Rules

- When turning, use hand or turn signals.
- Obey all traffic regulations. Know local traffic laws regarding lights, warning signs, load limits, and slow moving equipment on highways/roadways.
- When backing up traffic, pull over and allow the vehicles to pass.

(12) Shut Down/Parking

- Park on level ground.
- When parking on a grade, block the wheels and set the parking brakes.
- When parking, lower all loader, buckets, hydraulics to the ground.

17.7.3 Backhoes

(1) The following safe guidelines are provided:

- KNOW THE WORKING RANGE OF THE MACHINE.
- Be sure attachment or load doesn't catch on obstructions when lifting or swinging.
- When lifting a load, do not lift, swing or stop unnecessarily fast.
- Be sure everyone is in the clear before swinging or moving in any direction. NEVER swing or position attachment or load over personnel or vehicle cabs.
- Never allow personnel to walk or work under any part of the machine or load while the machine is operating.
- Never allow anyone to ride the attachment or the load. This is an extremely dangerous practice.
- Do not load a truck unless the driver is in a safe place. Then, load the truck from the rear or side.
- Use a signal person. The signal person must be in direct communication with the operator, and the operator must pay close attention to the signals.
- Never exceed the lifting capacity of the machine. Stay within the lifting limits shown on the Load Rating Chart. Remember - you may be able to lift the load in close, at ground level, but as the load radius and elevation change, the lifting capacity of the excavator may decrease.
- Keep the machine well back from the edge of an excavation. Avoid undercutting the machine. If necessary, provide adequate shoring to prevent the machine from falling into the excavation.
- Level off the work area if possible.
- Avoid swinging or extending the bucket farther than necessary in a downhill direction. This will reduce the stability of the machine.
- When working with the bucket on the uphill side, the excavator may tip over if the slope is too steep.

- Avoid working with the tracks across the slope, as this reduces stability and increases the tendency for the machine to slide.
- Always be sure that slings or chains used to lift the load are of adequate strength and that they are in good condition.
- Watch your boom clearance at all times.
- Turn off the engine and allow the machine to cool before working on the machine. Most fluids on the excavator are hot enough to cause severe burns at normal operating temperatures.

17.7.4 Dozers

(1) The following safe guidelines are provided:

- Operate the controls only with the engine running.
- Do not allow riders on the machine unless additional seat, seat belt, and rollover protection are provided.
- The operator must satisfy himself that no one will be endangered before moving the machine.
- Report any needed repairs noted during operation.
- Carry implements close to the ground, approximately 40cm (15 in) above ground level.
- Stay a safe distance from the edge of cliffs, overhangs, and slide areas.
- If the machine begins to sideslip on a grade, immediately dispose of the load and turn the machine downhill.
- Be careful to avoid the condition which could lead to tipping when working on hills, banks, or slopes, and when crossing ditches, ridges, or other obstructions.
- Work up and down slopes, rather than sideways, whenever possible.
- Keep the machine under control and do not work it over its capacity.
- Be sure hitch points and the towing device are adequate.
- Connect trailing equipment to a drawbar or hitch only.
- Never straddle a cable, wire rope, or similar device nor allow others to do so.
- Personnel are prohibited to be between the machine and trailing equipment when maneuvering to connect them. Block the tongue or hitch of trailing equipment to align it with the drawbar or hitch.

17.7.5 Loaders

(1) The following safe guidelines are provided:

- This is a one-person machine, NO RIDERS ALLOWED.
- Know the pinch points and wrap points on the loader.
- Operate at a speed consistent with working conditions, visibility, and terrain.
- Ensure loader has an adequate rear counterweight
- When crossing exposed railroad tracks, ditches, ridges, or curbs reduce speed and cross at an angle.
- Carry loaded buckets as close to the ground as possible. The further a loaded bucket is from the ground the more unstable the loader becomes.
- Use extreme caution when operating a loader on a side slope. Slow down and carry the bucket, loaded or empty, as close to the ground as possible.
- Stay in gear when traveling downhill - this will help control speed.
- Never move a load above the heads of other workers.
- When back filling, use extreme caution. The weight of the material plus the weight of the machine could cause the new construction to collapse.
- Keep work area level; avoid developing ruts by occasionally back dragging the bucket to smooth the surface.

17.7.6 Skidsteers

(1) The following safe guidelines are provided:

- Check to see that counterweights as recommended by the manufacturer are in place. NOTE: This is very important as improperly balanced skid-steer loaders are easily upset.
- Clean steps, pedals, and floor of any slippery substances.
- Clear the driving compartment for loose items that might interfere with the controls.
- Check the work area for hazards such as holes, soft spots, and obstructions. Check overhead for utility lines, doorway clearances, or other obstructions.
- Mount the machine wearing clean, dry shoes using the grab bars or handrails provided.
- Adjust the seat, fasten the seat belt, set the brake, and place transmission in park or neutral before cranking the engine.
- Visually check for the presence of others in the area and warn them away. Be especially alert for children.
- If the machine is garaged, leave the door or some windows open for ventilating the exhaust. CARBON MONOXIDE KILLS!
- Start the engine and check all controls to see that they are functioning properly.
- Check horn and backup alarm to see that they are working.
- Operate with caution on uneven surfaces. Avoid steep slopes completely.
- Carry the load as low as possible. Avoid sharp turns and slopes with a raised load.
- Travel straight up or down, with the heavy end of the machine pointed uphill.
- Operate with extreme caution near areas with sharp drop-offs.
- Do not undercut banks or materials that are piled high, to avoid cave-ins or falling of material.
- NEVER leave the machine without first lowering the bucket, stopping the engine, setting the parking brake, and placing the shift in park or neutral. Dismount the machine carefully. Do not jump out of the loader.
- If stopping for any length of time, lock the ignition and remove the key.

17.7.7 Trucks

(1) The following safe guidelines are provided:

- Truck drivers will be properly and thoroughly trained before attempting to do any work with or on any type of truck.
- Our motor vehicle policy, as well as State and Federal regulations, prohibit the operation of commercial motor vehicles by individuals who do not have the proper training and license. Do not attempt to operate any dump truck unless you have the proper license and training.
- Thoroughly inspect the truck for any defects that may inhibit safe operation of the vehicle. DOT regulations require that the operator fill an inspection form each day before placing the truck into operation. This form is an excellent tool to help the operator remember to check all necessary items.
- Always use the steps and grab irons and face the vehicle when getting in or out of the truck.
- Place the gearshift into neutral and set the parking brake before starting the engine.
- Allow the engine to reach operating temperature and the air pressure to build to operating pressure before placing the truck into motion.

- Carefully check the area around the truck before placing it into motion. Objects or people that are very close to the truck may not be visible from the driver's seat.
- Always make sure that your seatbelt is properly fastened before driving the truck.
- Allow adequate stopping distance between the truck and the vehicles in front of it.
- Check the area around the truck for obstructions (tree limbs, overhead wires, etc.) before raising the dump box. Make sure that the spreader chains aren't set if you intend to dump in a pile.
- Always try to be on a level surface when you raise the dump box. As the box raises the truck's center of gravity goes up and the truck becomes less stable and more apt to tip over. If you must dump on a slope place the truck so that it faces straight up, or down the slope. Do not try to raise the box with the truck parked parallel with the slope. Remember that a dump truck is much more apt to tip over (or run into overhead obstructions) when spreading material then it is when dumping in a pile.
- NEVER work under a raised box (not even "for just a little bit") unless the box is adequately supported by a prop rod or cribbing. Do not rely on the truck's hydraulic system to hold the box up while you work under it.

17.8 Articulating Boom Lifts

17.8.1 Common lift accidents:

(1) Tip-over due to the lack of use or incorrect use of outriggers

(2) Misapplication of the equipment

(3) Hitting obstacles on the ground or in the air such as beams or tree limbs

(4) Hitting electrical wires

17.8.2 In the workplace there is often a need to conduct elevated work. Safe access to this elevated area can be provided by an assortment of aerial lifts. Some types of aerial lifts are: JLG, Snorkel, scissor lifts, articulating boom platforms, etc. Any person using these types of lifts needs to be trained in their use prior to operating the equipment. The training will include OSHA requirements (see Aerial lifts.-1926.453) and all requirements that your company has put in place. Training documentation needs to be maintained and available for inspection upon request.

17.8.3 When using Aerial lifts the following requirements must be followed:

(1) Conduct a pre-use inspection of the equipment prior to use each day. The boom lift user shall be responsible for ensuring this has occurred. Results of the pre-use inspection must be documented.

(2) Ensure all warning placards on the machine are legible and all personnel are familiar with the operator's manual.

(3) Ensure malfunctioning lifts are tagged "OUT OF SERVICE" and the supervisor is promptly notified. The equipment shall

not be operated until repaired per the manufacturer's recommendations.

(4) Ensure the controls are plainly marked as to their function.

(5) Use equipment only on level ground.

(6) Do not load platforms/baskets in excess of the design working load. (The weight of personnel should also be factored into this consideration)

(7) Utilize aerial lifts for lifting personnel and small hand tools. The use of aerial lifts in lieu of a crane is prohibited.

(8) Always be aware of electrical hazards near the work area and of your path of travel. Employ an equipment spotter when working in close proximity of power lines.

17.8.4 When using an Aerial Lift Personnel Shall:

(1) Not walk under a boom to gain access to the platform.
(2) Not tie the platform off to any structure for any reason.

(3) Stand on the platform floor. Standing or sitting on the railing is prohibited.

(4) Always look in the direction the machine is moving.

(5) Do not rest the boom or basket on a steel structure of any kind.

(6) Wear safety harnesses and tie-off to the manufacturers provided anchorage point within the platform.

(7) Never attempt to move an aerial lift while the boom/platform is elevated.

(8) Ensure that a 10 lb fire extinguisher is available at all times.

(9) Erect barricading or use a flag person when operating in high-traffic areas.

17.8.5 Controls

(1) Articulating boom and extensible boom platforms, primarily designed as personnel carriers, shall have both platform (upper) and lower controls.

(2) Upper controls shall be in or beside the platform within easy reach of the operator.

(3) Lower controls shall provide for overriding the upper controls. Controls shall be plainly marked as to their function.

(4) Lower level controls shall not be operated unless permission has been obtained from the employee in the basket.

17.8.6 Maintenance

(1) An inspection of the lift should be conducted prior to every use, and a maintenance log should be kept.

(2) Always inspect before using.

(3) Keep the equipment secured to prevent unauthorized use

(4) Do not make repairs to the lift if you are not capable

(5) Always use the manufacturer's approved replacement parts

(6) Do not modify the equipment in any way

(7) If a lift is donated or purchased second hand, have it professionally inspected before using. Equipment manufacturers offer this service usually for around $100.00. Purchased equipment should also be registered with the manufacturer to assure up to date notices are obtained.

Sources:

Occupational Safety and Health Administration 29 CFR 1926.453 Aerial Lifts.

17.9 Vacuum Truck Safe Operation

(1) Vacuum tank trucks provide a fast and efficient method for removing and hauling sludge and waste from tanks. Follow these guidelines when using vacuum trucks:

- Be sure the area in which the vacuum tank truck operates is vapor-free.
- Locate the truck upwind from the tank and outside the path of probable vapor travel.
- Consider vapor travel and sources of ignition where sludge and waste will be discharged from the vacuum truck.

17.9.1 General Rules and Guidelines for Safe Operation

(1) Employers and owners should ensure that safe confined space entry practices are followed while entering tanks, bins, pits and other potential confined space.

(2) All vacuum trucks shall have an emergency stop device.

(3) Vacuum truck operators should be made aware of hazardous conditions caused by performing the task.

- Review of MSDS or Stream sheet for specific hazards related to the material being vacuumed.
- Review potential hazards found in area where vacuuming operation is being conducted with owner representatives.

(4) Vacuum truck operators must follow manufacturer's guidelines for safe operation, including working at a shallow angle, and moving the vacuum intake frequently.

17.9.2 Activities for Vacuuming

(1) Pre-Evacuation Procedures

- The vacuum truck service technician shall:
    - Ensure that the truck has a RPM gauge on the pump.
    - Confirm that the vacuum truck is empty and clean.
    - Confirm presence of a check valve between truck and well. The check valve may be located on the evacuation apparatus or on the inlet side of the vacuum truck pump.
    - Confirm that the vacuum truck has been grounded in accordance with Section 5.4.2 of API Publication

(2) Safe Operation of Vacuum Trucks.

- It is recommended that a Department of Transportation (DOT) certified vacuum truck be utilized for all vacuum operations to reduce potential liability during vacuuming event.
- While Vacuuming the vacuum truck service technician shall:
    - Install the well evacuation apparatus. The drop tube should be set 1 foot below the groundwater/free product interface.
    - Connect vacuum truck hose to apparatus prior to application of vacuum.
    - Commence evacuation activities. In order to confirm that the vacuum pump is operating at or near manufacturer’s recommended RPM, read the vacuum gauge on the truck vacuum pump and compare to the RPM noted on the pump curve for the truck. The operator should adjust the RPM if necessary.
    - Maintain the recommended RPM for the duration of the vacuuming.

(3) After Vacuuming

- The vacuum truck service technician shall:
- Move truck to level ground, gauge fluid levels in truck, and convert the fluid level measurement to volume.

- Record free product thickness for all the wells specified by the ERAC.
- Sign and complete field copy of the waste manifests.

(4) For precautions for travel and off-loading for the vacuum truck, refer to the API Publication No. 2219.

17.9.3 Hose Safety

(1) The following guidelines shall be considered when setting up an operation with regards to hose selection and use.

- Diameter size of the hose
- Hose Diameter
    - Changing hose diameters in the middle of the job is not only inefficient it can be dangerous.
- Performance decreases when friction is lost
- Smooth bore hoses almost always work better.

17.9.4 General Safety Tips/Recap

(1) Here are a few other safety points to keep in mind when performing vacuum operations:

- Toxic and/or hazardous materials
- Always ground the truck
- Wet and dry material should never be mixed
- In most cases, an operator does not know the chemical reaction if wet and dry materials are mixed.
- Knowledge of your truck and common safety measures will aid performance.

17.10 Hydro-blasting Safety

17.10.1 The purpose of this manual is to help identify the hazards involved with this type of activity at jobsites, and to explain the procedures required to minimize the risk.

17.10.2 Definitions

(1) **Hydro-Blasting:** Using water at high pressures and/or high volumes (high impact) to clean. It is also chemical free cleaning. High Pressure Blasting:

Typically, high pressure blasting is used for external cleaning. Pressures can range from 5,000 to 40,000 psi. You can cut concrete at 17,000 psi. Water volumes generally range from 4 to 20 gpm. Some typical methods for high pressure blasting include the following:

- **Shotgun Blasting**: Shotguns are hand held and operated spray nozzles used for general cleaning, de-coating, structural cleaning, and tough concrete cleaning jobs. The shotgun spray nozzles can be straight, fanned or a spinner device depending on the job. The 5 feet length of the shotgun is for the protection of the operator.

- **Hard and Soft Water Lancing**: These are small diameter hoses or tubing with spray nozzles attached. They are used to clean small diameter orifices such as heat exchangers, bundles, and small pipes. Soft lances are 50 feet or longer and can be joined together for additional cleaning distances. They can also negotiate bends. The operator uses a foot control to control the water pressure. Multiple lances can be operated at one time.

- **Water Jetting**: Water jetting uses larger diameter hoses and spray nozzles. The nozzles are self-propelled by aiming more of the water pressure backward and less forward. These hoses can be coupled together for cleaning longer distances. They are used for cleaning larger diameter pipes and sewer lines. The operator also uses a foot control to control the water pressure.

- **Abrasive Cutting**: Abrasive cutting uses very high pressure water and an abrasive to cut through steel and concrete (including rebar). It is the slowest and most expensive method of cutting. Its value is that it is spark free and can be used where flammable conditions exist. Its uses include: cutting up metal tanks to be scrapped, cutting doors in tanks for repairs, removing old pipes, and cutting accurate openings in concrete walls and floors.

- **High Impact Cleaning**: High impact cleaning is normally used for internal cleaning of tanks and boilers. The greatest value is that entry into the structure is not required. It is also our most aggressive cleaning system. A spinner device is inserted into the structure via a hard lance, cable, etc. The normal cleaning pressure is 10,000 psi and water volumes as high as 100 gpm are used. The higher volume gives the water "weight" and this weight at high velocity does the cleaning.

17.10.3 High Pressure Water Cleaning

(1) Introduction

- High pressure water cleaning is used to remove scale and other deposits from heat exchangers, vessels, structural steel, piping etc. and to prepare surfaces for protective coatings. This cleaning operation is more commonly known as Hydro Blasting.

    - High pressure water cleaning is a HIGHLY HAZARDOUS and complex operation and should only be used when other less hazardous methods have been considered and ruled out as ineffective or inefficient.

- High pressure water produces pressures as high as 36,000 psi, at a short distance. The water jet stream has extreme cutting potential and can inflict severe injury.

17.10.4 General Requirements

(1) Those calling for the high pressure cleaning to take place must be satisfied that all alternate methods of cleaning have been ruled out due to inadequacy or inefficiency.

(2) If the owner requests or has a requirement for permitting prior to hydro-blasting the following should be considered to complete the permit.

- A documented job safety or pre-task analysis with any special instructions noted on the JSA or PTA as well as the permit, such as:
  - A layout sketch
  - Completed pre-cleaning checklist
  - Any deviation from OSHA or other regulatory requirements, or standard industry practices.
  - Potential unauthorized use of automatic cleaning devices
  - Layout of site and ergonomics
  - Chances of slipping and falling
  - Method for emergency stopping
  - Communication between Operators and with the Control Room
  - Competency and experience of high pressure cleaning operators
  - Equipment adequacy for the task
  - Any special procedural requirements must be noted on the JSA form.

(3) The JSA or PTA should also include the potential hazards associated with the material being hydro-blasted, such as cooling water, legionella and overspray protection.

17.10.5 Responsibilities

(1) Supervisor:

- The supervisor overseeing the operations must be satisfied that all hazards have been identified and minimized.
- The supervisor must also be satisfied that the training received is adequate for them to start the job.

- The supervisor is responsible for compliance with Allied Environmental's written procedures and the procedures contained in this manual.

- The supervisor must be prepared to stop the work if they become aware of any change to the agreed procedure, or changes in circumstances.

- They must also cease the work immediately should a malfunction occur, or if an unauthorized or inadequately protected person enters the barricaded area.

(2) Operator:

- The operator is responsible for compliance with Allied Environmental's written procedures and the procedures contained in this manual.

- The operator must be prepared to stop the work if they become aware of any change to the agreed procedure, or changes in circumstances.

- They must also cease the work immediately should a malfunction occur, or if an unauthorized or inadequately protected person enters the barricaded area.

17.10.6 Training and Certification

(1) Allied Environmental shall ensure that all its operators are adequately trained and certificated to carry out the work.

(2) Allied Environmental must be able to produce and maintain a record of all such training and refresher training.

(3) When and where it is possible all high pressure cleaning operators will have completed training approved by industry regulations and standards.

17.10.7 Equipment and Area Protection

(1) It is expected that, prior to coming on site, the appropriate equipment for the job has been selected and will perform as designed.

(2) Documentation of current inspections of equipment should be filed for auditing purposes.

(3) The hydro-blasting equipment area must be barricaded using barricade tape as a minimum.

- Barricade tape should extend out in all directions from blasting equipment, far enough to prevent overspray and dispersal of potential contaminants.

- Hoses extending from equipment to blasting area should be surrounded by barricade tape and signs.

(4) In the event it is not possible to isolate the prescribed area, sturdy barriers/panels must be placed/erected to shield operations.

(5) Where hoses cross a roadway that cannot be closed to traffic, the hoses must be protected from vehicular damage by a covering ramp.

(6) The pumping unit should be located to minimize the length of hoses required. Considerations should be given to the distance from operating equipment. Select a location that does not require running hoses through an active access way or work area. Care must be taken to protect hoses from damage by vehicular traffic, hot lines/equipment, or external abrasion.

(7) The pumping unit must be equipped with a safety valve and/or rupture disc capable of rapidly relieving the full capacity of the pump.

(8) The operating pressure of the high pressure hose and fittings must comply with the Manufacturer's requirements.

- Hoses should be inspected before each job and tested according to the requirements of governmental agencies.

- Hoses must be tagged with the latest test date and test pressure.

(9) Quick connect/disconnect fittings are not permissible for use for hydro-blasting.

- Hose connections must have a secondary joining mechanism, otherwise called a hose restrainer, to prevent whipping if the connection is broken.

(10) Blasting equipment must be grounded to minimize static electricity buildup.

- Equipment being blasted must also be grounded.

(11) Minimum length of the shotgun barrel is 1.2m. If this is not practical, a Pre-Task Analysis will be required (comprising appropriate personnel) before allowing use of a shorter barrel.

(12) Shotguns shall be equipped with a single hand trigger switch as a minimum and double triggers as required.

- The double-action switches should be positioned so that both the operator's hands are required to initiate high pressure water flow, and hence water pressure will drop off and flow cease if either switch is released.

- A pressure regulator or dump valve that will immediately dump all the water pressure when the control is released is the only approved fail safe control.

(13) It is permissible to use rigid lances where the operator is in control of the foot pedal or safety trigger.

(14) When lancing, a foot or hand operated fail safe control with guard must be manipulated by the lance operator.

- In some operations such as lancing exchanger tubes or line moleing, another person may be used to assist with the lance or hose.

- Only the lance operator (person nearest the working end of the lance) should operate the fail-safe device.

17.10.8 Personal Protective Equipment

(1) The blast operator and those within the blasting area are required to wear the following protective equipment when blasting:

- Hard hat

- Face shield

- Hearing protection

- Heavy duty rain suit or hydro-blasting suit

- Rubber gloves, except during flex-lancing where operator safety is compromised by handling difficulties caused by the gloves

- Rubber boots with steel caps or metatarsal guards

- Other equipment, as required, if a hazardous chemical is involved

(2) The operator must wear a respirator when cleaning equipment that has been in cooling water service. This is to protect from the possibility of legionella infection.

17.10.9 Housekeeping

(1) During cleaning operations, accumulations of materials may form at the pipe/tube openings.

- Work should be stopped and the materials removed when a safe work position or working surface cannot be maintained.

    - This is particularly important where the work area is confined, working on platforms and scaffolds and where material debris may accumulate from the cleaning process.

17.10.10 Working Surfaces

(1) Blast equipment must be operated from safe work surfaces. Due to excessive back thrust exerted on the operator, the use of ladders and 'A-frames' are not acceptable as work platforms.

17.10.11 Procedural Requirements

(1) All high pressure cleaning activities will involve a minimum of two operators and a third where the operator is out of sight of the jetting unit.

(2) All high pressure cleaning personnel directly performing the cleaning shall be in direct control of the emergency shut off device, such as dead man foot switch, electrical isolation switch or pistol grip trigger.

(3) It is permissible for more than one isolation device to be in use at any time but the cleaning operator must still have ultimate control.

(4) All high pressure cleaning will require visual communication between operators.

(5) High pressure cleaning activity may require the stand by operator to be in contact with a Control Room, via radio.

(6) Whenever there is ANY likelihood of the cleaning device exiting the equipment being cleaned then an approved mechanical anti-withdrawal device MUST be used.

(7) All equipment being cleaned must be unable to move, and secured as appropriate.

(8) When lancing, a foot or hand operated fail safe control with guard should be manipulated by the lance operator. In some operations such as lancing exchanger tubes or line moleing, another person may be used to assist with the lance or hose.

- Only the lance operator (person nearest the working end of the lance) should operate the fail-safe device.

(9) Prior to commencing work, the total lance/hose system must be flushed, then pressured up to the maximum operating pressure and checked for leaks.

- Leaks must not be corrected while there is still pressure in the line.

(10) When cleaning tube bundles, ensure that the tube sheet is adequately cleaned to allow insertion of the tube lance before pressuring up the tube lance system.

(11) Rota Fanning may only be performed to an approved procedure.

17.10.12 Hydroblasting Safety Per - U .S. Water Jet Technology Association

U .S. Water Jet Technology Association
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Minneapolis, MN 55417

A. INTRODUCTION

These Recommended Practices cover the personnel requirements, operator training, operating procedures and recommended equipment for the proper operations of all types of high pressure water jetting equipment as normally used by industries concerned with construction, maintenance, repair, cleaning and demolition work, attention is drawn to the relevant or proposed, OSHA, ASTM, and ANSI Standards. It is intended that extensions to this code will be produced, in due course, to cover specialist applications,

e.g. multiple gun operation, pulsed jets, cutting with the use of abrasives and high pressure intensifiers, but in the meantime these practices should be used as far as practicable.

The use of high-pressure water jets for cutting and cleaning is a rapidly evolving technology, with current developments occurring. For this reason these practices are dated, and the Association shall, biannually, review these practices for any required changes.

B. SCOPE

These Recommended Practices are intended to provide guidance on the proper operation of high-pressure water jet cleaning and cutting equipment.

These Recommended Practices are also applicable at lower pressures where there is foreseeable risk of injury. As a guideline, these Recommended Practices are applicable where the product of pressure times flow exceeds 560 bar liters per minute (pressure being measured in bar and flow in liters per minute) or 2,000 psi gpm (pressure in psi, flow rate in gpm).

C. DEFINITIONS OF TERMS

1) **High Pressure Water Jet Systems:** High pressure water jet systems are water delivery systems which have nozzles or other openings whose function is to increase the speed of liquids. Solid particles or additional chemicals may also be introduced, but the exit in all cases will be in a free stream.

2) **High Pressure Water Cleaning:** The use of high pressure water, with or without the addition of other liquids or solid particles, to remove UJ1wanted matter from various surfaces, where the pressure of the liquid jet exceeds 1,000 psig (6.9 MPa) at the orifice.

3) **High Pressure Water Cutting:** The use of high pressure water, with or without the addition of other liquids or solid particles, to penetrate into the surface of a material for the purpose of cutting that material, and where the pressure of the liquid jet exceeds 1,000 psi (6.9 MPa) at the orifice.

4) **Caution:** The lower limit of 1,000 psig (6.9 MPa) does not mean that pressures below 1,000 psig (6.9 MPa) cannot cause injury or require any less attention to the principles of these Recommended Practices. Adequate precautions, similar to those of these Recommended Practices, are required at all pressures.

5) **Lancing:** An application whereby a lance and nozzle combination is inserted into, and retracted from, the interior of a pipe or tubular product.

6) **Moleing**: Moleing is an application whereby a hose fitted either with a nozzle or with a nozzle attached to a lance is inserted into, and retracted from, the interior of a tubular product. It is a system commonly intended for cleaning the internal surfaces of pipes or drains.

7) It can be self-propelled by its backward directed jets, and is manufactured in various shapes, sizes and combinations of forward and backward directed jets.

8) **Nozzle:** A device with one or more openings where the fluid discharges from the system. The nozzle restricts the area of flow of the fluid, accelerating the water to the required velocity and shaping it to the required flow pattern and distribution for a particular application, Combinations of forward and backward nozzles are often used to balance the thrust. Such nozzles are commonly referred to as tips, jets, orifices, etc.

9) **Shotgunning:** An application whereby a lance and nozzle combination can be manipulated in virtually all planes of operation.

10) **Lance:** A rigid metal tube used to extend the nozzle from the end of the hose.

D. EQUIPMENT DEFINITION AND STANDARDS

1) **Pressurizing Pump:** A unit designed to deliver high-pressure water or other fluid. This is usually based on positive displacement pistons or rubber diaphragm/hydraulic systems, and discharges water into a common manifold to which either flexible hoses, or rigid tubing, connecting to lances and nozzles are attached. These pumps can be either mobile or permanently mounted.

2) **Relief System:** The system shall be equipped with an automatic relief device on the discharge side of the pump.

3) **Automatic Pressure Relief Devices:** These may take the form of:
   a) Pressure Relief Valve or Bursting Disc in Holder
   b) Automatic Pressure Regulating Valve (Unloading Valve)
   c) Bypass Valve

4) **Pressure Relief Valve or Bursting Disc in Holder:** Usually mounted on the pump discharge chamber to prevent the pressure exceeding the rated maximum pressure of the whole system.

5) **Pressure Gauge:** The system should be equipped with a gauge indicating the pressure being developed. Gauges shall have a scale range of at least fifty percent (50%) above the maximum working pressure of the system.

6) **Filter or Strainer:** The water system should be equipped with a filter or strainer to prevent particles from restricting the orifices in the nozzle. The strainer or filter should be capable of removing particles smaller in size than the smallest orifice in the nozzle, and usually smaller to protect pumps, etc.

7) **Dry Shut-Off Control Valve:** This operator-controlled valve, normally hand-controlled, automatically shuts off flow to the lance and/or nozzle assembly when released by the operator, but retains the operating pressure within the supply line when shut off. This valve shall be used in systems with an Automatic Pressure Regulating Valve (see Section 4.3.2 of this Recommended Practice).

8) **Dump System:** The system should be equipped with a device which will either shut down the unit, idle it to a low rpm, bypass the flow or reduce the discharge pressure to a low level. The dump system shall be manually controlled only by the nozzle operator. The dump system actuator device should be shielded to preclude inadvertent operation. This device should immediately shut off the high-pressure water stream if the operator loses control.

9) **High Pressure Hose:** This is a flexible hose which connects two components and which delivers the high-pressure fluid to the gun or nozzle components. The hose should have a burst rating of a minimum of 2.5 times the intended working pressure. Operating levels below this ratio should require a protective shielding around that hose. The hose should be marked with the manufacturer's symbol, serial number, the maximum permissible operating pressure and the test pressure. The high-pressure hose should be tested at 1.5 times working pressure.

10) **End Fittings and Couplings:** High-pressure hose end fittings and couplings shall be manufactured to be compatible with the hose and tested as a unit.

11) **Jetting Gun Extension:** This is a length or lengths of tube carrying high-pressure fluid to the nozzle. Each shall be manufactured from suitable material to suit the application. End connections shall be suitable for the application. The extension is used in conjunction with a control valve (see Section 4.6 & 4.7 of these Recommended Practices); the extension shall have a minimum burst strength of at least 2.5 times the highest actual operating pressure used.

12) **Nozzle:** The nozzle creates the water jet or jets at the required velocity, flow rate, pressure, shape and distribution for a particular application. Combinations of forward and backward direct water jets are often used to balance the thrust. Such nozzles may be referred to as tips, jets, or orifices.

13) **Water Jet:** A jet stream of water produced from the individual outset orifice of a nozzle. The form of the orifice determines the shape of the jet while the orifice design, orifice area, and flow determine the speed at which it travels. The pressure drop at the orifice is a result of an increase in velocity. The two most commonly used jet shapes are the straight-jet and fan-shaped jet.

14) **Straight Jet:** Concentrates the stream of water over a small area of the work-piece by minimizing the spread. A typical application is for cutting, or for general cleaning of matter with higher shear and/or bond strength.

15) **Fan Jet:** Spreads the stream of water in one plane, so giving a wide band coverage of the workpiece. A typical application is for cleaning larger areas requiring less energy to remove unwanted matter.

16) **Foot Control Valve:** The operator's control valve (see Sections D-7 and D-8 of these Recommended Practices) may be arranged for actuation by the operator's foot if desired, either in place of or in addition to, hand control.

An adequate guard should be fitted to prevent accidental operation and the base place should be sufficient to ensure stability in use. If on the dump type (Section D-8) the layout should ensure that the dump line, if used, is restrained from whipping when the valve is released.

An adequate guard shall be fitted to prevent accidental operation and the base plate area shall be sufficient to ensure stability in use. If on the dump type (Section C-4) the layout should ensure that the dump line, if used, is restrained from whipping when the valve is released.

17) **Jetting Gun:** A portable combination of operator's control valve (Sections D-7 and D-8), lance (Section D-10) and nozzle (Section D-11) resembling a gun in layout and outline.

The control valve is hand-operated, generally by a squeeze action of the hand of the operator, who should always have control of this device and may be of the dry shut off (Section D-6) or dump (Section D-7) type, the gun being named accordingly. The hand-control normally takes the form of a trigger or lever which is provided with a guard adequate to prevent accidental operation and which shall have the means of being immobilized in the "off' position by means of a safety catch. The gun may be fitted with a shoulder pad or handgrips to facilitate back-thrust control.

18) **Retro Gun:** A retro safety gun is fitted with forward and backward facing jets. This reduces the thrust experienced by the operator. This type of gun is used mainly for underwater jetting operations. The retro balance jet protection tube should be sufficiently long or constructed so as to prevent the operator directing a retro balance jet at himself.

E. CARE AND MAINTENANCE OF EQUIPMENT

1) **Pump Unit:** The pump unit shall be maintained in accordance with the manufacturer's instructions. Where applicable this should include daily checks on the following items:
   a) Drive unit - lubricating oil, water, hydraulic fluid and fuel levels.
   b) Pump unit - lubricating oil and gearbox oil levels.
   c) Hydraulic hose reel - lubricating oil and fluid levels.
   d) Condition of guards and shields.

2) **Filters and Strainers:** All water filters should be checked at regular intervals, dependent upon the supply water conditions, and in accordance with pump manufacturer's recommendations.

3) **Hose Assemblies:** All hose assemblies shall be inspected prior to use with respect to the following:
   a) Correct pressure rating and size.
   b) Free from external damage, i.e., broken wires.
   c) All end fittings and couplings are in good order and of the correct pressure rating for the unit operating pressure.

4) **Nozzles:** All jetting nozzles shall be kept clean and the orifice shall be checked to ensure that it is not obstructed or damaged before installation. Defective nozzles shall not be used but should be replaced or repaired before installation. During the startup prior to operation, the nozzle should be removed from the lance and the system flushed thoroughly, to remove air and foreign particles.

5) **Jetting Guns and Lances:** Jetting guns and lances shall be checked daily and the trigger mechanism and guard given a thorough examination to ensure correct operation. All high-pressure connections should be observed during operation of the equipment at pressure. If a leak is observed, the pump shall be shut down and the connection repaired or replaced before further operation.

6) **Foot Control Valves:** All foot control valves shall be checked and cleaned daily and the foot mechanism and guard given a thorough visual examination to ensure correct operation.

7) **Trailers:** Trailer-mounted units shall be checked daily examining tires, braking systems, jacking points, towing hitch, lights, safety chains, structural damage and general cleanliness. The units should only be towed by vehicles fit for the purpose.

8) **Maintenance Servicing and Repair:** The following operations should only be carried out by competent personnel:
   a) Manufacturers' servicing requirements.
   b) The following items should be overhauled and checked for correct functioning at manufacturer's recommended intervals:

      i. Pressure relief valve.
      ii. Bursting discs if used.
      iii. Pressure control valves.
      iv. Hand or foot operated dump control valve or dry shut off control valve.
      v. Dry shut off valve or dump system.
      vi. Changeover valve.

9) **Tools:** When maintaining or assembling jetting systems the correct size tools must be used. The use of adjustable tools having serrated gripping jaws, for example pipe wrenches, which can damage equipment is not recommended, particularly on the crimped portion of a hose fitting.

10) **Compatibility:** All component parts and fittings should be checked to ensure they are of the correct size and rating for the unit.

F. PROTECTIVE CLOTHING AND PERSONNEL PROTECTION

1) **OSHA Compliance:** All applicable OSHA regulations covering personal protective equipment shall be followed.

2) **Head Protection:** All operators shall be issued suitable head protection that shall be worn. Where possible, this should include a full face shield.

3) **Eye Protection:** "Suitable" eye protection (adequate for the purpose and of adequate fit on the person) shall be provided to all operators of high-pressure water-jetting equipment, and must be worn within the working area. Additionally, several states have regulations governing eye protection that must be conformed with.

4) Where liquids liable to cause eye damage are encountered, it may be necessary to use either a combination of visor and goggles or a full hood with shield.

5) **Body Protection:** All operators should be supplied with suitable waterproof clothing having regard to the type of work being undertaken. Garments should provide full cover to the operator, including his arms. Liquid or chemical resistant suits shall be worn where there is a reasonable probability of injury that can be prevented by such equipment.

6) **Hand Protection:** Adequate hand protection should be supplied to all operators and shall be worn when there is a reasonable probability of injury that can be prevented by such equipment.

7) **Foot Protection:** All operators should be supplied with waterproof boots with steel toecaps. Jetting gun operators should use a metatarsal guard.

8) **Hearing Protection:** Most high pressure water jetting operations produce noise levels in excess of 90 dB(A) and so suitable ear protection issued in accordance with OSHA Standards must be worn and provision should be made for its regular inspection and maintenance. All personnel and operators should receive instruction in the correct use of ear protectors, so that noise exposure lies within the limits as specified by OSHA

9) **Respirator Protection:** A respiratory protection program shall be implemented where there is a reasonable probability of injury that can be prevented by such a program.

10) **Equipment Limitations:** It should be recognized that protective equipment might not necessarily protect the operator from injury by direct high-pressure water jet impact.

G. PRE-OPERATING PROCEDURES

1) **Planning:** Each job shall be pre-planned. Personnel familiar with the equipment to be cleaned or the material to be cut and the work environment shall meet with the personnel that will be doing the work, and outline potential hazards of the work area, environmental problems, safety standards and emergency aid procedures.

2) **Dump Valve:** All systems shall incorporate at least one fluid shut off or dump device. The gun operator must always be able to shut down the water jet by releasing pressure on the trigger, switch, or foot valve pedal.

3) **Warning Barriers:** Suitable barriers shall be erected to encompass the hazard area and signs posted to warn personnel they are entering a hazardous area. The perimeter should be outside the effective range of the jet wherever possible. Barriers may be of rope, safety tape, barrels, etc. as long as they give an effective warning, and are highly visible.

4) **Hose:** Hose shall be arranged so a tripping hazard does not occur. Hoses, pipes and fittings shall be supported to prevent excessive sway, and/or wear created by vibration or stress on the end connections, when laid on the ground, over sharp objects or on vertical runs.

5) **Fittings:** All fittings shall be cleaned and lubricated before installing in the system. Be sure all fittings, hoses and nozzles are fit for the purpose.

6) **Hose:** All hoses shall be checked for evidence of damage, wear or imperfections. The check shall be made periodically during the operation.

7) **Preflushing:** The system shall be completely flushed with sufficient water to remove any contaminants before installing the nozzle.

8) **Nozzles:** All orifices shall be checked in all nozzles for any stoppage, and/or damage or imperfections.

H. OPERATIONAL PROCEDURES

1) **Work Area:** Where practical, work pieces to be jetted should be removed from plant areas to a high pressure water jetting area. Where this is impractical, cutting or cleaning in place or adjacent to the installed position can be done with the necessary clearance and permission of the occupier.

2) **Area Limits:** Area limits applicable to the cutting or cleaning operations shall be defined, and the team shall mark these limits by barriers and notices to warn against access to other personnel. As a minimum, suitable barriers shall be an approved form of hazard warning, rope or tape. Alternatively, a suitable barrier shield is acceptable at any reasonable distance. Notices should state "DANGER-KEEP CLEAR, HIGH PRESSURE WATER JETTING IN OPERATION", or other suitable wording.

3) **Corrosive Materials:** Where there is a possibility of encountering corrosive or toxic material, the occupier shall be requested to inform the person in charge of high pressure water jetting of any precautions that may be necessary, including the collection and disposal of waste materials.

4) **Work Surface:** Operators should have good access to the workpiece, a safe working platform, and secure footing. The area in which work is to proceed shall be kept clear of loose items and debris to prevent tripping and slipping hazards.

5) **Access:** Access by unauthorized persons into the area where high pressure water jetting is taking place shall be prevented. The area shall be cordoned off and warning notices displayed in prominent positions. The perimeter should be outside the effective range of the jet wherever possible.

6) **Approaching the Operator:** The occupier shall be requested to inform all personnel likely to require access to the area that high pressure water jetting is in progress. Personnel having reason to enter the water jetting area should wait until the jet is stopped and their presence known. Personnel wishing to have the jet stopped shall approach a team member other than the jet operator. The jet operator shall not be distracted until the jet has been stopped.

7) **Side Protection:** Target and side shields shall, where feasible, be suitably placed to safeguard personnel and equipment against contact with grit, or solids removed by the jets.

8) **Protective Equipment:** All personnel working or entering the barricaded area while cleaning or cutting is in progress, shall wear the required protective equipment.

9) **Pressurizing the System:** Pressure shall be increased slowly on the system while it is being inspected for leaks and/or faulty components. All leaks or faulty components shall be repaired or replaced. The system shall be de-pressurized for repairs.

10) **Team Operations:** In most jetting operations it is accepted practice to employ a minimum of two persons.

11) **Supervision:** A Supervisor who is trained in all aspects of the jetting operation shall control all high-pressure water jetting operations.

12) **Number of Operators:** The operation of the high pressure water jetting equipment should be by two or more operators according to the equipment being used and the nature of the job. These operators shall work as a team, with one member in charge. The operator of the gun or lance as described in Section H-13 (below) shall take the lead role while jetting is in progress.

13) **Gun Operator:** One operator from the team shall hold the lance, gun or delivery hose, with the nozzle mounted on it. His primary duty is to direct the jet.

14) **Second Operator:** The second operator of the team shall attend the pump unit, keep close watch on the first operator for signs of difficulty or fatigue, and watch the surrounding area for intrusion by other persons or unsafe situations. If required, the operator will shut off the pressure until it is safe to continue. Caution should be exercised in shutting off the pressure rapidly as this can cause the loss of footing by the gun operator.

15) **Additional Operators:** Further operators are required in the following circumstances:
    - **a)** To assist the first operator with the handling of the lance if it is too long or heavy for one man.
    - **b)** To provide communication if the lance operator is out of sight of the pump unit operator.

16) **Job Rotation:** The team members should rotate their duties during any job to minimize fatigue to the operator holding the lance or gun.

17) **Team Leader:** The team leader is responsible for basic equipment checks, the preparation of the working area for safe operation, and for obtaining a permit to work where and when required.

18) **Code of Signals:** Before starting a jetting operation the team members, one of who must be in charge, shall agree on a code of signals to be used during the operation of the equipment.

19) **Attendance:** The system shall never by left unattended when pressurized.

20) **Target Holding:** Objects to be cleaned shall never be held manually.

21) **Connection Protection:** The point where the hose connects to the gun shall be shrouded by a protective device such as a heavy duty hose, shoulder guard, etc. such as to prevent injury to operator should hose, pipe, or fitting rupture.

22) **Minimum Length:** Where practicable, the minimum length of the shotgun lance extension should be 4 ft. from the triggering device to the nozzle.

23) **Hose Protection:** Steel braided hoses should be used on air operated fail safe systems to keep the system from being activated by someone stepping on the hose or running over it.

I. MOLEING OR FLEX LANCING

1) **Control:** The operator inserting the nozz1e shall have direct control of the dump system.

2) **Retrojets:** During manual operations, the entrance to a line or pipe shall not be cleaned with a nozzle containing back jets without adequate shielding.

3) **Clearance:** The clearance between the outside diameter of the hose, lance and nozzle assembly, and the inside wall of the item being cleaned shall be sufficient to allow adequate washout of water and debris.

4) **Pressurization:** During manual operations, the nozzle shall be inserted into the tube prior to pressurizing. Conversely, the system shall be de-pressurized before removal of the nozzle from the tube.

5) **End Identification:** Hoses shall be conspicuously marked no closer than 24" (0.6 m) from the nozzle to warn the operator of the nozzle location.

6) **Nozzle Support:** Where the length of the nozzle and rigid coupling is less than the inside diameter of the pipe, a length of rigid pipe of not less than the diameter of the pipe being cleaned should be fitted directly behind the nozzle, or a suitable safety shield should be provided to protect the operator. This is to prevent the nozzle turning around 180° and doubling back towards the operator.

J. RIGID LANCING

1) **Control:** The operator inserting the nozzle shall have direct control of the dump system.

2) **C1earance:** The clearance between the outside diameter of the lance and nozzle and the inside wall of the item being cleaned shal1 be sufficient to al1ow adequate washout of water and debris.

3) **Pressurization:** When under manual operation, the nozzle shall be inserted into the tube prior to pressurizing. Conversely, the system shall be de-pressurized before removal of the nozzle from the tube, unless proper shielding is provided.

4) **Shie1ds:** When lancing tubes with a rigid 1ance, a guard should be installed, where practicable, around the lance, to prevent a lance nozzle from being inadvertently withdrawn and causing injury.

K. PROPER OPERATION

1) **Startup:** The pump unit shall not be started and brought up to pressure unless each team member is in his designated position, the nozzle is held in or directed at the work piece, and the lance or gun securely held.

2) **Adjustments:** Apart from operational procedures no attempt shall be made to adjust any nut, hose connection, fitting, etc., while the system is under pressure. The pumps shall be stopped and any pressure in the line discharged prior to making any such adjustment.

3) Care should be taken to release the pressure in the dry shut off gun and the line when the unit *is* switched off.

4) **Equipment Malfunction:** If for any reason the water flow does not shut off when the trigger or foot pedal is released, work shall cease until the item has been serviced, repaired, or changed by properly trained personnel.

5) **Reaction Force:** The operator should be allowed to experience the reaction force of the jet progressively until the required operating pressure is reached. The *lowest* pressure *should* be used compatible with the work to be done. The pressure *shall* not be adjusted without the operator's awareness.

6) **Thermo-Plastic Hoses:** Thermo-plastic hose should not be used for water jetting unless specifically designed for this purpose.

7) **Work Stoppage:** Work shall stop:
   - **a)** In the event that leaks or damage become apparent.
   - **b)** If any person becomes aware of any change in conditions or any hazards being introduced or existing.
   - **c)** If plant or work alarms are sounded.
   - **d)** Any of the Recommended Practices in this document are not being followed.

8) **Hose Protection:** All hoses should be protected from being run over and crushed by vehicles, forklift trucks, etc.

L. THE USE OF LANCES AND NOZZLES

1) **Lances:** Lances which are rigid or semi-rigid having nozzles fitted to them with any combination of forward, backward or 900 angle jets shall be used with either a dump system or dry shut off control valve. When a flexible lance or nozzle mounted on a hose is in use, the jet should not be operated at pressure unless the nozzle is properly positioned inside the workpiece or the operator is protected by screens or proper shielding from the rear-facing jets. If necessary, the lead-in to the workpiece should be cleaned by other methods.

2) **Flexible Lances:** Flexible lances used to clean pipes where the inside diameter of the pipe is not small enough to prevent the lance from turning back on itself, shall have a piece of rigid straight tube, slightly longer than the diameter of the pipe fitted immediately behind the nozzle to prevent this from happening.

3) **Distance Indicator:** When an assembly is used which allows the nozzle to enter the workpiece with restricted visibility, the lance, hose or floor should be clearly marked in a manner which enables the operator to judge how far the nozzle is in the workpiece before pressure is applied and, conversely, so that pressure is released before the apparatus is completely withdrawn from the workpiece.

4) **Lance Length:** The length of a rigid lance or combination of lances shall be such that the operator can maintain control at all times.

5) **Improper Use:** Should an operator enter a manhole or access port for any purpose (preferably with the jetting machine turned off) the hose shall not be used to support his weight when climbing up or down.

6) **Confined Working:** Before entry into a confined space for jetting, a certificate of clearance shall be obtained to ensure that access is safe.

M. OPERATIONAL AND TRAINING REQUIREMENTS

1) **Cutting Action:** The cutting action of a high pressure water jet and the potential hazard it poses to the human body shall be demonstrated through the use of audio-visual aids or actual use of equipment (by cutting through a piece of lumber, a concrete block, etc.).

2) **Personal Protective Equipment:** The minimum personal protective equipment shall be explained. Instructions shall be given as to when and how specific clothing and other types of protective devices shall be worn according to the type of work performed, locations, etc.

3) **System Operation:** The operation of the system shall be explained pointing out potential problems and proper corrective action.

4) **Control Devices:** The operation of all control devices shall be explained. The importance of not tampering with any control devices as well as the importance of keeping them in proper working order shall be stressed.

5) **Equipment Maintenance:** It should be pointed out that valves and seating surfaces in pressure regulating devices encounter high wear during high pressure water jetting. These items require frequent inspections, maintenance, and/or replacements in order to provide proper operation.

6) **Hose:** The proper method of connecting hoses including laying out without kinks, protection from excessive wear, and proper tools to use on couplings and fittings shall be explained.

7) **Stance:** The proper stance for sound footing and how to use the various devices for lancing, shotgunning, and moleing shall be demonstrated, The trainee, under close supervision, shall use the various devices while the unit is slowly pressurized.

8) **Proficiency:** Personnel shall demonstrate knowledge and skill in the proper operation of equipment through practical application.

9) **General:** System shall be de-pressurized when:
   - **a)** Not in use
   - **b)** An unauthorized or inadequately protected person enters the barricaded area.
   - **c)** Replacement or repairs are made to the system.
   - **d)** Any Recommended Practices are violated.

N. PERMANENT CLEANING AREAS

1) **Enclosure:** The areas shall be suitably enclosed and warning notices prominently displayed at the access points and perimeters.

2) **Access:** Access by persons other than the jetting team shall be strictly prohibited while work is in progress. If any unauthorized entry is made, all work shall cease immediately.

3) **Hazards:** The working area shall be free from hazards likely to trip personnel and be provided with adequate drainage and lighting facilities.

O. FREEZE PRECAUTIONS

1) **Freeze Precautions:** During the periods where there is a risk of freezing, following manufacturer's recommendations or take the following precautions on shutting down.

   a) Remove gun or nozzle from delivery hose.

   b) Pump water from supply tank until level of water is just above the filter. Add recommended quantity of anti-freeze into water tank. Place delivery hose into water tank and secure.

   c) Run the pump until the anti-freeze works through the system.

   d) Move selector level to dump or recycle position until the anti-freeze shows in the water tank.

2) If no supply tank is fitted, follow manufacturer's recommendations.
WARNING: IF A PUMP OR HOSE APPEARS FROZEN, ON NO ACCOUNT MUST THE PUMP BE ENGAGED OR THE ENGINE STARTED IF THERE IS A DIRECT DRIVE TO THE PUMP UNTIL THE SYSTEM HAS BEEN THAWED OUT AND LOW PRESSURE WATER HAS BEEN ALLOWED TO FLOW THROUGH THE SYSTEM TO THE NOZZLE END OF THE LANCE, THE LANCE HAVING BEEN REMOVED.

P. ACCIDENTS

1) **Personal Injuries:** In the event that a person is injured by the impact of a water jet, the injury caused may appear insignificant and give little indication of the extent of the injury beneath the skin and the damage to deeper tissues. Large quantities of water may have punctured the skin, flesh, and organs through a very small hole that may not even bleed.

2) **Operator Identification:** Immediate hospital attention is required and medical staff must be informed of the cause of the injury. To ensure that this is not overlooked, all operators engaged on jetting should carry an immediately accessible waterproof card that outlines the possible nature of the injury and bears the following text. "This man has been involved with high pressure water jetting at pressures up to 14,500 lb./in2 (100 MPa, 1000 bar, 1019 kg/cm2) with a jet velocity of 900 miles (1440 km) per hour. Please take this into account when making your diagnosis. Unusual infections with micro-aerophilic organisms occurring at lower temperatures have beep reported. These may be gram negative pathogens such as are found in sewage. Bacterial swabs and blood cultures may therefore be helpful."

3) **Medical Recommendations:** If an accident should occur and high pressure water penetrates the *skin*, the National Poison Center Office, telephone number 1/412/681-6669 may be contacted for best medical measures.

4) **Immediate First Aid:** Where medical examination is not immediately possible in remote situations, first aid measures should be confined to dressing the wound and observing the patient closely until medical examination has been arranged.

5) **Reporting:** If any person or equipment is accidentally struck by the jet, this fact must be reported to a responsible party.

Q. RESPONSIBILITY

Purpose: These Recommended Practices are provided to assist persons unfamiliar with the operation of water jetting equipment in learning to correctly use the equipment.

The responsibility of correct operation and use of the equipment is the sole responsibility of the operator. The operator should familiarize himself with the identification of high pressure metal fittings, hoses, guns, and accessories. The modification of water jetting equipment or accessories is not recommended without prior written approval by the manufacturer of the equipment.

Serious harm or injury may result from the misuse of water jetting equipment, the use of improper fittings, hoses, or improper attachments. The Water Jetting Association does not accept liability for the use of water jetting equipment by the provision of these Recommended Practices or warrant that the techniques expressed or implied herein are correct or will prevent harm or injury.

18.0 Welding and Cutting

All welding and cutting apparatus, equipment, and operations shall be in accordance with the requirements of this section. First aid equipment shall be available at all times during welding/cutting and related activities.

18.1 Training

All personnel assigned to welding and cutting operations shall be trained to recognize potential fire hazards. The following shall be included in training:

Fire Watchers – Assigned fire watchers must be trained in the use of fire extinguishing equipment and familiar with the facilities for sounding an alarm in the event of a fire.

Cutters, Welders and Supervisors –Cutters, welders and their supervisors must be suitably trained in the safe operations of their equipment and the safe use of the process

18.1.1 Daily Inspection

Welding apparatus and equipment shall be inspected daily prior to use. Defective apparatus and equipment shall be removed from service, replaced, or repaired and re-inspected before being used again. When equipment is found with a defect, it shall be red-tagged with the defect clearly identified on the tag to prevent inadvertent use.

18.1.2 Fire Extinguishers

Fire extinguishers rated at 2-A 20;BC units or larger shall be immediately available wherever welding or cutting is being done.

18.1.3 Fire Hazards / Protection

The following precautions shall be taken, as applicable, when welding or cutting:

(1) Flammable Material – Welding shall, whenever possible, be confined to areas free of combustible materials. When this is not possible, all combustible material shall be removed or protected from fire, sparks, and slag. If the object to be welded or cut cannot be moved and if all the fire hazards cannot be removed, then guards shall be used to confine the heat sparks and slag and to protect the immovable fire hazard. If necessary/required a fire watch shall be posted at the hot work site for 30 minutes after work is completed to ensure fire protection. Training shall be provided for personnel assigned as fire watches.

(2) Flammable and Combustible Liquids – No welding, cutting, or burning shall be done in areas containing flammable and/or combustible liquids, vapors, or dusts except in accordance with Section 35.11.

(3) If the requirements stated above cannot be followed, then welding and cutting shall not be performed.

18.1.4 Fire Watch

Fire watchers shall be required whenever welding or cutting is performed in locations where other than a minor fire might develop, or any of the following conditions exist:

(1) Appreciable combustible material, in building construction or contents, closer than 35 feet (10.7 m) to the point of operation.

(2) Appreciable combustibles are more than 35 feet (10.7 m) away but are easily ignited by sparks.

(3) Wall or floor openings within a 35-foot (10.7 m) radius expose combustible material in adjacent areas including concealed spaces in walls or floors.

(4) Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and are likely to be ignited by conduction or radiation.

Fire watchers shall have fire extinguishing equipment readily available and be trained in its use. They shall be familiar with facilities for sounding an alarm in the event of a fire. They shall watch for fires in all exposed areas, try to extinguish them only when obviously within the capacity of the equipment available, or otherwise sound the alarm. A fire watch shall be maintained for at least a half hour after completion of welding or cutting operations to detect and extinguish possible smoldering fires.

18.1.5 Authorization

Before cutting or welding is permitted, the area shall be inspected by the individual (competent person) responsible for authorizing cutting and welding operations. He/she shall designate precautions to be followed in granting authorization to proceed preferably in the form of a written permit.

18.1.6 Goggles and Protective Clothing

Welders and helpers shall wear protective clothing and eye protection as specified in Section 8.0. Also, other persons shall be protected from exposure to welding rays, flashes, molten metal, and slag. Welding screens shall be installed, where possible, in all areas where welding is done.

18.1.7 Confined Spaces - Ventilation

Ventilation and protection of employees welding, cutting, or heating in confined spaces shall conform to requirements contained in Section 26, Confined Spaces. The following applies to such work in confined space situations:

Ventilation – Local exhaust or general ventilating systems shall be provided and arranged to keep the amount of toxic fumes, gases, or dusts below the maximum allowable concentration as specified in CFR 1910.1000.

Securing Cylinders and Machinery - When welding or cutting is being performed in any confined spaces the gas cylinders and welding machines shall be left on the outside. Before operations are started, heavy portable equipment mounted on wheels shall be securely blocked to prevent accidental movement.

Lifelines - Where a welder must enter a confined space through a manhole or other small opening, means shall be provided for quickly removing him in case of emergency. When safety belts and lifelines are used for this purpose they shall be so attached to the welder's body that his body cannot be jammed in a small exit opening. An attendant with a preplanned rescue procedure shall be stationed outside to observe the welder at all times and be capable of putting rescue operations into effect.

Electrode removal - When arc welding is to be suspended for any substantial period of time, such as during lunch or overnight, all electrodes shall be removed from the holders and the holders carefully located so that accidental contact cannot occur and the machine disconnected from the power source.

Gas cylinder shutoff - In order to eliminate the possibility of gas escaping through leaks of improperly closed valves, when gas welding or cutting, the torch valves shall be closed and the fuel-gas and oxygen supply to the torch positively shut off at some point outside the confined area whenever the torch is not to be used for a substantial period of time, such as during lunch hour or overnight.

Where practicable the torch and hose shall also be removed from the confined space.

Warning signs - After welding operations are completed, the welder shall mark the hot metal or provide some other means of warning other workers.

Employees welding, cutting, heating, brazing, or using fluxes, coatings, and filler materials containing the following materials shall have proper ventilation and respiratory protection, and be considered for medical monitoring in accordance with requirements of Sections 7.5:

- Lead
- Zinc or galvanized materials
- Cadmium
- Fluorides
- Stainless steel
- Chlorinated hydrocarbons
- Other materials or compounds determined to be toxic by the manufacturer or national recognized source referenced in 29 CFR Part 1910.
-

18.2 Gas Welding and Cutting

Workmen in charge of the oxygen or fuel-gas supply equipment, including generators, and oxygen or fuel-gas distribution piping systems shall be instructed and judged competent by their employers for this important work before being left in charge. Rules and instructions covering the operation and maintenance of oxygen or fuel-gas supply equipment including generators, and oxygen or fuel-gas distribution piping systems shall be readily available.

18.2.5 Regulators

Pressure reducing regulators shall be used only for the gas for which they were designed. Except for cracking the valve slightly to remove dust or dirt, gas shall not be released from a cylinder under pressure without attaching a pressure-reducing regulator to the cylinder valve. Acetylene regulators shall be adjusted to permit a discharge not greater than 15 lb/in2 (gauge).

18.2.6 Torches

Torch valves shall be closed and the gas supply shut off when work is suspended. Torch valves shall be checked for leaks at the beginning of each shift. Torches shall be lit by friction lighters or other approved devices and not by matches or from hot work.

18.2.7 Check Valves

All oxygen, acetylene, or other fuel gas oxygen combinations used in cutting or welding shall have reverse flow check valves installed at the inlet side of the torch.

18.2.8 Fuel Gas and Oxygen Hoses

Only properly marked and identified hose in good condition and specifically manufactured for oxyacetylene service shall be used for gas welding and cutting. Hose, which has been subject to flashback or which indicates evidence of severe wear or damage, shall be removed from service. Containers used for storage of fuel gas hoses shall be ventilated.

18.3 Compressed Gas Cylinders

18.3.5 Cylinder Storage

Onsite storage of gas cylinders shall conform to the following requirements:

(1) Separation – Cylinders containing the same gas shall be stored in segregated groups and not mixed with other gas cylinders. Empty gas cylinders shall be stored in the same manner.
(2) Confined Spaces – Cylinders shall be stored in well ventilated spaces. Cylinders containing oxygen, acetylene, or other fuel gases shall not be stored or taken into confined spaces.
(3) Flammable or Combustible Material – Cylinders in storage shall be stored in an upright secured position, and separated from flammable or combustible material by at least 20 feet or by a fire-resistant partition of at least one half hour fire-resistance rating.
(4) Smoking Restrictions – Smoking or open flame shall not be permitted where cylinders are stored, and the area shall be posted with "DANGER – NO SMOKING OR OPEN FLAME" signs.

18.3.6 Upright Position

Compressed gas cylinders shall be secured in an upright position at all times except when being hoisted.

18.3.7 Cylinder Valves

Cylinder valves shall be closed when in storage, in transit, or not in use.

18.3.8 Valve Caps

Cylinder valve caps shall be securely in place during storage, transit, and at all times when the regulator is not connected to the cylinder. Cylinders, secured on cylinder trucks, can be moved within a jobsite without the regulators removed when the regulators and cylinder valves are adequately protected.

18.3.9 Transporting

Compressed gas cylinders transported by crane, hoist, or derrick shall be transported in cradles, nets; never directly by slings, chains, or magnets.

18.3.10 Valve Wrenches

The valve wrench shall be in the operating position when the cylinder is in use.

18.3.11 Handling

Cylinders shall be handled in a manner which will not weaken or damage the cylinder or valve. They shall not be exposed to extremes of temperature, physical damage, or electrical current.

18.3.12 Oxygen

Oxygen cylinders and fittings shall be kept free of grease or oil and shall not be handled with oily hands or gloves. Oxygen shall not be used as a substitute for compressed air.

18.3.13 Defective Cylinders

Leaking cylinders shall be removed to an isolated location out of doors, away from personnel and sources of ignition. The valve shall then be cracked, permitting gas to escape slowly. The cylinder shall be tagged "DEFECTIVE" and returned to the supplier.

18.4 Arc Welding and Cutting

Workmen designated to operate arc welding equipment shall have been properly instructed and qualified to operate such equipment.

Workmen assigned must be familiar with CFR 1910.254 and with CFR 1910.252(a)(b) & (c). If gas shielded arc welding is performed, workmen must be familiar with the American Welding Society Standard A6-1-1966.

18.4.1 Equipment Maintenance

Machine hook up- Before starting operations all connections to the machine shall be checked to make certain they are properly made. The work lead shall be firmly attached to the work; magnetic work clamps shall be freed from adherent metal particles of spatter on contact surfaces. Coiled welding cable shall be spread out before use to avoid serious overheating and damage to insulation.

Grounding- Grounding of the welding machine frame shall be checked. Special attention shall be given to safety ground connections of portable machines.

Leaks- There shall be no leaks of cooling water, shielding gas or engine fuel.

Switches- It shall be determined that proper switching equipment for shutting down the machine is provided.

Manufacturers' instructions- Printed rules and instructions covering operation of equipment supplied by the manufacturers shall be strictly followed.

Electrode holders- Electrode holders when not in use shall be so placed that they cannot make electrical contact with persons, conducting objects, fuel or compressed gas tanks.

Electric shock- Cables with splices within 10 feet (3 m) of the holder shall not be used. The welder should not coil or loop welding electrode cable around parts of his body.

The operator should report any equipment defect or safety hazard to his supervisor and the use of the equipment shall be discontinued until its safety has been assured. Repairs shall be made only by qualified personnel. Machines which have become wet shall be thoroughly dried and tested before being used. Cables with damaged insulation or exposed bare conductors shall be replaced. Joining lengths of work and electrode cables shall be done by the use of connecting means specifically intended for the purpose. The connecting means shall have insulation adequate for the service conditions.

18.5 Hot Work Permits

This procedure is meant as a guideline for the preparation, issuance, and management of Hot Work Permits pertaining to tasks and/or equipment that may cause an ignition if a flammable atmosphere exists.

Special materials & equipment: Calibrated combustible gas meters, fire extinguishers, and fire retardant clothing.

The safe completion of hot work has a positive indirect impact on quality. Safe work practices reduce the risk of spills, leaks and releases to the environment.

18.5.1 General

Hot work cannot proceed until a properly prepared Hot Work Permit is issued to the personnel performing the work.

Hot work includes any work or the use of any device that produces flames, heat, electrical arc, or sparks. This includes, but is not limited to, the following:

a. burning or cutting torches, welding equipment, open fires (salamanders, blow torches, etc.) and soldering irons
b. non-intrinsically safe electrical appliances
c. friction tools capable of producing sparks and/or ignition temperatures (impacts, grinders, sandblasting equipment, etc.)
d. portable non-explosion proof motors driving equipment such as pumps or compressors
e. internal combustion engines
f. battery powered non-intrinsically safe tools and appliances such as cameras, flash attachments, cell phones and pagers
g. electrical heating elements and space heaters
h. driving vehicles in areas not specifically designated for their use (off road)
i. pigtails and temporary electrical connections
j temporary tower/vessel lighting (intrinsically safe lighting does not require Hot Work Permits).

A Hot Work Permit gives written authorization to proceed with hot work for a SPECIFIC TASK in a specific location.

Motor vehicles, including cranes, require a Vehicle Entry Permit when used in a hazardous area.

A Hot Work Permit must contain the following information:

a. a description of the gas/atmosphere tests taken
b. a description of the involved equipment
c. the effective date and valid time duration
d. a description of the equipment preparation
e. additional protection measures
f. signature of the person performing the testing (Issuing Authority)
g. signature of the person performing the work (Executing Authority)
h. model and serial number of test instrument
i. allowable LEL limits.

A Hot Work Permit is valid until the specified expiration time and date of the associated Safe Work Permit.

A fire watch is required for open flame hot work or grinding. Fire watch must remain 30 minutes after the completion of welding or flame cutting operation, 10 minutes for grinding.

Fire watch must:

-Have extinguishing equipment ready.
-Be trained in its use.
-Know how to notify or sound the alarm in case of fire.
-Watch for fire in exposed areas.
-Extinguish fires within their ability and the capability of the equipment.

18.5.2 Testing for Flammable Gases and Vapors

Testing must be performed ONLY by authorized and trained personnel.

Combustible gas meters must be properly used and maintained

Combustible gas meters used to determine the presence of flammable gases and vapors must have been bench calibrated in the last 3 months and bump checked within the last 24 hours.

Testing should be performed as near as possible to the permit start time.

Sewers and other sources of flammable gases and vapors must be isolated before performing testing. Combustible materials must be removed from the affected area.

Testing must be performed in a manner that is representative of the ambient air as well as equipment conditions.

NOTE: The acceptable LEL range to perform hot work is 0- 2%, LEL greater than 2% but less than or equal to 20% requires an MOC.

DANGER: No hot work will be performed at LEL levels greater than 20%.

Periodic retesting shall be performed as necessary or when conditions change. Periodic retesting is required when a Permit is extended, or if the work does not start for two hours or stops for greater than two hours.

Continuous monitoring must be implemented when it is likely that ambient air or equipment conditions will change.

NOTE: Persons performing hot work have the right to witness the testing and ask for a retest at any time.

18.5.3 Permit Preparation

A valid Hot Work Permit requires the following sections be completed: Job Preparation, Gas Testing, Hot Work/Vehicle Entry Permit Requirements, PPE Authorization Section. Other sections may apply depending on the job.

The operator (Issuing Authority) in charge of the area will properly complete the information on the Permit by using a ball point pen and pressing hard to make a clear copy.

18.5.4 Issuing the Permit

The Issuing and Executing Authority will sign the Permit in the Authorization Section indicating acceptance of the conditions stated in the permit.

Once authorized, one copy is given to the Executing Authority to be posted at the job site.

Completed Hot Work Permits will be saved and archived.

18.5.5 Managing the Permit

Operators (Issuing Authority) must periodically inspect the hot work site to determine if conditions have changed.

WARNING: Should hot work conditions change the work shall be stopped and the Permit canceled.

NOTE: Any person observing conditions unsafe for hot work is authorized to stop the job then notify the operator.

Before hot work continues the area shall be re-inspected and tested and a new Hot Work Permit issued.

When a Hot Work Permit extends through a work shift change the relieving operator assumes responsibility for the hot work.

The departing operator shall inform the new operator that the Hot Work Permit is valid and of the conditions required by the Permit.

The new operator shall manage the Permit according to the conditions set forth on the Permit and this procedure.

18.5.6 Hot Work In/On Process Lines and Confined Spaces

When hot work is to be performed on process equipment, the equipment shall be blanked or disconnected at the first practical flange or separation point. Disconnection shall be enough to prevent migration of gases and vapors into the equipment.

CAUTION: Use of a double block and bleed for isolation for hot work requires Management of Change (MOC) procedures.

Process equipment must be drained, washed, cleaned, and/or purged as necessary before hot work may proceed.

18.5.7 Deviation

Any deviation from this procedure requires a Management of Change.

Hot Work /Safe Work Permit is presented below.

SAFE WORK PERMIT

ALLIED ENVIRONMENTAL SERVICES, INC.

Permit No. _____ Job No.#

PERMIT TYPE: ☐ Hot Work ☐ Excavation ☐ Confined Space Entry ☐ Vehicle Access ☐ Critical Lift		
Issued To (Company):	Start Date & Time:	Expiration Date & Time:
Facility Name:	Location of Work:	
Brief Description of Work:		
Task/Entry Supervisor:		
Tools/Equipment Needed:		

Job Preparation

	Yes	No	N/A		Yes	No	N/A	If 'No' is checked, explain:
1. System Depressurizedd?	☐	☐	☐	9. Energy Sources Isolated	☐	☐	☐	
2. Equipment Drained?	☐	☐	☐	10. Sources Chained/Locked/Tagged	☐	☐	☐	
3. Equipment Washed?	☐	☐	☐	11. Blank List Completed	☐	☐	☐	
4. Equipment Steamed?	☐	☐	☐	12. Blanks Installed?	☐	☐	☐	
5. Bleed Valve Rodded?	☐	☐	☐	13. Start Button Pushed To Check LO?	☐	☐	☐	
6. Steam Tracing Off?	☐	☐	☐	14. MOC/Procedures Reviewed?	☐	☐	☐	
7. Equipment Gas Tested?	☐	☐	☐	15. Alloy Metals Used?	☐	☐	☐	
8. Barricade Tape & Signs Posted?	☐	☐	☐	16. Affects Other Work?	☐	☐	☐	

Electrical verification complete? ☐ Yes ☐ N/A

Atmosphere/Gas Testing (☐ N/A)

			Time:				
Test	**Safe Limits**	**IDLH**		**Result**	**Retest**	**Retest**	**Test Performed By:**
O2	19.5 – 23.5 %	19.5 – 23.5 %					Initial Test:
% LEL	≤ 2% (hot work); ≤ (entry)	N/A					Retest:
CO	≤ 35 ppm	750 ppm					Retest:
H2S	≤ 10 ppm	100 ppm					
Benz	≤ 1 ppm	500 ppm					**Meter Serial No.:**
HC	≤ 300 ppm	1,100 ppm					Meter Calibration Date:
Other							Initial: Retest: Retest:

HOT WORK / VEHICLE ENTRY REQUIREMENTS (☐ N/A)

☐ Conditions Safe for Hot Work / Vehicle Entry

Check all that are required:

- ☐ Fire Extinguisher(s)
- ☐ Fire Watch (flame/grind only)
- ☐ Sewers Covered / Sealed
- ☐ Combustibles Removed / Protected
- ☐ Fire Blankets
- ☐ Contain All Sparks (enclosure)
- ☐ Lubricant / Water Spray
- ☐ Spark Resistant Tools
- ☐ Manual Hand Tools
- ☐ Vac Truck Vent Location Safe
- ☐ Vac Truck Grounded/Bonded
- ☐ Steam Hose(s)/Lance(s)
- ☐ Pressurized Fire Hose(s)
- ☐ Keep Area Wet
- ☐ Inert Atmosphere Required
- ☐ No Sampling/Venting/Draining
- ☐ Proper Bonding/Grounding
- ☐ Continuous Gas Monitoring - Monitor for: ☐ O2 ☐ CO ☐ %LEL ☐ H2S
- ☐ Other:

Is a vehicle needed? ☐ Yes ☐ No

Route of entry/exit:

Monitoring:	**Time**	**Result**	**Time**	**Retest**
O2				
%LEL				

	Initial Test	**Retest**
Gas Test By:		
Meter Serial No.		
Meter Calib. Date		

Comments:

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Check all that are required:

- ☐ Standard PPE (Level D)
- ☐ Hearing Protection
- ☐ Welder's PPE
- ☐ Dust Tight Goggles
- ☐ Fall Protection
- ☐ Chemical Splash Goggles
- ☐ Face Shield
- ☐ Half-Face Respirator
- ☐ Full-Face Respirator
  Cartridge Type:
- ☐ Air Line Respirator
- ☐ 5 min. Escape SCBA
- ☐ SCBA
- ☐ Personal Monitor
- ☐ Chemical Gloves
- ☐ Thermal Gloves
- ☐ Electrical Flash Hood & Jacket
- ☐ High Voltage Gloves
- ☐ GFCI

SPECIAL HAZARDS

Check all that apply:

- ☐ Acids/Caustics
- ☐ Benzene
- ☐ Electrical
- ☐ Hot Materials
- ☐ Hydrocarbons
- ☐ H2S
- ☐ Ice
- ☐ Lead
- ☐ Nitrogen/Inert Gas
- ☐ Radiation/X-ray
- ☐ Refractory/Wool
- ☐ Other

EXCAVATION REQUIREMENTS (☐ N/A)

Pre-excavation Checklist Completed? ☐Yes ☐N/A

Pre-entry Inspection attached to permit? ☐Yes ☐N/A

Issuing Authority: x

Extended by: x

CRITICAL LIFT REQUIREMENTS (☐ N/A)

Is this a critical lift? ☐Yes ☐N/A

If yes, a lift plan is required. Is it attached? ☐Yes ☐N/A

Executing Authority: x

Extended by: x

Permit Close Out. Is permitted work complete? ☐Yes ☐No

Has worksite been cleaned and made safe? ☐Yes ☐No

Issuing Authority: x

Executing Authority: x

19.0 Trenching and Excavations

19.1 General

This procedure will apply to all personnel and subcontractors whose job function requires them to enter any excavation. If the scope of work includes work in a trench or excavation, a pre-plan hazard analysis must be performed to ensure the follow points have been addressed. Due to the unique hazards associated with numerous job sites, this hazard analysis plan will be written in letter format, specific for the owner's facility.

- Inspection of surrounding areas for potential hazards
- Soil Classification to determine:
  - Support system requirements if needed
  - Benching or sloping considerations
  - Other worker protection systems
- Entry and egress requirements for employees
- Warning and protection for other workers in the area (signs, caution lights, etc.)
- Barricades required if trench is left open – protection of pedestrian and vehicle traffic
- Atmospheric testing as necessary
- Ventilation requirements
- Use of Personal Protective Equipment (Respirators, face shields, gloves, etc.)
- Water accumulation
- Underground utilities
- Protection of workers from vehicles and equipment traffic in the work area

Each worker involved in the entry and excavation shall have input into the pre-plan. The ability to share experiences, whether positive or negative, is an invaluable tool in trench safety awareness.
Use of the Daily Excavation and Trenching Inspection Form Figure 19-1 shall be utilized to document the above points and all inspection findings. This must be accomplished on a daily basis if workers will be performing tasks within the trench.

19.1.1 Definitions

Excavation –Any manmade cut, cavity, trench, or depression in the earth's surface formed by earth removal. This section applies to all excavations.
Competent Person – A competent person is defined as anyone capable of identifying existing and predictable hazards in the work environment and who has the authority to correct such hazards.
OUPS - Ohio Utilities Protection Services. OUPS must be called at least 48 hours before you dig. Call 1-800-362-7264.

19.1.2 Competent Person Responsibilities

Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated.

Where the competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

The competent person for Allied Environmental Services will be the site superintendent. The project manager shall ensure this superintendent is capable of identifying existing and predictable hazards in the work environment and who has the authority to correct such hazards.

19.2 Specific Requirements

19.2.1 Employees entering excavations four feet or more in depth must be protected by an adequate protective system (as described in section 19 of this procedure).

19.2.2 Prior to opening an excavation, the estimated location of utility installations that may be encountered shall be determined. Utility companies or owners shall be contacted to establish the location of the underground installations. Location and depth shall be marked indicating the type of service.

19.2.3 While the excavation is open, underground installations shall be protected, supported or removed to protect employees.

19.2.4 All surface objects/encumbrances that may present a hazard to employees by rolling or falling into an excavation, shall be removed or supported. Personnel shall be adequately protected from vehicular traffic –reflective vests (DOT)

19.3 Access and Egress

19.3.1 A stairway, ladder, ramp or other safe means of egress shall be located in excavations that are over four feet in depth so as to require no more than 25 feet of lateral travel for employees.

19.3.2 Ladders must extend 36 inches above the point of support at the top of excavation.

19.4 Hazardous Atmospheres

19.4.1 In areas where hazardous substances are stored nearby or other areas where oxygen deficiency (atmospheres containing less than 19.5% oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, the atmosphere in the excavation must be tested before employees enter.

19.4.2 Emergency rescue equipment, such as breathing apparatus, a safety harness and lifeline, or a basket stretcher, should be readily available where hazardous atmospheric conditions exist or may be expected to develop during work in an excavation. Reference subsection 26 - Confined Spaces.

19.5 Water Accumulation

19.5.1 Employees shall not work in excavations where there is accumulated water, or where water is accumulating unless adequate precautions have been taken. Precautions include support or shield systems, water removal to control the level, and the use of a safety harness and lifeline. When used, water removal equipment must be monitored by a competent person.

19.6 Stability of Adjacent Structures

19.6.1 Where the stability of adjoining building, walls, or other structures is endangered by excavation work, support systems such as shoring, bracing, or underpinning must be provided. No lifting of material shall be conducted over personnel in a trench or excavation.

19.7 Loose Rock or Soil and Equipment

19.7.1 Excavated or other material and equipment must be kept at least two feet from the edge of excavations or behind retaining devices to prevent material or equipment from falling or rolling into the excavation.

19.8 Inspections

19.8.1 Daily inspections of excavations, adjacent areas and protective systems must be made by Allied Environmental Services superintendent (competent person) for evidence of any of the following:

- Situations that could result in cave-ins.
- Indications of failure of protective systems.
- Hazardous atmospheres.

19.8.2 Inspections must be conducted :

- Prior to the start of work.
- As needed throughout the shift.
- After every rainstorm or other hazard increasing occurrence.

19.9 Fall Protection

When employees or equipment are required or permitted to cross over excavations, walk-ways with standard guardrails must be provided. Adequate barricades providing physical protection must be provided at all excavations. Upon completion of work, temporary pits or other openings must be backfilled.

19.10 Protective Systems

19.10.1 Sloping and Benching

Sloping and benching systems for excavations greater than 20 feet deep must be designed by a Registered Professional Engineer. For excavations 20 feet or less, one of the following may be used:

Option 1

Excavations shall be sloped one and one half horizontal to one vertical (34 degrees measured from the horizontal) unless option 2 or 3 is used. Slopes shall be excavated to configurations in accordance with slopes shown for type C soil in 1926.650 subpart P, appendix B, Maximum Allowable Slopes.

Option 2

Slopes and configurations for sloping and benching systems shall be determined in accordance with subsection 19.10.3 of this procedure, soil classification and Appendix B, Maximum Allowable Slopes.

Option 3

Designs of sloping and benching systems shall be in accordance with tabulated data and charts identifying parameters, limits of use, and explanatory information as necessary. The data must be in written form on the job site and bearing the seal of the approving Register Professional Engineer.

19.10.2 Shield Systems (Shoring)

For excavations greater than 20 feet deep, refer to section 19.10.3 of this procedure, Timber Shoring for Trenches. For shielding systems in excavation 20 feet or less in depth, one of the following options may be used:

Option 1

Designs for timber shoring in trenches shall be determined using Tables C1.3 or C2.3 located in 29 CFR 1926.652 (Appendix C) for soil type C. Designs for aluminum hydraulic shoring shall be in accordance with manufacturers tabulated data, or 29 CFR 1926.652 (Appendix D).

Option 2

Designs for timber shoring in trenches shall be determined according to subsection 19.10.4, Soil Classification and subsection 19.10.3, Timber Shoring in Trenches.

Option 3

Use of pre-fabricated support systems, such as aluminum hydraulic shoring, or other protective systems drawn from manufacturer's data must be in accordance with all specifications and limitations issued by the manufacturer.

Option 4

Designs of support, shield, or other protective system must be in accordance with tabulated data and bear the seal of the approving Registered Professional Engineer.

19.10.3 Timber Shoring for Trenches

- Timber shoring may be provided as a means of protection from cave-ins in excavations that do not exceed 20 feet in depth.
- Timber shoring for excavations greater than 20 feet deep must be designed by a Registered Professional Engineer.
- In order to use this section, the soil type or types in which the excavation is made must first be determined using subsection 19.10.4, Soil Classification.

19.10.4 Soil Classification

- Soil classifications shall be made by a competent person as stable rock, Type A, Type B, or Type C in accordance with the definitions set forth in 29 CFR 1926.652 (Appendix A).
- The classification shall be based on at least one visual and at least one manual analysis. Such analysis shall be conducted by a competent person using tests described in 29 CFR 1926.652 (Appendix A).

19.11 Training of Employees

Key Points and Emphasis for worker protection:

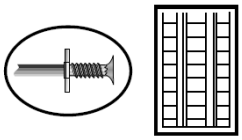
- Do NOT enter an unprotected trench!
- Do NOT work under equipment or loads (buckets, material handling)
- Each employee in a trench shall be protected from a cave-in by an adequate protective system.

- Some of the protective systems for trenches are:
    - Sloped for stability; or
    - Cut to create stepped benched grades; or
    - Supported by a system made with posts, beams, shores or planking and hydraulic jacks; or
    - Supported by a trench box to protect workers in a trench.
- Additionally, excavated or other materials must be at least 2 feet back from the edge of a trench; and
- A safe means of egress shall be provided within 25 feet of workers in a trench.

Example of Worker Protection in Trenches:

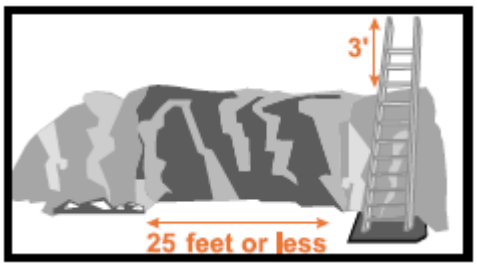
Sloping

Benching



Trench Box

Egress from a Trench:



Documentation of training for each employee shall be maintained at the Allied Environmental Services Corporate office. Every employee attending shall sign in and pass a quiz or test demonstrating understanding of the program and safety requirements for a safe trench entry.

19.12 Trench Failure

- When a trench is excavated, the stable relationship described in the previous section no longer exists (see Figure 2).

- The horizontal pressure on the soil blocks along the trench wall is no longer in equilibrium, and a block may not be able to support its weight and the weight of any blocks above.

- At the point where the soil can no longer withstand the pressure, the wall will shear and break away from its stable position, as indicated in Figure 2a.
- The first failure occurs as the bottom of the wall moves into the trench (see Figure 2b).
- This movement creates an undercut area at the base of the trench as soil material along the wall falls into the trench.
- Often there is a second movement in which more of the wall material erodes.
- Finally, the erosion at the base of the trench leaves the upper part of the column supported only by cohesion to the columns around it (see Figure 2c), and more soil from the column will soon fall into the excavation (see Figure 2d).
- Many rescue attempts are unsuccessful because rescuers attempt to save victims before the second and third failures take place, often trapping the would-be rescuers along with the first victims.

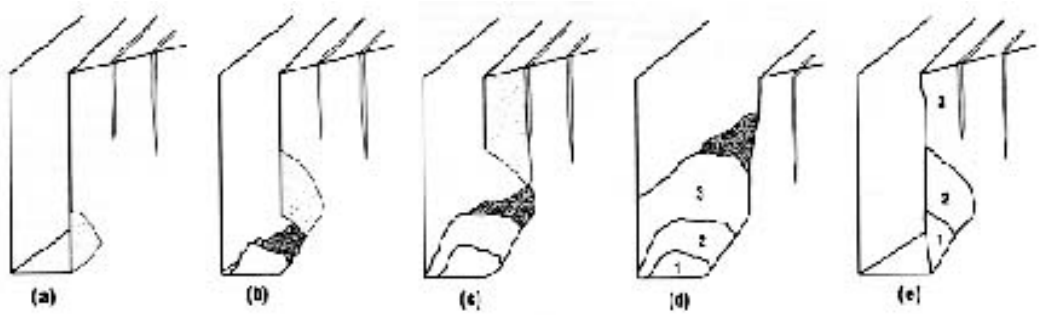


Figure 2. Mechanics of a trench failure (abstracted from Mickle, 1991).

- Figure 2-e summarizes the three areas of failure in the trench wall as explained in the example above.
    - In order of occurrence, soil in Area 1 at the base of the wall moves into the trench, and then is followed by the failure of Area 2.
    - The failure of Areas 1 and 2 leave the remaining trench wall, Area 3, unsupported.
    - Area 3 will break the cohesion and shear off the wall under its own weight and fall into the trench.
    - Typically, time elapses between the failure of segments.
    - It is the uncertainty of when the next failure will occur that makes rescue or recovery extremely hazardous.
    - Time is a major consideration. The longer the trench is unsupported, the more potential there is for further trench collapse.

19.13 General Requirements

When performing trenching and excavation operations in Ohio, there are general precautions that should be considered before starting any work.

- Contact the Ohio Utility Protection Service, OUPS (1-800-362-2764), and the Oil and Gas Producers Protection Service (614-587-0486), to identify the location of any underground cables, pipes or utility installations in the area of the proposed excavation.

- Ohio law requires excavators to call OUPS two working days before breaking ground. Once these areas are located and marked, avoid them.

- When working in areas where there is a back-filled trench, or a railroad, highway, source of vibration or other unstable condition, take additional precautions to properly shore and brace the excavation. These precautions will help prevent cave-ins.

- Undercutting of exposed vertical faces is prohibited unless supported by one or more of the methods prescribed in the Ohio Administrative Code, Chapter 4121:1-3, for exposed faces of trenches.

- Place all excavated or fill materials a minimum of two feet away from the top edge of the trench. If materials need to be placed closer than two feet from the edge of the trench, install an effective barrier to prevent them from falling into the excavation.

19.14 More about trenches

- Exposed trench faces that are more than five feet high must be stabilized by either shoring, sloping the face of the wall back to a stable slope or some equivalent method to prevent cave-ins. (The definition of stable slope is based on soil properties as noted in the Ohio Administrative Code, Chapter 4121:1-3.)

    - If the trench is excavated in hard, compact soil materials more than five feet in depth, the wall must be supported.

    - If the walls of a trench are less than five feet deep and in soft or unstable soil materials, then trench boxes, shoring, sheeting, bracing, sloping or other equivalent methods are required to prevent the trench wall from collapsing.

    - Trench walls above five feet in height may be sloped instead of shored.

- Materials used for trench boxes, sheeting, sheet piling, bracing, shoring and underpinning should be in good condition, and should be installed so that they provide support that is effective to the bottom of the trench.

    - Timber must be sound and free from large or loose knots.

    - Vertical planks in the bracing system should be extended to an elevation no less than one foot above the top of the trench face.

- When employees are required to be in trenches that are four feet or more in depth, an adequate means of exit, such as a ladder or steps, must be provided and located so that no more than 25 feet of lateral travel is required for a person to reach the exit structure.

- The trench should be braced and shored during excavation and before personnel are allowed entry.

- Cross braces and trench jacks should be secured in true horizontal positions and spaced vertically in order to prevent trench wall material from sliding, falling or otherwise moving into the trench.

- Portable trench boxes (also called sliding trench shields) or safety cages may be used to protect employees instead of shoring or bracing.
    - When in use, these devices must be designed, constructed and maintained in a manner that will provide at least as much protection as shoring or bracing, and extended to a height of no less than six inches above the vertical face of the trench.
- During the backfill operation, backfill and remove trench supports together, beginning at the bottom of the trench.
- Release jacks or braces slowly and, in unstable soil materials, use ropes to pull them from above after employees have left the trench.
- Excavation safety requirements are quite similar to trenching requirements.
    - For excavations in which employees may be exposed to unstable ground, qualified personnel using practices that are compatible with standards required by a registered architect, a registered professional engineer or other duly licensed or recognized authority will design support systems such as piling, cribbing, bracing and shoring that meet accepted engineering requirements to contain the walls.
    - Excavations with conditions such as water, silty materials, loose boulders, erosion, deep frost action or earth fracture planes require that the slope of the earth adjacent to the excavation be lessened.
    - Scaling, benching, barricading, rock bolting, wire meshing or other equally effective means of excavation support must meet accepted engineering requirements for all sides, slopes and faces of excavations.
    - Materials used to support excavations should be maintained in good condition.
    - Never excavate below the level of the base of the footing or retaining wall, except in hard rock, unless the wall is underpinned and appropriate precautions are taken to ensure the stability of adjacent walls.
    - If it is necessary to place or operate power shovels, derricks, trucks, materials or other heavy objects on a level above and adjacent to an excavation, the side of the excavation must be sheet-piled, shored, braced or sloped as necessary to resist the additional pressure resulting from such loads.
    - Install substantial stop logs or barricades when using mobile equipment on or near an excavation, grade away from the excavation, and provide walkways or bridges with standard guardrails for employees or equipment to cross over excavations.

DAILY EXCAVATION AND TRENCHING INSPECTION

Date:_____ Time:_____ Site Name:_____

Excavation Location:_____

Site Evaluation

_____Surface encumbrances
_____Underground installations
_____Access and egress
_____Exposure to vehicular traffic
_____Exposure to falling loads
_____Hazardous atmospheres
_____% O2
_____ Warning system for mobile equipment
_____ Protection from water accumulation
_____ Stability of adjacent structures
_____ Employee protection – loose rock/soil
_____ Inspections
_____ % LEL

Note: Atmospheres in excavations greater than four feet shall be tested for oxygen content and flammable gas concentrations prior to entry of personnel. Emergency rescue equipment shall be readily available.

Soil Classification

Soil classification shall be made based on the results of at least one visual and one manual test.

_____ Stable Rock _____ Type A _____ Type B _____ Type C

Visual Tests

Inspect worksite for:

_____Fissured ground
_____Layered soil
_____Previously disturbed earth
_____Seepage
_____Vibration
_____Poor drainage

Manual Tests

Analyze soil for:

_____ Plasticity
_____ Dry strength
_____ Thumb penetration
_____ Pocket penetrometer
_____ Shear vane

Protective Support Systems

Sloping & Benching

_____Stable rock 90°
_____Type A - 53°
_____Type B - 45°
_____Type C - 34°

Shoring & Shielding

_____ Timber or hydraulic
_____ Trench boxes, trench shields
_____ Design using tabulated data
_____ RPE design

Additional Comments or Information:

Inspection performed by:_____
Authorized Competent Person

Figure 19-1

20.0 Crane Safety

20.1 General

The safe operation of cranes and other hoisting devices is of utmost importance to virtually all Allied Environmental Services, Inc., operations. It is therefore, company policy that steps be taken to provide for safe crane and hoist operations.

20.2 Qualified Operators

Only qualified personnel trained in safe work standards, including use of fire extinguishers, will be allowed to operate crane and hoisting devices on Allied Environmental Services, Inc., projects. The Supervisor shall:

(1) Question a new operator about his/her previous experience with the specific piece of equipment that is to be operated.

(2) Observe a new operator until you feel comfortable with the operation and control of the equipment.

(3) If you find that you have an inexperienced or unqualified operator, have the operator move off the machine and request a better-qualified operator.

20.3 Crane Condition

All cranes must be in good operating condition at all times. Defects must be tagged and reported to the Supervisor and Operations Manager immediately. A regular schedule for maintenance shall be established and followed.

(1) Every crane must be equipped with a 5lb C02 or dry chemical fire extinguisher.

(2) The glass in any crane cab must be clear, clean and unbroken.

(3) Operations manuals and load charts must be available at the operator's station at all times while being operated. A substantial and durable chart with clearly legible letters & figures shall be provided with each crane and securely fixed to the crane cab in a location easily visible to the operator while seated at this control station.

(4) Cranes and hoists must be "dry run" and inspected by the operator and the Inspection Report - Hydraulic RT, RT, TM Cranes (Figure 20-1) filled out and signed by the operator prior to lifting any loads.

20.4 Inspection and Test Records

(1) Certification records which include the date of inspection, the signature of the person who performed the inspection and the serial number, or other identifier, of the crane which was inspected shall be made monthly on critical items in use such as brakes, crane hooks, and ropes. This certification record shall be kept readily available.

(2) Employer shall keep and maintain written reports on rated load tests showing the test procedures and confirming the adequacy of any repairs or alterations.

(3) Running Ropes - A thorough inspection of all ropes in use shall be made at least once a month and a certification record which includes the date of inspection, the signature of the person who performed the inspection and an identifier for the ropes shall be prepared and kept on file where readily available. All inspections shall be performed by an appointed or authorized person. Any deterioration, resulting in appreciable loss of original strength shall be carefully observed and determination made as to whether further use of the rope would constitute a safety hazard. Some of the conditions that could result in an appreciable loss of strength are the following:

- Reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires.

- A number of broken outside wires and the degree of distribution of concentration of such broken wires.

- Worn outside wires.

- Corroded or broken wires at end connections.

- Corroded, cracked, bent, worn, or improperly applied end connections.

- Severe kinking, crushing, cutting, or un-stranding.

(4) Other Ropes - Heavy wear and/or broken wires may occur in sections in contact with equalizer sheaves or other sheaves where rope travel is limited, or with saddles. Particular care shall be taken to inspect ropes at these locations.

All rope which has been idle for a period of a month or more due to shutdown or storage of a crane on which it is installed shall be given a thorough inspection before it is used. This inspection shall be for all types of deterioration and shall be performed by an appointed or authorized person whose approval shall be required for further use of the rope. A certification record which includes the date of inspection, the signature of the person who performed the inspection, and an identifier for the rope which was inspected shall be prepared and kept readily available.

Particular care shall be taken in the inspection of non-rotating rope.

20.5 Overhead and Gantry Cranes

20.5.1 Definitions applicable to this section.

A "crane" is a machine for lifting and lowering a load and moving it horizontally, with the hoisting mechanism an integral part of the machine. Cranes whether fixed or mobile are driven manually or by power.

An "automatic crane" is a crane which when activated operates through a preset cycle or cycles.

A "cab-operated crane" is a crane controlled by an operator in a cab located on the bridge or trolley.

"Cantilever gantry crane" means a gantry or semi-gantry crane in which the bridge girders or trusses extend transversely beyond the crane runway on one or both sides.

"Floor-operated crane" means a crane which is pendant or nonconductive rope controlled by an operator on the floor or an independent platform.

"Gantry crane" means a crane similar to an overhead crane except that the bridge for carrying the trolley or trolleys is rigidly supported on two or more legs running on fixed rails or other runway.

"Hot metal handling crane" means an overhead crane used for transporting or pouring molten material.

"Overhead crane" means a crane with a movable bridge carrying a movable or fixed hoisting mechanism and traveling on an overhead fixed runway structure.

"Power-operated crane" means a crane whose mechanism is driven by electric, air, hydraulic, or internal combustion means.

A "pulpit-operated crane" is a crane operated from a fixed operator station not attached to the crane.

A "remote-operated crane" is a crane controlled by an operator not in a pulpit or in the cab attached to the crane, by any method other than pendant or rope control.

A "semi-gantry crane" is a gantry crane with one end of the bridge rigidly supported on one or more legs that run on a fixed rail or runway, the other end of the bridge being supported by a truck running on an elevated rail or runway.

"Storage bridge crane" means a gantry type crane of long span usually used for bulk storage of material; the bridge girders or trusses are rigidly or non-rigidly supported on one or more legs. It may have one or more fixed or hinged cantilever ends.

"Wall crane" means a crane having a jib with or without trolley and supported from a side wall or line of columns of a building. It is a traveling type and operates on a runway attached to the side wall or columns.

20.5.2 General Requirements

Only designated personnel shall be permitted to operate a crane covered by this section. Designated means selected or assigned by the employer, or employer's representative as being qualified to perform specific duties.

20.5.3 Equipment Inspections

Initial inspection - Prior to initial use all new and altered cranes shall be inspected to insure compliance with the provisions of this section.

Inspection procedure for cranes in regular service is divided into two general classifications based upon the intervals at which inspection should be performed. The intervals in turn are dependent upon the nature of the critical components of the crane and the degree of their exposure to wear, deterioration, or malfunction. The two general classifications are herein designated as "frequent" and "periodic" with respective intervals between inspections as defined below:

Frequent inspection - Daily to monthly intervals.

Periodic inspection - 1 to 12-month intervals.

Frequent inspection. The following items shall be inspected for defects at intervals as defined in paragraph CFR 1910.179 (j)(1)(ii) of this section or as specifically indicated, including observation during operation for any defects which might appear between regular inspections. All deficiencies such as listed shall be carefully examined and determination made as to whether they constitute a safety hazard:

All functional operating mechanisms for maladjustment interfering with proper operation. Daily.

Deterioration or leakage in lines, tanks, valves, drain pumps, and other parts of air or hydraulic systems. Daily.

Hooks with deformation or cracks. Visual inspection daily; monthly inspection with a certification record which includes the date of inspection, the signature of the person who performed the inspection and the serial number, or other identifier, of the hook inspected. For hooks with cracks or having more than 15 percent in excess of normal throat opening or more than 10< twist from the plane of the unbent hook refer to paragraph CFR 1910.179 (l)(3)(iii)(a) of this section.

Hoist chains, including end connections, for excessive wear, twist, distorted links interfering with proper function, or stretch beyond manufacturer's recommendations. Visual inspection daily; monthly inspection with a certification record which includes the date of inspection, the signature of the person who performed the inspection and an identifier of the chain which was inspected.

20.6 Maintenance

A preventive maintenance program based on the crane manufacturer's recommendations shall be established.

20.6.1 Maintenance Procedure

Before adjustments and repairs are started on a crane the following precautions shall be taken:

(1) The crane to be repaired shall be run to a location where it will cause the least interference with other cranes and operations in the area.

(2) All controllers shall be at the off position.

(3) The main or emergency switch shall be open and locked in the open position.

(4) Warning or "out of order" signs shall be placed on the crane, also on the floor beneath or on the hook where visible from the floor.

(5) Where other cranes are in operation on the same runway, rail stops or other suitable means shall be provided to prevent interference with the idle crane.

(6) After adjustments and repairs have been made the crane shall not be operated until all guards have been reinstalled, safety devices reactivated and maintenance equipment removed.

20.6.2 Adjustments and Repairs.

(1) Any unsafe conditions disclosed by the inspection requirements of this section shall be corrected before operation of the crane is resumed. Adjustments and repairs shall be done only by designated personnel.

(2) Adjustments shall be maintained to assure correct functioning of components

20.7 Running Ropes and Other Ropes.

A thorough inspection of all ropes shall be made at least once a month and a certification record which includes the date of inspection, the signature of the person who performed the inspection and an identifier for the ropes which were inspected shall be kept on file where readily available to appointed personnel. Any deterioration, resulting in appreciable loss of original strength, shall be carefully observed and determination made as to whether further use of the rope would constitute a safety hazard. Some of the conditions that could result in an appreciable loss of strength are the following:

- Reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires.
- A number of broken outside wires and the degree of distribution or concentration of such broken wires.
- Worn outside wires.

- Corroded or broken wires at end connections.
- Corroded, cracked, bent, worn, or improperly applied end connections.
- Severe kinking, crushing, cutting, or unstranding.

Other ropes - All rope which has been idle for a period of a month or more due to shutdown or storage of a crane on which it is installed shall be given a thorough inspection before it is used. This inspection shall be for all types of deterioration and shall be performed by an appointed person whose approval shall be required for further use of the rope. A certification record shall be available for inspection which includes the date of inspection, the signature of the person who performed the inspection and an identifier for the rope which was inspected

20.8 Manbaskets

Special requirements apply if the crane or hoist will be used to lift or transport personnel. Contact the Program Manager for assistance.

20.9 Pre-Lift Determinations

Prior to the start of hoisting operations, determine the following: (Refer to Figure 20-2, Pre-Lift Checklist)

(1) The weight of the load and rigging
(2) Whether the load is within the capacity of the equipment being used.
(3) Whether the surrounding surface is capable of supporting the crane and the load.
(4) Whether the swing radius and operating radius are barricaded or secured to prevent someone from being injured.
(5) Location of power lines (maintain 10 feet clearance). Using the guidelines of CFR 1910.333(c)(3) lines shall be de-energized or grounded or other protective measures shall be provided before work is started
(6) For rear capacity and tandem lifts refer to Figure 20-3 and notify corporate safety.

20.10 Signaling

Standard crane hand signals shall be posted at the job site. The following consideration shall be made prior to making any lift:

(1) Operators should take signals from only one person.
(2) Make sure that the signal person knows all of the standard signals.
(3) Telephone or radio signaling for “blind” lifts requires that the operator and the signal person discuss and practice their signals prior to any lifting.

20.11 Rigging

All rigging shall be inspected prior to each use and documented on Inspection Form Fig. 20-1.

All hooks and hoist chains shall be included in the pre-use inspections – documentation required.

ALLIED ENVIRONMENTAL SERVICES, INC.

DAILY CHECK SHEET
(TO BE COMPLETE BY OPERATOR)

MANUFACTURER_____UNIT NUMBER_____

MODEL_____SERIAL NO_____INSPECTION DATE_____

GENERAL:

____1. Appearance
____2. Damage
____3. Outriggers/Pads
____4. Crane Set-up
____5. Swing Barricade
____6. Wheels/Tires/Brakes
____7. Carrier/Superstructure/Welds
____8. Other

CAB/OPERATORS STATIONS

____1. Appearance
____2. Operators Manual
____3. Load Chart & Crane Certification
____4. Fire Extinguisher
____5. Gauges/Controls
____6. All Controls Properly Labeled
____7. Anti-Two-Block
____8. LMI
____9. Boom Angle Indicator
____10. Back Up Alarm
____11. Lights/Flasher
____12. Horn
____13. Glass
____14. Seat
____15. Wiper(s)
____16. Drum Rotation Indicator

ENGINE/ELECTRICAL/HYDRAULIC

____1. Leaking Oil/Fluids
____2. Hoses/Lines/Valves/Fittings
____3. Belts
____4. Filters
____5. Nuts/Bolts/Washers
____6. Battery Condition
____7. Guards/Covers/Panels
____8. Walkways/Handles
____9. Other

WIRE ROPE_____
CONDITION_____

BOOM ASSEMBLY: LENGTH:

____1. Boom Damage
____2. Wear pads
____3. Lubrication
____4. Operational Test
____5. Sheave Size
____6. Sheave Guard
____7. No. of Sheaves
____8. Other

JIB ASSEMBLY: LENGTH:
TYPE:_____

_____1. Damage
_____2. Pins/Keepers
_____3. Anti-Two Block
_____4. LMI
_____5. Lacings/Cords
_____6. Other

WARNING SIGNS

_____1. Electrocution
_____2. Hand Signal Chart
_____3. Crush Hazard (Ctw)
_____4. Stay Clear-Moving Parts
_____5. Operators Responsibility

OPERATIONAL TESTING

_____1. Steering
_____2. Swing
_____3. Hoisting/Lowering
_____4. Travel/Forward/Reverse
_____5. Braking
_____6. Swing Brake
_____7. House Lock/In
_____8. Outrigger Operation
_____9. Other

SIZE_____
CERTIFICATE NUMBER_____

OK=ACCEPTABLE **D=DEFICIENCY - NEEDS REPAIR/REPLACEMENT SEE DEFICIENCY REPORT** **NE-NOT EQUIPPED**

FIGURE 20-1

20.12 PRE-LIFT CHECKLIST (FOR NEAR CAPACITY AND TANDEM LIFTS)

	YES	NO
Has an inventory of the equipment been done?		
Have weather conditions been considered?		
Have general safety precautions been reviewed?		
Have the electrical safety procedures been reviewed? (Overhead Electrical Lines)		
Have safe rigging practices been implemented?		
Have safety precautions for lifting in tight quarters and confined spaces been reviewed?		
Has a method of attachment and handling been determined?		
Are all lifting lugs engineered to specification?		
Has the matting been inspected?		
Has the stability of the ground been assured?		
Is a tag line going to be used?		
Have disconnecting/connecting means been developed?		
Has the orientation of equipment been confirmed?		
Is survey equipment required?		
Means of communication established?		
Has a pre-lift meeting been held?		
Has a critical lift plan been completed?		

FIGURE 20-2

20.13 CRITICAL LIFT PLAN (FOR NEAR CAPACITY & TANDEM LIFTS)

GENERAL INFORMATION

Date:_____Superintendent:_____

Job Name:_____Job Number:_____

PRE-LIFT MEETING ATTENDEES

_____

_____

_____

DESCRIPTION OF LOAD

_____

_____

_____

LIFT PERSONNEL

Erection Crane Operator_____
Oiler_____

Tailing Crane Operator_____
Oiler_____

Other (s)_____
_____
_____
_____

FIGURE 20-3

LOAD AND CAPACITY CALCULATIONS

A. Weight of Equipment - Live Load

Equipment Condition	New ( ) Used( )
Weight of Equipment Empty	_____lbs.
Weight of Attachments	_____lbs.
Platforms & Ladders	_____lbs.
Piping & Accessories	_____lbs.
Liquids inside	_____lbs.
Dirt & Debris	_____lbs.
Internal Trays or Liners	_____lbs.

B. Crane Load Weight

Erection Crane

Percent of Equipment Weight	_____%
Amount of Equipment Weight	_____lbs.
Weight of Headache Ball	_____lbs.
Weight of Block	_____lbs.
Weight of Lifting Bar	_____lbs.
Weight of Slings & Shackles	_____lbs.
Weight of Jib Erected	_____lbs.
Stored	_____lbs.
Weight of Jib Headache Ball	_____lbs.
Weight of Cable (load fall)	_____lbs.
Auxiliary Boom Head	_____lbs.
Other	_____lbs.

TOTAL WEIGHT _____lbs.

Tailing Crane

Percent of Equipment Weight	_____%
Amount of Equipment Weight	_____lbs.
Weight of Headache Ball	_____lbs.
Weight of Block	_____lbs.
Weight of Lifting Bar	_____lbs.
Weight of Slings & Shackles	_____lbs.
Weight of Cable (load fall)	_____lbs.
Auxiliary Boom Head	_____lbs.
Other	_____lbs.

TOTAL WEIGHT

Source of Load Weight_____

(Name Plate, Drawings, Calculated, Weighted)
Weights Verified By:_____

C. Capacities of the Crane(s)

Erection Crane Configuration

Type of crane _____

Model of crane _____

Date Certified _____

Rated Capacity _____tons

Lifting Arrangement
- Max. Radius During Lift _____ft.
- Length of Boom _____ft.
- Angle of Boom at Pick _____deg.
- Angle of Boom at Set _____deg.
- Rated Capacity Under Most Severe Conditions
  - Over Rear _____lbs.
  - Over Front _____lbs.
- Over Side _____lbs.
- Rated Capacity for lift _____lbs.

JIB
- Is the jib to be used? _____
- Length of Jib _____ft.
- Jib Angle _____deg.
- Rated Jib Capacity _____lbs.

Cable
- Number of Parts _____
- Size of Cable _____inch.
- Maximum Capacity _____lbs.

Percent of Cranes Capacity

$\frac{\text{Total Weight}}{\text{Rated Capacity}} \times 100 =$ _____%

SLINGS

Sling Selection
- Type of Arrangement _____
- Number of Slings to Hook _____
- Sling Size _____
- Rated Capacity _____

Tailing Crane Configuration

Type of Crane _____

Model of Crane _____

Date of Certified _____

Rated Capacity _____tons

Lifting Arrangement
- Max. Radius During Lift _____ft.
- Length of Boom _____ft.
- Angle of Boom at Pick _____deg.
- Angle of Boom at Set _____deg.
- Rated Capacity Under Most Severe Conditions
  - Over Rear _____lbs.
  - Over Front _____lbs.
  - Over Side _____lbs.

Rated Capacity for lift _____lbs.

Jib

Is the jib to be used? _____
Length of Jib _____ft.
Jib Angle _____deg.
Rated Jib Capacity _____lbs.

Cable

Number of Parts _____
Size of Cable _____inch.
Maximum Capacity _____lbs.

Percent of Cranes Capacity

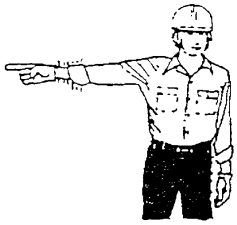
$\frac{\text{Total Weight}}{\text{Rated Capacity}} \times 100 =$ _____

Sizing of Slings

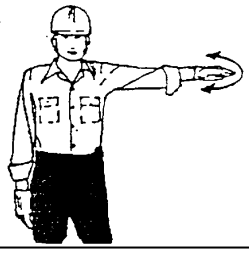
Sling Selection

Type of Arrangement _____
Number of Slings to Hook _____
Sling Size _____
Sling Length _____
Rated Capacity _____

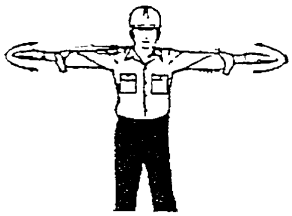
STANDARD HAND SIGNALS FOR MOBILE CRANES



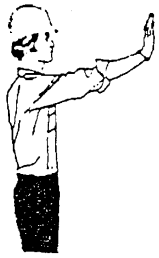
SWING: Arm extended, point with finger in direction of swing of boom



STOP: Arm extended, palm down, move hand right and left.



EMERGENCY STOP: Both arms extended palms down, move back and forward.



TRAVEL: (rail mount or trolley) arm extended forward, hand open and slightly raised, making pushing motion in direction of

DOG EVERYTHING: Clasp hands in front of body.

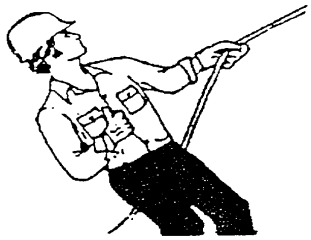
TRAVEL: (BOTH TRACKS) Use both fist in front of body making a circular motion about each other, indicating direction of travel forward or backward.

TRAVEL: (one track) Lock the track on the side indicated by raised fist. Travel opposite track in direction indicated by circular motion of other fist, rotated vertically in front of body. (for crawler cranes only.)

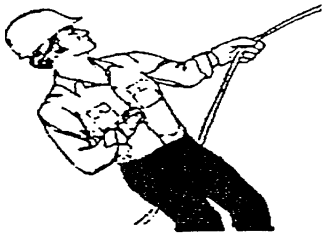
EXTEND BOOM: (Telescoping booms) Both fist in front of body with thumbs pointing outward.

RETRACT BOOM: (Telescoping booms) Both fist in front of body with thumbs pointing inward.

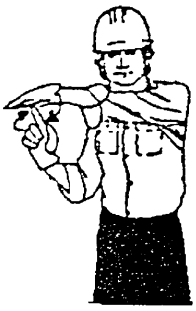
STANDARD HAND SIGNALS FOR MOBILE CRANES



EXTEND BOOM: (Telescoping boom) one hand signal, one fist in front of chest with thumb tapping chest



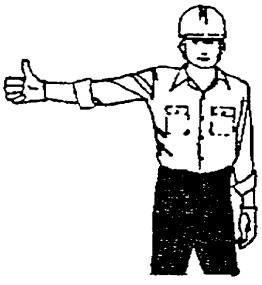
RETRACT BOOM: (Telescoping boom) one hand signal, one fist in front of chest with thumb pointing outward and heel tapping chest.



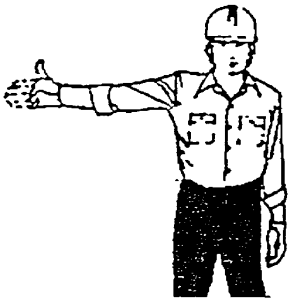
MOVE SLOWLY: Use one hand to give any motion signals and place other hand motionless in front of hand giving the motion signal.

USE WHIP LINE: (Auxiliary hoist) Tap elbow with one hand, then use regular signals.

HOIST: With forearm vertical, forefinger pointing up, hand in small horizontal circles.



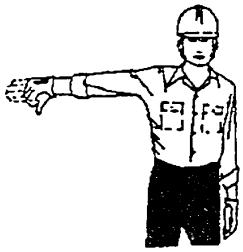
RAISE BOOM: Arm extended fingers closed thumb pointing upward.



RAISE THE BOOM AND LOWER THE LOAD: With arm extended thumb pointing up, flex fingers in and out as long as load as load movement is desired.

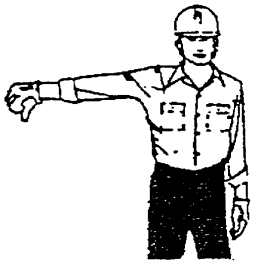
LOWER: With arm extending downward, forefinger pointing down, move hand in small horizontal circles

STANDARD HAND SIGNALS FOR MOBILE CRANES



LOWER THE BOOM AND RAISE THE LOAD: With arm extended thumb pointing down, flex fingers in and out as long as load as load movement is desired.

USE MAIN HOIST: Tap fist on head, then use regular signals.



LOWER BOOM: Arm extended, fingers closed, thumb pointing downward.

21.0 Pre-Job Planning

21.1 General

An important step in the success of any safety process is planning. Planning a job with safety in mind provides a clear set of directions for the protection of employees and reduces the possibility of having to change operations. This ultimately reduces job cost. In keeping with our goals of high quality and reasonable costs, it is the policy of Allied Environmental Services, Inc., to consider safety as an integral part of the pre-job plan.

21.2 Bidding

(1) Bids must include costs for items required by law, such as personal protective equipment, guardrails, and any special safety considerations required to execute the work safely.

(2) The Operations Manager will, review bid documents and drawings for the purpose of determining the nature and extent of any special exposures or hazards. The Operations Manager will provide as much information as possible regarding special safety equipment or operations that may be dictated by a particular project.

21.3 Pre-Work Survey

Prior to beginning work on any project, the Supervisor will, when requested, survey the work area with the Operations Manager, and/or Owner Representative (as necessary) for the purpose of determining any special safety hazards or exposures.

21.4 Job Start-Up Checklist (Figure 21-1)

JOB START UP SAFETY CHECKLIST

PROJECT_____

DATE_____

SUPERVISOR_____

YES	NO	N/A	
			COPY OF ALLIED'S SAFETY PROCEDURES MANUAL
			COPY OF ALLIED'S HAZARD COMMUNICATION PROGRAM
			MSDS FILE
			MINIMUM OF 3 EXTRA HARD HATS
			MINIMUM OF 2 FACE SHIELDS
			MINIMUM OF 3 EXTRA SAFETY GLASSES
			EMERGENCY FIRST - AID KIT
			EMERGENCY PHONE NUMBER POSTER WITH EMERGENCY NUMBERS FOR AMBULANCE FIRE POLICE
			LABOR/SAFETY POSTER (21/2" X 18" LAMINATED)
			WARNING POSTERS ("NO SMOKING." "HARD HAT AREA," ETC.
			MINIMUM OF 1 ROLL - YELLOW CAUTION BARRICADE TAPE 1 ROLL - RED DANGER BARRICADE TAPE
			FIRE EXTINGUISHER
			MALE/FEMALE ELECTRICAL CONNECTORS
			GFCI
			OUTLET TESTER
			OTHER AREAS TO BE GIVEN CONSIDERATION ARE: LOCATION & DIRECTIONS TO THE NEAREST HOSPITAL APPROVED CONTAINERS FOR FLAMMABLE/COMBUSTIBLE MATERIALS EMPLOYEE PARKING ACCESS AND DELIVERY ROADS ADEQUATE STORAGE/LAY-DOWN AREAS MAINTAIN CLEAR ISLES AND PASSAGEWAYS POTABLE WATER PORT-A-LETS TRASH CONTAINERS

FIGURE 21-1

22.0 Inspection Checklists

22.1 Supervisor's Safety Audit – (Figure 22-1 below)

SUPERVISOR'S SAFETY AUDIT REPORT

PROJECT:	**SUPERVISOR:**
DATE:	**CONTRACTOR:**
DESCRIPTION OF JOB SITE "HOUSEKEEPING:	
FIRE PROTECTION/PREVENTION - HOT WORK:	
ELECTRICAL INSTALLATIONS:	
CONDITION OF ELECTRIC POWER TOOLS:	
DOES AREA HAVE CORRECT SIGNS, SIGNALS, & BARRICADES?	
ARE EMPLOYEES WEARING PROPER PERSONAL PROTECTION EQUIPMENT:	
EXTENSION CORDS:	
EMPLOYEE SAFE WORK PRACTICES:	
FALL PROTECTION:	
LADDER & SCAFFOLD USE:	
OTHER:	
CC: **PROJECT MANAGER:**	

FIGURE 22-1

23.0 Hazard Communication (HAZCOM and GHS)

23.1 General

Hazard Communication Program

OSHA Standards 29CFR 1910.1200 for General Industry and 29 CFR 1926.59 for Construction Work required employers to develop a written Hazard Communication Program. The OSHA standards establishes uniform requirements to ensure that the hazards of all chemicals produced, imported, or used in United States workplaces are evaluated, and that this hazard information is communicated to affected employers and exposed employees. In compliance with these standards, Allied Environmental has adopted a written Hazard Communication Program. The program informs employees of chemicals known by Allied Environmental Services to be present in the workplaces that may create a safety or health hazard. Employees with potential exposure will be provided with information and training on safe use and handling precautions and emergency and first aid procedures. Employees may obtain a copy of the Allied Environmental Services Hazard Communication Program (Section 23.0) from the Allied Environmental Operations Manager.

Allied Environmental Services has developed this program to ensure employees understand the hazardous properties of materials they work with or may encounter in the workplace. All Supervisors are required to keep a copy of this manual with the Hazard Communication Program, Chemical Inventory and SDS/MSDS for those hazardous chemicals used at the jobsite.(HAZCOM/GHS). Implementation of the program has been initiated by the Safety Manager and Operations Manager. Supervisors are designated as competent persons and shall ensure maintenance and compliance with the program.

23.2 Chemical Inventory

Allied Environmental Services, Inc., maintains an inventory of all known chemicals in use on all job sites. As a result of recent changes in the Hazard Communication Standard, Material Safety Data Sheets will be phased out and will be known as Safety Data Sheets in the future. Along with this change, Container Labeling are changed, to include Pictograms, Hazard Statement, Cautionary Statement, and Signal Words. If so desired, employees have the right to obtain a copy of this program including specific Safety Data Sheets or Material Safety Data Sheets issued by the manufacturer. To obtain a personal copy, contact the Operations Manager of Allied Environmental Services, Inc., in writing. A copy of this program is to be maintained on each job site at all times, along with a list of hazardous substances used on the specific job, and corresponding SDS/MSDS.

A complete hazardous chemical listing is provided at the end of this section (Section 23). A copy of this safety manual has been issues to all supervisors and shall kept with the supervisor on all jobs. The list detailed at the end of this section must be on each job site as well as a copy of relevant Safety Data Sheets or Material Safety Data Sheets.

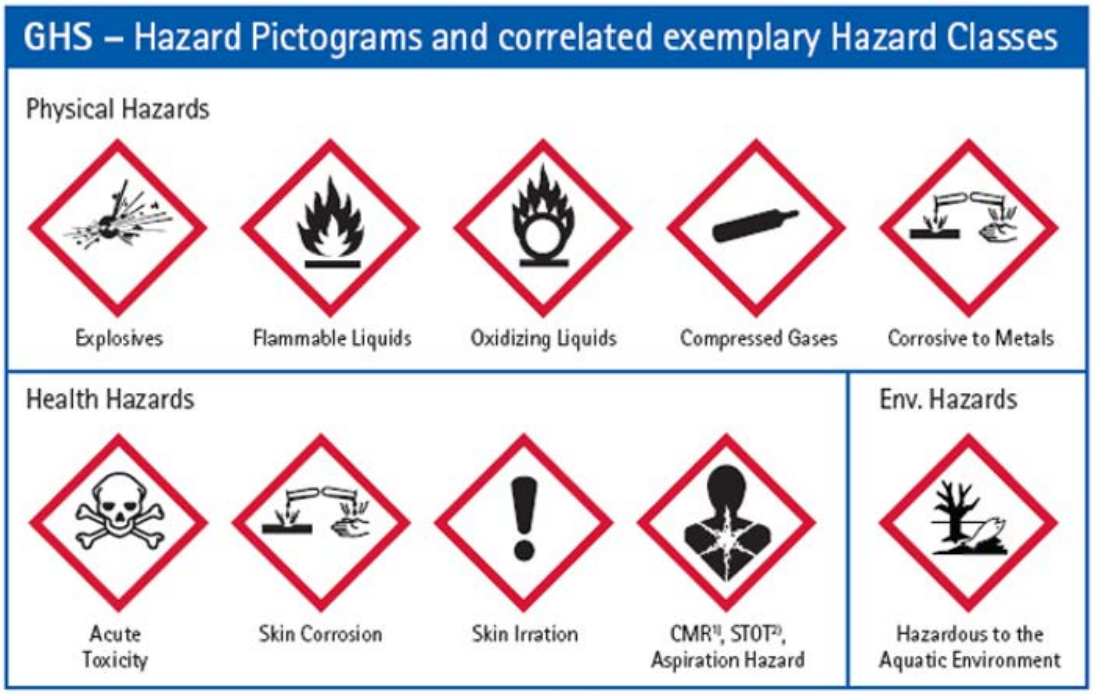
23.3 Container Labeling

All chemicals on site will be stored in their original containers with the manufacturer's applied label attached. Container labels shall not be removed, defaced or otherwise modified from the manufacturer's original labeling. The only exception would be for small quantities for immediate use (during the current shift). Any container not properly labeled should be brought to management's attention for labeling or proper disposal. Labeling shall be in accordance with the new Globally Harmonized System (GHS) and include the following:

- All containers shall be labeled with the following:
- The identity of the hazardous chemical
- The hazard warnings of the chemical(s)

- Hazard Statement - Example: WARNING! Causes Respiratory and Eye Irritation!
    - Applies to each hazard class and category

Use of Pictograms on Labels



23.4 Safety Data Sheets or Material Safety Data Sheets

Safety Data Sheets (SDS) or Material Safety Data Sheets (MSDS) are furnished by the manufacturer of the chemical and are relied upon by our company as having pertinent and accurate information. These data sheets contain all the information needed about a particular substance. Special attention should be given to the following areas for the quickest understanding of the chemical being handled:

(1) Know the name of the chemical you are handling.
(2) Check the hazardous ingredients so you know what you are dealing with.
(3) Review the information contained on the manufacturer's label so as to understand the effects of the chemical.
(4) Most importantly, review the section on personal protective equipment and know how to use the equipment.
(5) Know the first aid procedures associated with the chemical in case an over exposure situation arises.
(6) Review the instructions on how to handle any spills, disposal, or contamination procedures will be given during a toolbox meeting on each chemical.

SDS/MSDS will be maintained and available at the Allied Environmental Services, Inc. office and warehouse location.

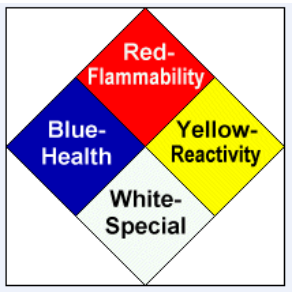
23.5 Employee Training

Each employee will be given General Hazard Communication training upon initial assignment, annually and when new hazardous chemicals are introduced into our system.

This training will include information about the written program, employee rights under OSHA's hazard Communication Standards, training on SDS/MSDS, and labeling as well as each chemical they may come into contact with. This training shall include:

- Operations in the work area where hazardous chemicals are present
- Information regarding the location of the written plan, the listing of hazardous chemicals present, and SDS/MSDS
- Methods to detect the presence or release of hazardous chemicals by use of monitoring devices, visual appearance and/or odor
- The physical & health hazards of chemicals in the work area.
- Protection measures to be utilized to prevent exposure, appropriate work practices, emergency procedures & proper PPE to be used.
- Labeling systems to be used to identify containers of hazardous materials used at jobsites:

    - NFPA Fire Diamond - for large tanks and containers with the name of the material



    - HMIS labeling system – for smaller containers with the name of the material

- Details of the hazard communication program, explanation of the labeling system and the SDS/MSDS and how employees can obtain & use the appropriate hazard information.
- For non-routine tasks involving the use of hazardous chemicals and new hazardous materials used for that task, a special pre-task review of the job and hazardous materials will be reviewed with all workers. Copies of this pre-task review shall be maintained at the job site.

This method of training will be in the same form as employee orientation and or toolbox safety meetings with documentation of training maintained on the jobsite. Evaluation of this requirement will be accomplished during regular safety audits of each job site.

23.6 Subcontractors Owners and Clients

Under the OSHA Hazard Communication Standard, Allied Environmental Services, Inc., will supply all subcontractors/owners/clients a list of hazardous substances on our job site, and make available, upon request, copies of SDS/MSDS's. It is the subcontractor/owner/clients responsibility to train its own employees on the hazards involved.

All subcontractors/owners/clients will supply (or make available upon request) Allied Environmental Services, Inc., with their list of hazardous substances along with the corresponding SDS/MSDS's. Allied Environmental Services, Inc., will determine the necessity of training based upon an evaluation of the SDS/MSDS's received from subcontractors/owners/clients.

- Review of hazardous materials intended for use during the project shall be reviewed with the owner at pre-work meetings.
- At regular project coordination meetings, new hazardous material usage and SDS/MSDS shall be reviewed with the owner and other contractors who may have incidental contact with the materials.
- All Allied Environmental Services employees shall review the job site SDS/MSDS prior to working with any hazardous materials.
- All Allied Environmental Services employees shall know the location of the owner's SDS/MSDS and the location of the company's SDS/MSDS.
- A complete Hazardous Materials Inventory is included with this program element.

24.0 Inspections by OSHA and/or Ohio EPA

24.1 Policy

The diverse scope of our work and the geographically scattered locations of our projects cause Allied Environmental Services, Inc., jobs to come under the jurisdiction of many different governmental agencies. The primary agencies are the Occupational Safety and Health Administration (OSHA) and Ohio Environmental Protection Agency (Ohio EPA). There are also state and local agencies that may have either concurrent or exclusive jurisdiction.

OSHA (and most state agencies) are required by law to conduct regular "Scheduled General Inspections" of job sites. They may also inspect because of a complaint from a worker or because of a serious injury. These inspections take place without prior notice. The inspecting officer will arrive at the job site, identify him/herself, and announce their purpose. These inspecting officers have a legal procedure that they must follow. They are generally very professional and unbiased. The procedures may seem slow or time consuming, however, be patient. They cannot be changed. If your project is selected for inspection, the following steps should be taken:

(1) Contact the Operations Manager for information and/or assistance upon arrival of the officer.
(2) If you are in an operating plant, contact the owner. He may have some objections or restrictions, or he may just want to observe.
(3) Treat the Compliance Officer with professional courtesy.
(4) ALWAYS accompany the Compliance Officer when he is on the job site. Make notes of what he observes, to whom he talks, and where he takes pictures.
(5) The Compliance Officer is entitled to have a private interview with employees, however, the employee's steward may be present if either party so desires.
(6) Make sure you have all safety records available. Records such as toolbox talks and equipment inspection should be made available if requested. NOTE: NEVER give the Compliance Officer a copy of anything!!!
(7) At the closing conference, ask the Compliance Officer for a detailed list of the findings. Forward a copy of that list to the Operations Manager. If we do our job well, we have nothing to worry about during an OSHA inspection. Present this attitude to the Compliance Officer from the beginning. Show him that we are "up to speed" with safety. He will form an opinion based on your response to his questions. A good attitude on your part will make the inspection easier and smoother for all involved.

25.0 Substance Abuse Policy

As part of our commitment to safeguard the well-being of our employees and to provide a safe and healthful working environment for everyone, Allied Environmental Services (Allied) has established a drug/alcohol free workplace Substance Abuse Policy.

It is the intent of Allied Environmental Services, Inc., to maintain a safe workplace free of the influence of alcohol, drugs or other mind-altering substances. Further, it is our intent to comply with the requirements of the Drug-Free Workplace Act of 1988, as well as, the special drug/alcohol testing rules promulgated by the United States Department of Transportation and its various divisions.

The ultimate goal of this program is to balance our respect for individual privacy with our need to keep a safe, productive, drug and alcohol-free environment. We encourage those who abuse any substance to seek help in overcoming their problem.

While Allied understands that employees and applicants under a physician's care are required to use prescription drugs, abuse of prescribed medications will be dealt with in the same manner as the abuse of illegal substances.

According to the Occupational Safety & Health Administration (OSHA), of all drug and alcohol users, about 75% hold regular jobs, and in approximately 10% of the cases where employees are involved in deadly accidents at work, the deceased tested positive for drug or alcohol use.

Types of drug/alcohol testing required.

- **Job applicant drug testing**. Allied requires job applicants who are offered employment to submit to a post-offer drug test. A job applicant is a person who has applied for a position of employment with Allied and is offered a position contingent upon successfully passing a drug test. (See Attachment 1 for Program Acknowledgement). A refusal to submit to a drug test or a non-negative confirmed drug test may be used as a basis for rejecting a job applicant.

- All active employees shall sign and date Attachment 1 on the effective date of this program.

- **Random Drug Testing**. A random substance abuse testing process has been implemented by Allied as detailed below:
    - Random testing will be performed quarterly at a minimum.
    - ~~o~~ Percentage of random tests to be performed is a management decision and can be increased or decreased each quarter.
    - Employees selected for random testing will be notified that they must report to a company designated collection and testing facility immediately.
        - No Exceptions – Failure to follow this directive shall be deemed a refusal to test by the employee and will be considered a non-negative test.
    - Only actively working employees shall be entered into the random pool of participants.
    - Random pool of participants includes staff and field employees.
        - The random pool of active employees (participants) shall be maintained by the Safety Manager.
    - Random selection is performed using a double-blind process and will be witnessed by members of management.
    - Observed sampling may be performed by medical professionals if requested by Allied Management.

- **Reasonable-suspicion drug testing**. Allied requires an employee, upon request, to submit to a reasonable-suspicion, observed drug/alcohol sample collection test. Reasonable-suspicion drug/alcohol testing is based on direct observation that an employee may be under the influence or has used drugs/alcohol in violation of the Substance Abuse Program. Reasonable suspicion may be drawn from specific objective and articulable facts and reasonable inferences drawn from those facts in light of experience. Refer to Attachment 3 for the checklist to be used. Among other things, such facts and inferences may be based upon:

    - Observable phenomena while at work, such as direct observation of drug use or of the physical symptoms or manifestations of being under the influence of a drug.
    - Abnormal conduct or erratic behavior while at work or a significant deterioration in work performance.
    - A report of drug use, provided by a reliable and credible source.
    - Evidence that an individual has tampered with a drug test during his or her employment with the current employer.
    - Information that an employee has caused, contributed to, or been involved in an accident while at work.
    - Evidence that an employee has used, possessed, sold, solicited, or transferred drugs while working or while on Allied's premises, Owner/Client property or while operating Allied's vehicles, machinery, or equipment.

- **Routine fitness-for-duty drug testing**. Allied requires an employee to submit to a drug test if the test is conducted as part of a routinely scheduled employee fitness-for-duty medical examination that is part of the established policy, or that is scheduled routinely for all members of an employment classification or group such as Asbestos, Hazwoper, Respiratory, DOT or other specific physical examination.

- **Follow-up drug testing.** If the employee in the course of employment enters a drug/alcohol rehabilitation program, Allied requires the employee to submit to a drug/alcohol test as a follow-up to the program and a certificate or letter of satisfactory completion of the program from the rehabilitation counsler/center to be considered for re-instatement. Allied has the option to require post-rehabilitation drug/alcohol testing. Normally, follow-up testing will be performed every quarter for 1 year. Advance notice of a follow-up testing date will not be given to the employee to be tested.

- **On the Job Impairment.** Impairment may be defined as an inability to complete job-related activities and consistently communicate or think rationally without error while performing duties.
  Many aspects of the workplace today require alertness, and accurate and quick reflexes. An impairment to these qualities can cause serious accidents, and interfere with the accuracy and efficiency of work. Other ways that substance abuse can cause problems at work include:

    - After-effects of substance use (hangover, withdrawal) affecting job performance
    - Absenteeism, illness, and/or reduced productivity
    - Preoccupation with obtaining and using substances while at work, interfering with attention and concentration
    - Illegal activities at work including selling illicit drugs to other employees,
    - Psychological or stress-related effects due to substance abuse by a family member, friend or co-worker that affects another person's job performance.

Category	Examples	Examples of General Effects
Alcohol	beer, wine, spirits	impaired judgement, slowed reflexes, impaired motor function, sleepiness or drowsiness, coma, overdose may be fatal
Cannabis	marijuana, hashish	distorted sense of time, impaired memory, impaired coordination
Depressants	sleeping medicines, sedatives, some tranquilizers	inattention, slowed reflexes, depression, impaired balance, drowsiness, coma, overdose may be fatal
Hallucinogens	LSD (lysergic acid diethylamide), PCP (phencyclidine), mescaline	inattention, sensory illusions, hallucinations, disorientation, psychosis
Inhalants	hydrocarbons, solvents, gasoline	intoxication similar to alcohol, dizziness, headache
Nicotine	cigarettes, chewing tobacco, snuff	initial stimulant, later depressant effects
Opiates	morphine, heroin, codeine, some prescription pain medications	loss of interest, "nodding", overdose may be fatal. If used by injection, the sharing of needles may spread Hepatitis B, or C and HIV/AIDS.
Stimulants	cocaine, amphetamines	elevated mood, overactivity, tension/anxiety, rapid heartbeat, constriction of blood vessels

- **On the Job impairment may not involve the use of illegal substances.**
  - Medical/Health Event
  - Side effects or reactions to prescription or over the counter medications
  - Abuse of prescribed medications or over the counter medications may also occur
  - It is important to remember that any employee suffering impairment should be evaluated by a medical professional as soon as possible and to determine fitness for duty

- **Immediate Actions Allied will take regarding an employee deemed impaired while on the job**
  - The affected employee shall be removed from performing tasks and if practical, from the jobsite immediately.
    - Do not let the employee drive.
    - The employee shall not be allowed to work and shall be observed to ensure his and other's safety until a decision is made regarding a course of action to take regarding the employee.
    - If there is doubt of an employee's current state of health and consciousness due to his or her condition, call medical first responders immediately
  - Immediately notify the Operations/Branch Manager, HR Manager and/or the Safety Manager of the event.
  - When an employee demonstrates any type of impairment while on the job, supervisors must utilize the Drug/Alcohol Reasonable Suspicion Checklist (Attachment 3) to document any indicators of impairment or drug/alcohol use regardless of medical intervention.
  - Operations /Branch Manager, HR Manager or Safety Director shall report to the jobsite to interview supervisor and employee and if necessary, call first responders or bring the employee to attesting/collection facility if it is determined that it is safe to do so.
    - The Supervisor may drive an employee to the Corporate Office.
      - **<u>Employee shall not be allowed to drive under any circumstances</u>**
  - Arrangements shall be made to escort the employee to a Drug and Alcohol Testing and Collection Facility, or if transported to a medical facility, have them perform drug testing.
    - A urine or blood sample as appropriate shall be obtained.
      - If the employee refuses a drug or alcohol test, the employee shall be informed that their refusal will be considered a non-negative test by the HR Manager, Branch Manager or the Operations Manager.

- **A urine sample submission shall be observed to ensure adulteration of the sample does not occur**
    - If possible, obtain an instant test. The collection site will obtain a sample for GC or MS.
- A fitness for duty examination shall be performed by a medical professional

- The employee shall return (or be returned) to the Corporate or Branch Office as soon as feasible to be interviewed by the HR Manager and Operations Manager/Branch Manager or Safety Manager and informed of the company's position as it relates to this policy.
- Each event shall be thoroughly evaluated and investigated to determine which course of action to take on a case by case basis.
    - Options include:
        - Referral to Allied's Employee Assistance Program
            - Last Chance Policy
        - No Action
            - Prescription medication reaction
            - Side effects of prescribed medications
            - Medical/Health event
    - If it is determined that the employee is not impaired through a fitness for duty examination by a medical professional:
        - Await results of drug or alcohol test before making a decision regarding the disposition of the employee
        - Evaluate the circumstances to ensure that alcohol and/or drug abuse did not occur.
            - Consideration may be made to re-instate the employee or follow this procedure for non-negative substance abuse testing, dependent upon the results of testing and/or a medical professional's opinion.

- **Actions Allied may take against an employee on the basis of a non-negative confirmed drug/alcohol test result or admission of substance abuse.**

    - Results of non-negative drug test results shall be reviewed with the employee and a signature obtained indicating notification. (Attachment 2)
    - If the employee comes forward prior to any requests for testing and voluntarily admits abusing drugs or alcohol to his/her immediate supervisor, the supervisor shall contact the Human Resource Manager immediately. (Admission of illegal drug use is considered current if used within 30 days)

    - The Management Team shall review the circumstances of the employee's admission and determine appropriate actions.
        - The employee shall be referred to a drug testing facility for submission of a 10 panel drug test immediately.
        - Others may be involved with this review to best determine the appropriate course of action.
            - Results of the drug test should be taken into account before final action is determined.
    - **An employee must sign a Last Chance Agreement prior to returning to work – Attachment 5) and may be placed on an unpaid leave of absence for a minimum of 30 days while the employee is seeking appropriate counseling or treatment to prevent reoccurrence. Leave of absence not to exceed 60 days and**
        - **At the end of the leave of absence a determination will be made by Allied to consider eligibility for re-hire or terminate the employee.**
        - **See Employee Assistance Program Section.**

- **Non-negative Test - Denial of unemployment benefits.**
  - **Upon a non-negative confirmed drug/alcohol test result, Allied will deny an employee's claim for unemployment benefits.**
- **Refusal of Test will result in denial of unemployment benefits.**

Confidentiality

- Except as otherwise provided in this section, all information, interviews, reports, statements, memoranda, and drug test results, written or otherwise, received or produced as a result of Allied's drug-testing program are confidential.

- Company, laboratories, medical review officers, employee assistance programs, drug rehabilitation programs, and their agents may not release any information concerning drug test results obtained pursuant to this section without a written consent form signed voluntarily by the person tested, unless such release is compelled by an administrative law judge, a hearing officer, or a court of competent jurisdiction pursuant to an appeal taken under this section or is deemed appropriate by a professional or occupational licensing board in a related disciplinary proceeding. The consent form must contain, at a minimum (See Attachment 4):

  - The name of the person who is authorized to obtain the information.
  - The purpose of the disclosure.
  - The precise information to be disclosed.
  - The duration of the consent.
  - The signature of the person authorizing release of the information.

- This subsection does not prohibit an agent of Allied or laboratory conducting a drug test from having access to employee drug test information or using the information when consulting with legal counsel in connection with actions brought under, or related to this section, or when the information is relevant to its defense in a civil or administrative matter.

Reporting use of prescription or nonprescription medications.

- An employee or job applicant may confidentially report the use of prescription or nonprescription medications to a medical review officer, both before and after a drug/alcohol test, by contacting the medical review officer directly; Allied will provide the contact information upon request.

  - Prescription or nonprescription medication is a drug or medication obtained with a prescription from an authorized health care provider or a medication that is authorized by federal or state law for general distribution and use without a prescription in the treatment of human diseases, ailments, or injuries.

  - A medical review officer (MRO) is a licensed physician contracted by the collection and testing facility who has knowledge of substance abuse disorders, laboratory testing procedures, and chain of custody collection procedures; who verifies non-negative confirmed test results; and who has the necessary medical training to interpret and evaluate an employee's non-negative test result in relation to the employee's medical history or any other relevant biomedical information.

List of common medications that may affect a drug/alcohol test

- The following is a list of the most common medications, which may alter or affect a drug test, and is not intended to be all-inclusive:
- All liquid medications containing ethyl alcohol (ethanol). Please read the label for alcohol content.

Amphetamines	Obetrol, Biphetamine, Desoxyn, Dexedrine, Didrex, Ionamine, Fastin.
Cannabinoids	Marinol (Dronabinol, THC).
Cocaine	Cocaine HCl 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, Tussi-organidin, etc.
Barbiturates	Phenobarbital, Tuinal, Amytal, Nembutal, Seconal, Lotusate, Fiorinal, Fioricet, Esgic, Butisol, Mebaral, Butabarbital, Butalbital, Phrenilin, Triad, etc.

Benzodiazepines	Ativan, Azene, Clonopin, Dalmane, Diazepam, Librium, Xanax, Serax, Tranxene, Valium, Verstran, Halcion, Paxipam, Restoril, Centrax.
Methadone	Dolophine, Metadose.
Propoxyphene	Darvocet, Darvon N, Dolene, etc.

Consequences of refusing drug/alcohol testing

- **Post offer job applicant drug/alcohol testing. Allied will not hire a job applicant who refuses to submit to a drug/alcohol test.**
- **Employee drug/alcohol testing.**
    - **If an employee refuses to submit to a drug/alcohol test, the refusal will be considered a non-negative test. The employee may be referred to Allied's Employee Assistance Program. Failure to accept referral to Allied's Employee Assistance Program may result in termination of employment.**
    - **Allied may deny unemployment benefits.**

Employee Assistance Program

Allied maintains an Employee Assistance Program ("EAP"). The purpose of an EAP is to provide help to employees who suffer from alcohol abuse, drug abuse or other health issues. Employees may access these services without Allied's involvement. Please direct any questions regarding this program to the HR Manager.

It is the responsibility of an employee to seek assistance from an EAP ***before*** alcohol and drug problems lead to disciplinary actions. Once a violation of this policy occurs, subsequently seeking treatment through an EAP on a voluntary basis will not necessarily lessen disciplinary action and may, in fact, have no bearing on the determination of appropriate disciplinary action.

Allied's EAP will provide appropriate assessment, evaluation and counseling and/or referral for treatment of drug and/or alcohol abuse. Employees ***may*** be placed on an unpaid leave of absence status for 30 days with a conditional return to work, contingent upon successful completion of the agreed-upon treatment regimen (within 60 days of employee notification of a non-negative drug/alcohol test), which shall include follow-up testing.

The cost of seeking assistance from the program will be the responsibility of the employee and subject to provisions of Allied's health insurance plan, if any. Please consult the provider concerning any costs that may be your responsibility.

After the completion of the EAP program, the employee shall submit to a drug/alcohol test and have a fitness for duty examination performed by a medical professional. Under no circumstances, shall an employee be on any maintenance medications for their addiction when requesting re-instatement.

Challenges to test results

- An employee or job applicant who receives a non-negative confirmed test result may contest or explain the result to the designated medical review officer (MRO) within five (5) working days after receiving written notification of the test result. If an employee's or job applicant's explanation or challenge of the non-negative test is not acceptable to the MRO, the MRO shall communicate the positive test result back to the employer.

- The terms "confirmation test," "confirmed test," or "confirmed drug test" mean a second analytical procedure used to identify the presence of a specific drug or metabolite in a specimen, which test must be different in scientific principle from that of the initial test

procedure and must be capable of providing requisite specificity, sensitivity, and quantitative accuracy.

- Confirmation testing shall be done in accordance with the following:

    - If an initial drug test is negative, Allied may, in its sole discretion, seek a confirmation test.
    - Only licensed or certified laboratories may conduct confirmation drug tests.
    - All non-negative initial tests shall be confirmed using gas chromatography/mass spectrometry (GC/MS) or an equivalent or more accurate scientifically accepted method approved by the Testing Facility.
    - If an initial drug test of an employee or job applicant is confirmed as non-negative, Allied's designated medical review officer shall provide technical assistance to the Allied and to the employee or job applicant for the purpose of interpreting the test result to determine whether the result could have been caused by prescription or nonprescription medication taken by the employee or job applicant.

    Note:

    - **In light of several states passing legislation regarding the use of medical marijuana (MM), Allied's policies remain the same regarding the prohibition of being under the influence of any substance while performing job duties as well as detection considered non-negative in any submitted sample such as urine, blood, hair or saliva.**
    - **Questions regarding the program should be directed to the Safety Manager and/or the Human Resource Manager.**
    - **For those employees who fall under the FMSCA/PHSMA (DOT) regulations, Allied Environmental will follow current protocols relating to Federal Register (82 FR 5229) Part 40.**

Drug Free Workplace Program Acknowledgement

I hereby acknowledge that I have read and received Allied's Substance Abuse Program. I have had an opportunity to have all aspects of this material fully explained and was permitted to ask any questions to clarify any misunderstandings.

I also understand that during my employment I may be required to submit to testing for the presence of drugs or alcohol in my body. I understand that submission to such testing is a condition of employment with Allied, and subject to disciplinary action up to and including termination if:

- **I refuse to consent to testing.**
- **I refuse to accept Allied's EAP (if employed)**
- **I refuse to authorize release of the test results to the company.**
- **The tests establish a violation of Allied's Substance Abuse Policy.**
- **I otherwise violate the policy.**

I also recognize that the Substance Abuse Policy and related documents are not intended to constitute a contract between Allied and me.

The undersigned further states that he/she has read, understands and will abide by the policy reviewed and the above acknowledgement and signs below of his/her own free will.

PLEASE COMPLETE IN INK

_____ _____

PRINT NAME DATE

_____

SIGNATURE

_____ _____

WITNESS DATE

Attachment 1

Notification of Non-Negative Drug/Alcohol Test

Employee Name: _____ Date: _____

On _____ you were drug/alcohol tested according to requirements in Allied's Substance Abuse Program. Based on Allied's drug testing standards, your urine/blood specimen was tested twice in a controlled laboratory environment, which includes confirmation testing. Or, if tested for alcohol, the breath or blood sample submitted indicated levels above the acceptable limit.

We have received the test result from our company's medical review officer (MRO), and the result indicates that you have tested non-negative (failed the test) for the following substance(s):

_____ Cannabinoids (marijuana)	**_____ Alcohol**
_____ Amphetamines	**_____ Cocaine**
_____ Phencyclidine (PCP)	**_____ Methaqualone**
_____ Opiates	**_____ Barbiturates**
_____ Benzodiazepines	**_____ Synthetic Narcotics**

_____ Other Please indicate:_____

If you disagree with the test result or have some other related concern, you have the right to submit information explaining or contesting the test result, and explaining why the non-negative test result does not constitute a violation of our substance abuse policy, within five working days after receiving this notice. You also have the right, within 180 days of your challenge, to have your original urine/blood specimen retested at another certified laboratory. Arrangements and cost will be your responsibility.

Allied's Laboratory Medical Review Officer (MRO) is _____, M.D.
Phone: _____. You may contact the MRO to ask questions or discuss your drug test result.

Sincerely,

_____ _____

Print Name **Signature**

Attachment 2

Drug/Alcohol Reasonable Suspicion Checklist

When completing this checklist, please check all indicators that apply for the basis of suspicion.
Reasonable Suspicion cannot be based upon hearsay from a third party. Behavior must be observed by the supervisor or management and documented by the supervisor or management. However, any employee should report any worker appearing to be impaired or demonstrating any of the following indicators and act as a witness.

Nature of Incident / Cause for Suspicion

___ Observed/reported possession or use of a prohibited substance
___ Apparent drug or alcohol intoxication
___ Observed drug or alcohol intoxication
___ Arrest for drug-related offense
___ Other (e.g. flagrant violation of safety or serious misconduct, accident or 'near miss', fighting or argumentative/abusive language, refusal of supervisor instruction, unauthorized absence on the job) Specify:

_____
_____
_____

Behavioral Indicators

___ Verbal abusiveness
___ Physical abusiveness
___ Extreme aggressiveness or agitation
___ Withdrawal, depression, tearfulness, or responsiveness
___ Inappropriate verbal responses to questioning or instruction
___ Other erratic or inappropriate behavior (e.g. hallucinations, disoriented, confused) Specify:

_____

Physical Signs and Symptoms

___ Possession, dispensing, or using prohibited substance
___ Slurred or incoherent speech
___ Unsteady gait or other loss of physical control, poor conditioning
___ Dilated or constricted pupils or unusual eye movement
___ Bloodshot or watery eyes
___ Extreme aggressiveness or agitation
___ Excessive sweating or clamminess of skin
___ Flushed or very pale face
___ Highly excited or nervous
___ Nausea or vomiting
___ Disheveled appearance or out of uniform
___ Odor of alcohol
___ Odor of Marijuana
___ Dry mouth (frequent swallowing/lip wetting)
___ Shaking hands or body tremors/twitching
___ Dizziness or fainting
___ Breathing irregularity or difficulty breathing
___ Runny nose or sores around nostrils
___ Inappropriate wearing of sunglasses

___ Puncture marks or “tracks”
___ Other (Specify)
_____
_____
_____

Written Summary

Please summarize the facts and circumstances surrounding the incident. The observations must be specific, and detailed regarding the appearance, behavior, speech, or body odors of the employee. Attach additional sheets as needed.

_____
_____
_____
_____
_____
_____
_____

The above document of physical, behavioral, and performance indicators of the named employee were observed by:

_____ _____
_____
Supervisor’s Full Name Signature
Date

_____ _____
_____
Witness Full Name Signature
Date

Employee referred for:

Non DOT Drug Testing _____ Yes _____No Date:
_____

Non DOT Alcohol Testing _____ Yes _____No Date:
_____

DOT Drug Testing _____ Yes _____No Date:
_____

DOT Alcohol Testing _____ Yes _____No Date:
_____

Fitness for Duty Assessment _____ Yes _____ No Date:
_____

Employee Removed from Duty Pending Results: _____ Yes _____No Date:
_____

Attachment 3

Allied Drug Free Workplace Program
Consent for Release of Information

Allied Employee Name (Print):

_____

Allied Employee SS or ID Number:

_____

I hereby authorize release of information from drug and alcohol testing records to:

_____

_____

_____

Purpose of the release is:

_____

_____

_____

Precise information to be disclosed:

_____

_____

_____

_____

Duration of Consent for Release of Information: _____

This release is in accordance with Allied Environmental Services, Inc. Substance Abuse Program. Upon employee's signed consent, information detailed below can be released by Allied Environmental Services, Inc. to the following:

- Employee Assistance Programs
- Drug/Alcohol Rehabilitation Programs
- Designated Representative of the employee (in writing)

No information may be released by the above listed organizations or their agents concerning drug/alcohol test results without a consent form voluntarily signed by the above named employee.

I understand that information to be released by Allied Environmental Services, is limited to the following items:

1. Verified non-negative drug tests;
2. Specific name of the person who is authorized to obtain the information;
3. Purpose of the disclosure;
4. Refusals to be tested;
5. Other violations of Allied Environmental drug and alcohol testing procedures;
6. Documentation, if any, of completion of the return-to-duty process following a rule violation.

Employee Signature: _____**Date:**_____

Employee Name: _____

Employer Name: _____

Address: _____

Phone #: _____

Fax #: _____

Designated Employer Representative: _____

Title: _____

Address: _____

Phone #: _____

Attachment 4

A LLIED ENVIRONMENTAL SERVICES DRUG FREE WORKPLACE
LAST CHANCE AGREEMENT

I, _____hereby acknowledge that in my position as _____, with Allied Environmental Services, Inc. I am subject to the provisions set forth under the Drug Free Workplace Program in accordance with Allied's Drug Free Workplace Program.

I have been notified of a violation of Allied's Drug Free Work Place Program and will be placed on a minimum ____ day suspension.

I have also been informed that I may be terminated if the following requirements are not met. I've been informed that my eligibility for re-instatement is contingent upon my successful completion of the following requirements:

I will be referred to a Substance Abuse Professional by the Employee Assistance Program (EAP). I will also submit to and cooperate in a substance abuse evaluation by that individual.

I must complete a substance abuse treatment program and be approved to return to work by the Substance Abuse Professional. Said program of treatment will be prescribed by the Substance Abuse Professional and he/she must certify the successful completion of that program to the employer in writing.

I agree to the release of medical and other information required by the EAP and/or Allied Environmental Services which are necessary for Allied to review and evaluate my substance abuse evaluation and treatment program and my participation in same.

I must pass a return to duty drug and/or alcohol test which has been identified as such to Allied Environmental Services prior to being permitted to return to work. This test must be scheduled by Allied and a negative result must be received prior to returning to duty. A non-negative return to duty test result may result in termination.

After return to work, I must continue to strictly follow all directives and substance abuse treatment programs required by the Substance Abuse Professional.

I must not violate any rule or policy relating to drug or alcohol use, or the terms of this agreement.

I understand that all return to duty and follow-up drug tests are subject to direct observation procedures and failure by me to permit any part of the direct

observation procedure will be considered a refusal to test. All follow-up drug and/or alcohol tests must be negative.

It is agreed by the parties that the employee shall be considered on an unpaid leave of absence (the employee should use all available paid time off per the Allied Team Handbook) until such time that he/she returns to work under the above conditions or 60 calendar days whichever is shorter. Should the employee fail to properly be certified to return to work by the Substance Abuse Professional and return to work within 60 calendar days he/she shall be terminated from employment. Should the employee not cooperate fully with the directive of the Substance Abuse Professional or fail to return to work, the Allied Environmental Services may terminate his/her employment.

The employee further understands and agrees that upon his/her return to work he/she will be subject to not less than six (6) random drug and/or alcohol follow-up tests for up to one year and that further random drug and/or alcohol follow-up testing may be ordered by the Substance Abuse Professional for up to five years. It is also agreed that the employee shall be responsible for payment (within three (3) days) for the amount the employer is charged for any return to work determinations/examinations or follow-up testing relating to this violation.

If during the duration of the Agreement, the employee violates this Last Chance Agreement or any subsequent agreement made between the employee and the Substance Abuse Professional or the EAP, if the employee is found in violation of the Allied Environmental Services drug and alcohol policies, if the employee refuses to submit to a drug and/or alcohol test, the employee may be subject to termination from employment.

_____

_____

Printed Employee Name Date

_____

Employee Signature

_____

_____

Employer Representative Date

Attachment 5

26.0 Confined Spaces

26.1 Definitions

A Confined Space is an enclosed space, which is large enough and so configured that an employee can enter and perform work. It has limited or restricted means for entry or exit. The space is not designed for continuous employee occupancy. The space has one or more of the following characteristics:

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

26.2 Examples

Confined spaces include, but are not limited to, storage tanks, process vessels, pits, sewers, manholes, sumps, ducts, and unventilated rooms with limited access openings.

26.3 Requirement

The Confined Space Entry Permit should be posted near the entrance into the confined space. Employees required to enter a confined space should use a Confined Space Entry Permit similar to Figure 26.2. The following items shall be considered and the appropriate actions taken before anyone enters the confined space:

1. Complete Pre-entry checklist - Figure 26-1.
2. Before an employee enters the confined space, the internal atmosphere shall be tested with a calibrated direct-reading instrument, for oxygen content, for flammable gases, vapors and dust, and for potential toxic air contaminants, in that order. Any employee who enters the space, or that employee's authorized representative, shall be provided an opportunity to observe the pre-entry testing required by this paragraph. Instruments must be calibrated based on manufacturer requirements.
   (a) Only an approved instrument shall be used. Instruments should be checked to ensure they are working properly.
   (b) Employees conducting the tests shall be properly trained. However all personnel involved in the entry shall be given the opportunity to participate and observe the monitoring process prior to entry.
   (c) Testing of the confined space is frequently the responsibility of the owner. However, if this option is not available, Allied Environmental personnel shall perform the monitoring.
   (d) Consideration should also be given to the use of continuous monitoring while workers are in the confined space.
   (e) All levels of the confined space shall be tested to ensure there are no pockets of hazardous gases, fumes, or oxygen deficient areas.
   (f) If lengthy work in the confined space is anticipated, tests shall be conducted periodically to ensure that safe conditions are maintained.
   (g) Constant monitoring may be required based on the hazards and the work being performed (i.e., welding, painting, coating, using chemicals, etc.).
   (h) All results shall be recorded on the Confined Space Entry Permit. Figure 26-2. The permit shall be displayed at the man-way or entrance to the confined space.
   (i) Entry into a confined space with an unsafe atmosphere shall be avoided if at all possible. An employee required to enter a confined space with an unsafe atmosphere shall be equipped with the necessary personal protective equipment. A self-contained breathing apparatus, lifeline, body harness, and protective clothing shall be worn. A confined space entry and rescue plan will be developed by the Allied Environmental Services Operations Manager and reviewed with all employees involved with the entry, prior to the entry into any unsafe atmosphere.

(j) Breaking the plane of the confined space by the person with their face is considered entry.

3. The confined space shall be ventilated as required to ensure a continuous supply of breathing air to the work area.
4. A lockout/tag out procedure shall be used to ensure all equipment and systems that could affect the confined space are rendered inoperative. Refer to Section 13.0 Subsection 13.4. If required, the space shall be prepared by isolation, draining, venting, and cleaning.
5. No employee shall enter a confined space unless a standby employee (hole watch or attendant) is stationed outside the entrance:
   (a) It shall be the standby employee's responsibility to provide assistance to the employees working in the confined space, and to summon emergency assistance in the event of an emergency.
   (b) The standby employee shall not enter the confined space or leave the area without being replaced by another employee.
   (c) It shall be the standby employee's responsibility to keep track of employees entering and exiting the confined space. He/she shall log them in and out on the back of the Confined Space Entry Permit.
7. Rescue and fire equipment shall be available in the event of an emergency.
8. A communication system shall be preplanned to include communications between the standby person and the employees inside the confined space, and a method to call for emergency assistance.
9. Safe access to the confined space shall be maintained at all times:
   (a) If the confined space is entered by a ladder, the ladder shall remain in place and shall be fastened in a firm position while employees are inside the space.
   (b) If possible, all cords, hoses, leads, etc., shall be routed through an entrance other than the employee access to the space.
10. All electrical equipment used shall be properly grounded. Low voltage lighting, explosion proof lighting, and ground fault circuit interrupters shall be used when required.
11. Tools and equipment used in confined spaces that contain flammable or explosive mixtures shall be of the non-sparking type.
12. To prevent the latching of self-locking doors or hatches while employees are working inside a confined space, the locking devices shall be made inoperative before employees enter.
13. Electric welding, gas welding, cutting, or any other hot work, shall not be performed on the interior, exterior, or near the openings of any confined space that may contain flammable or explosive vapors until the confined space has been properly cleared.
14. Compressed gas cylinders shall not be allowed in a confined space.
15. After the permit has been posted, but before any employee enters the confined space, a pre-entry briefing with all employees required to enter the space shall be conducted by the person authorizing the permit. The briefings shall cover all items required to safely enter the confined space and the hazards associated with working in confined spaces.
16. When the work in the confined space is complete, the person that requested the permit shall ensure all personnel and equipment are out of the confined space.
17. The confined space entry program shall be evaluated annually to ensure effectiveness and to ensure changes made in the program during the year are incorporated.
18. Entry operations shall be reviewed whenever there is reason to believe that the measures taken under the permit space program may not protect employees. The program shall be revised to correct deficiencies found to exist before subsequent entries are authorized. Examples of circumstances requiring the review of the permit space program are: any unauthorized entry of a permit space, the detection of a permit space hazard not covered by the permit, the detection of a condition prohibited by the permit, the occurrence of an injury or near-miss during entry, a change in the use or configuration of a permit space, and employee complaints about the effectiveness of the program

19. The written program must be reviewed annually (unless no entries were made during the prior 12 month period) and revised as necessary to protect employees from confined space hazards. Canceled entry permits must be kept 1 year to facilitate the review problems encountered & should be noted and appropriate changes made during review.

Duties of Attendant:
Review Confined Space Entry Permit with Entry Supervisor and Entrants
Remain outside of confined space
Only job is to monitor personnel inside space and ensure safe surrounding conditions
Ensure all entrants sign in and out of the confined space
Summon emergency personnel as needed
Maintain visual or verbal communication with entrants
Evacuate Space in the event of an emergency or unsafe condition
Do Not Enter The Confined Space At Any Time – Including During An Emergency Or Rescue Attempt
Assist rescuers as needed in the event of an emergency
Turn in form to supervisor or owner after completing work or expiration of permit.

Duties of Authorized Entrant:
- Review Confined Space Entry Permit with Entry Supervisor and Attendant
- Sign in and out of confined space
- Do only the work described on the permit
- Do not enter the space until it has been checked for O2, Flammability and Contaminants
- Evacuate the space when ordered by the Attendant
- Order an evacuation of the space if any unsafe conditions are observed
- Review completed entry with attendant and entry supervisor

Duties of Entry Supervisor:
- Review entry operations with crew and owner prior to entry;
- Ensure confined space has had atmospheric testing to determine level of work allowed and PPE
- Determine testing and monitoring equipment needed
- Evaluate ventilating equipment needed to obtain acceptable entry conditions;
- Ensure effective means of communications is available for attendant, supervisor and entrants
- Review with all workers the procedure for emergency notification of entry supervisor, owner and rescue personnel. This requirement shall be documented on the confined space entry permit.
- Determine personal protective equipment requirements insofar as feasible if engineering and work practice controls do not adequately protect employees;
- Lighting equipment needed to enable employees to see well enough to work safely and to exit the space quickly in an emergency;
- Barriers and shields as required to protect other workers, vehicle and pedestrian traffic;
- Equipment, such as ladders, needed for safe ingress and egress by authorized entrants;
- Rescue and emergency equipment needed, except to the extent that the equipment is provided by rescue services; and
- Any other equipment necessary for safe entry into and rescue from permit spaces.

26.4 Confined Space Emergencies and Rescue

Confined space rescue involves the rescue and recovery of victims trapped in a confined space or in a place only accessible through confined spaces, such as underground vaults, storage silos, storage tanks, or sewers.

Confined space rescues can be technically challenging due to the environment in which they occur. Confined spaces are often narrow and constricting preventing easy access by rescuers. They are usually either unlit or poorly lit so rescuers must provide their own light source. Finally, confined spaces often contain hazardous materials in liquid or gas form which can be harmful or fatal to humans.

These hazards can be fatal as they create a limited window in which to perform a rescue. The general rule is that after four minutes without oxygen, a person in a confined space will likely suffer asphyxia resulting in either brain damage or death. The urgent need to rescue someone from a confined space often leads to ill-prepared rescue attempts. Two-thirds of all deaths occurring in confined spaces are attributed to persons attempting to rescue someone else.

Rescue may be performed by host facility, local emergency services or Allied Environmental Services personnel (if properly trained and drill practice performed). This needs to be addressed prior to issuing the confined space entry permit. All parties involved in the entry must be aware of the procedures to be utilized, should an emergency develops.

Classes of Confined Space Rescue:

Self rescue

In a self-rescue, much as the name suggests, the individual who recognizes a critical condition or symptoms of exposure and exits the space on his or her own. This is the preferred rescue method as confined space hazards can quickly incapacitate or kill an individual. An individual can almost always exit a confined space in far less time than it takes to wait for someone to come in and retrieve them.

Non-entry rescue

A non-entry rescue involves attempting to extricate an incapacitated person without having anyone else enter the confined space. This can be done via a safety line attached to the personnel in the confined space or by grabbing the personnel with a rope, strap or pole and pulling them to safety.

Entry rescue

This is a last resort option as having more personnel enter an area that has already incapacitated one or more persons places the rescuer at considerable risk. Entry rescues must be carefully planned and executed to avoid creating more victims in need of rescue. Rescuers need to be aware of their surroundings and must reevaluate their plans immediately if there is any change in the conditions of the confined space. In the event of an entry rescue, standby rescuers are recommended in the event that the initial entry rescuer(s) encounter trouble.

Rescue equipment

Due to the unique nature of confined space rescues, there is specialized equipment necessary to perform a safe and successful rescue.

One of the initial pieces of equipment employed in a confined space is a method of ventilation to disperse collected hazardous gasses and introduce fresh air into the environment.

A wristlet is often the first item used to actually perform the rescue, as opposed to the ventilator which is used to prepare the environment for a rescue. A wristlet is a cloth strap that is used to cinch tightly around the wrist or ankle of an incapacitated person. Once the strap is looped around a hand or foot, its attached rope is pulled by rescuers, tightening around the arm or leg and pulling the victim out of the confined space.

In the event that an entry rescue must be performed, rescue personnel will wear protective clothing appropriate for the situation. This may include a self contained breathing apparatus (SCBA), protective headgear and the use of explosion proof lighting (to prevent igniting any gases). The rescuer may also wear a full body harness with an attached safety line, especially if a vertical descent is required. To assist in vertical descents, a mechanical winch and tripod may be set up over the access point, if the bottom of the confined space is more than five feet from the entrance.

The rescuers may also carry monitoring equipment by which they can ascertain the quality of the air in the environment. Even if the air quality reading does not indicate any hazardous conditions, it is still recommended that rescuers wear SCBA.

Rescue training

Agencies that oversee workplace safety require that persons qualified for confined space rescue operations complete rescue training and exercises annually, at the least, and recommend more frequent training.

Numerous agencies in the United States have facilities for technical rescue training and often have a confined space training area.

In the USA, confined space rescue is covered under the National Fire Protection Association (NFPA) 1670, and under 29 CFR 1910.146 and 29 CFR 1910.147.

All permits are cancelled in the event of an emergency. The space must be re-evaluated and a new permit issued prior to re-entry. Any involved in the work or the owner can cancel the confined space permit if deemed necessary.

Examples of emergencies that would cancel the permit include:

- Changes in scope of work
- Changes in atmosphere inside the confined space
- Unusual symptoms or injury of worker or workers in the confined space
- Outside emergency around the work area or plant
- Unauthorized entrant into the confined space
- Any situation the attendant, entrant or entry supervisor places workers at risk

26.5 Training

- Allied will provide training so that all employees whose work is regulated by this section acquire the understanding, knowledge, and skills necessary for the safe performance of the duties assigned under this section

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

- Allied will certify that training under this section has been accomplished. The certification shall contain each employee's name, the signatures or initials of the trainers, and the dates of training. The certification shall be available for inspection by employees and their authorized representatives

CONFINED SPACE PRE-ENTRY CHECKLIST

This checklist should be completed prior to any entry into confined spaces

Did your survey of the surrounding areas show it to be free of hazards such as drifting vapors from tanks, piping sewers, running vehicles?

Yes _____ No_____

Does your knowledge of industrial or other discharges indicate this area is likely to remain free of dangerous air contaminants while occupied?

Yes _____ No_____

Have you been trained in operation of the gas monitor to be use?

Yes _____ No _____

Has a gas monitor functional test been performed this shift on the gas monitor to be used?

Yes _____ No_____

Did you list the atmospheric test results of the confined space prior to entry?

Yes _____ No _____

Did the atmosphere check as acceptable (no alarms)?

Yes _____ No _____

Will the atmosphere be continuously monitored while the space is occupied?

Yes _____ No _____

Contact:_____Telephone:_____

For personnel rescue by local fire department in the event of an emergency-Shawnee Fire Department

NOTICE: IF ANY OF THE ABOVE QUESTIONS ARE ANSWERED "NO," DO NOT ENTER! CONTACT THE COMPANY OPERATIONS MANAGER

Job Location:_____Job Number:_____

Supervisor Signature:_____Date:_____

Figure 26-1

CONFINED SPACE ENTRY PERMIT

COMPANY /LOCATION_____DEPARTMENT_____DATE_____

CONFINED SPACE TO BE ENTERED_____PERMIT EXPIRATION DATE/TIME_____

DESCRIPTION OF WORK TO BE PERFORMED_____

NATURE OF HAZARDS IN CONFINED SPACE(CHECK)

☐ Oxygen deficiency (Less than 19.5% at sea level)
☐ Flammable gases or vapors (greater than 10% of the lower flammable limit, or greater than 23.5% oxygen at sea level)
☐ Toxic gases or vapors (greater than the permissible exposure limit)
☐ Mechanical hazards
☐ Electrical shock
☐ Materials harmful to the skin
☐ Engulfment
☐ Configuration
☐ Other_____

EQUIPMENT REQUIRED FOR ENTRY AND WORK (CHECK)

☐ Respirator ☐ Lighting (Explosive Proof)
☐ Lifeline and safety harness ☐ Fire Extinguishers

☐ Protective clothing ☐ Emergency Escape Retrieval Equipment
☐ Hearing protection ☐ Resuscitators-Inhalator
☐ Other_____

Electrical equipment/tools

☐ Low voltage
☐ Ground-fault current interrupters
☐ Approved for hazardous locations
Respiratory protection (specify)_____
Communication aid (specify)_____
Rescue equipment (specify)_____

PREPARATION (CHECK)

☐ Notify affected departments of service interruption
☐ Isolate - blanked or double valve, with lock and tag
☐ Zero energy state (Lock Out all energy sources)
☐ Cleaned, drained, washed and purged
☐ Ventilation to provide fresh air
☐ Emergency response team available
☐ Employees informed of specific confined space hazards
☐ Secure area (post, sign and flag)
☐ Procedures reviewed with each employee
☐ Atmospheric test in compliance
☐ Attach hot work permit
☐ Other _____

AUTHORIZED ENTRANTS

_____
_____
_____
_____
_____
_____

AUTHORIZED ATTENDANTS

_____
_____
_____

STAND BY SAFETY PERSONNEL

_____
_____

TEST	Allowable Limits	Check if Received	Result A.M./P.M.	Result A.M./P.M.	Result A.M./P.M.	Result A.M./P.M.	Result A.M./P.M.	Result A.M./P.M.
Time								
Oxygen-min.	19.5%							
Oxygen-max.	23.5%							
Flammability	10% LEL/LFL							
H_2S	10 ppm							
Toxic (Specify)								
CI_2	5ppm							
CO	35ppm							
SO_2	2 ppm							
Heat	°F/°C							
Other								

Name of employee conducting atmospheric monitoring _____Instrument(s) used_____

Statement of acceptable entry conditions

AUTHORIZATION

I certify that all required precautions have been taken and necessary equipment is provided for safe entry and work in this confined space.

Time_____Date_____Name(Print)_____Signature_____

Figure 26-2

27.0 Hazardous Waste Safety / Tank Cleaning Safety

27.1 General

- Regardless of the type of material, employees must know what the material is, how to handle it, its hazard, be it corrosive, flammable, explosive, etc., before transporting, handling, or removal of material.
- Material must be coded and labeled. Manifests must be completed and a manifest must accompany the product at all times.
- Prior to transport, ensure federal, state, and local transportation requirements have been thoroughly investigated and complied with.
- Employees must wear all protective clothing necessary to handle product for transportation or clean-up.
- Trucks must show code of material in truck on front, back and side of vehicle.
- All state, federal and local laws must be obeyed.

27.2 Tank Cleaning Safety

- Before entering any tank or field, management must be notified.
    - Permit must be obtained
    - Tank location, tank and piping systems must be tested for clean breathing air and toxic atmospheres prior to entry
    - Entry permit must be displayed
    - All tools must be non-sparking
    - Precautions must be taken to prevent sparks and fires
    - No one shall enter a tank or vessel without prior testing
    - All entrants must be attached to a life line
    - Entrants must have at least one person assigned as an attendant at the man-way at all times
    - One person must be assigned to monitor fresh air gauges if supplied air is utilized – Not the attendant
    - Air lines must be kept clean
    - Respirators must be inspected daily prior to each use and cleaned daily
    - Entry rules may vary depending upon owner's requirements

28.0 Lead Exposure Prevention

28.1 Requirements

Before an Allied Environmental employee is assigned to work on a project where there is a potential exposure to lead, the employee shall:

(a) Enroll in the Allied Environmental medical monitoring program (refer to Section 7.5).

(b) Receive the required training on the hazards associated with lead exposure initially and thereafter.

(c) Receive the required training on safe work practices and the use of personal protective equipment to avoid exposure to lead.

- Appropriate signage shall be displayed to protect unqualified workers and pedestrians from entering controlled work areas or zones.
- When feasible, administrative controls and work practices shall be used to reduce employee exposure. This information shall be documented in the supervisor's daily report.
- Changing, showering and hand washing facilities shall be provided to ensure adequate opportunity for decontamination.
- Employees shall not be exposed to lead concentrations greater than 50 ug/m3 over an 8 hour period or (400 ug/m3 ÷ # hrs in the shift). See section 6.0 for sampling strategies.
- Specific program elements for lead shall be reviewed every 6 months to ensure program effectiveness.

28.2 Medical Monitoring Program

All employees involved with operations that expose them to hazardous chemicals, hazardous waste operations, asbestos or lead abatement, or are required to wear a respirator shall enroll in the Allied Environmental Services, Inc. medical monitoring program prior to starting such work. Those employees declining to be medically monitored will be required to sign an article of declination.

28.3 General

Dependent on the type of exposure, the medical monitoring requirements for specific employees may include the following:

- Lead Medical Questionnaire
- Medical health history
- Pulmonary function
- Heavy metal screen
- Blood chemistry screen (Lead & ZPP)
- Urinalysis
- Blood Pressure
- Physical Exam

28.4 Program Specific Elements

Allied Environmental will provide a hazard free workplace and have a Lead Exposure Prevention program to ensure the safety and health of all company employees performing job tasks in which a potential lead exposure could occur.

Compliance with this program is mandatory and is applicable to all company employees who work in an environment where lead is present in any amount. Failure to comply will result in disciplinary action.

28.5 Methods of Compliance

The nature of job activities sometimes involves working with lead environments where there is a potential for lead exposure. Prior to commencing work on a job where potential lead exposure is identified as a hazard, a pre-job assessment shall be completed which allows the company to provide effective control methods for employees. The Lead Protection Program incorporates all of the requirements of 29 CFR 1926.62(e)(2)(ii)(A)-(I) as follows:

• 1926.62(e)(2)(ii)(A) A description of each activity in which lead is emitted; e.g. equipment used, material involved, controls in place, crew size, employee job responsibilities, operating procedures and maintenance practices.

• 1926.62(e)(2)(ii)(B) A description of the specific means that will be employed to achieve compliance and, where engineering plans and studies used to determine methods selected for controlling exposure to lead.

• 1926.62(e)(2)(ii)(C) A report of the technology considered in meeting the PEL.

• 1926.62(e)(2)(ii)(D) Air monitoring data which documents the source of lead emissions.

• 1926.62(e)(2)(ii)(E) A detailed schedule for implementation of the program, including documentation such as copies of purchase orders for equipment, contracts, etc.

• 1926.62(e)(2)(ii)(F) A work practice program which includes items required under paragraphs (g) *protective work clothing and equipment*, (h) *housekeeping*, and (i) *hygiene facilities and practice* of this program and incorporate other relevant work practices such as those specified in paragraph (e)(5) *employees will follow safe work practice*.

• 1926.62(e)(2)(ii)(G) An administrative control schedule required by paragraph (e)(4) *administrative controls-implementation of a job rotation schedule*.

• 1926.62(e)(2)(ii)(H) A description of arrangements made among contractors on multi-contractor sites with respect to informing affected employees of potential exposure to lead and with respect to responsibility for compliance with this program.

• 1926.62(e)(2)(ii)(I) Other relevant information. (e.g. site inspections, revision of the program every six months, and reviewing the performance of mechanical ventilation).

Once the site specific Lead Assessment is completed all applicable employees will receive information and training for the identified areas of potential lead exposure at that site. During work activities, the supervisor will periodically inspect the area to maintain the effectiveness of the lead protection program. If the inspection reveals a change in the work environment that could increase potential lead exposure, all employees will evacuate the area and a follow-up lead assessment will be completed and the necessary additional precautions will be implemented before work activities resume.

28.6 Definitions

Permissible Exposure Limit **-** means the dermal or inhalation exposure limit calculated daily using 400 ug/m3 ÷ hours in shift.

Time Weighted Average **(TWA) -** the sum of all exposure over an 8-hour work shift.

Action Level **-** employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 ug/m3 averaged over an (8) hour time weighted average.

Exposure Assessment **-** Employers are required to determine if any employee is exposed to lead concentrations at or above the action level of (30) thirty microns per cubic meter of air at an (8) eight hour TWA.

Lead **(Pb) -** metallic lead, all inorganic lead compounds, and organic lead soaps. It 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. Excluded from this definition are all other organic lead compounds.

Final Medical Determination **-** the outcome of a multiple physical review or an alternate medical determination.

28.7 Forms of Lead Exposure

- Lead Metal
- Lead Dust
- Lead Fumes

Non-occupational exposure to lead is less than industrial exposure. Lead and lead forms are found at operations such as stacking, pasting, casting, burning and smelting, oxide manufacturing and assembly. There may be a potential health hazard at manufacturing facilities where lead is a part of operations.

28.8 Routes of Entry Into The Body

- Inhalation
- Ingestion
- When lead is absorbed into the body in certain doses it is a toxic substance. Lead is not absorbed through the skin, but can enter the body by inhalation and ingestion.
- When lead is scattered through the air as a dust, fume, or mist it can be inhaled and absorbed by the lungs and upper respiratory tract.
- Inhalation of airborne lead is generally the most important source of occupational lead absorption. Lead can also be absorbed through the digestive system if swallowed. Handling food, cigarettes, chewing tobacco, or make-up with hands contaminated with lead will contribute to ingestion. It is for these reason that eating, drinking, and smoking in identified lead areas are avoided.
- Lead blood levels will continue to increase if exposure is not controlled. A significant portion of the lead that you inhale or ingest gets into the blood stream. Once in your blood stream, lead is circulated throughout your body and stored in various organs and body tissue. Some of the lead is filtered out of the body by excretion, but some remains in the blood and other tissues. The amount of lead stored in the body will increase if lead absorption is more than body excretion. The lead stored in the body can slowly cause irreversible damage to cells, organs, and the body system.

28.9 Health Effects of Lead Exposure

If steps are not taken to control exposure, continued absorption of lead could result in:

- Constipation or diarrhea
- Lack of appetite
- Weight loss
- Nausea
- Abdominal pain
- Adverse effects in the male and female reproductive systems
- Adverse effects in an unborn fetus

Short Term Overexposure (Acute)

- Lead is a systemic poison that serves no known useful function once absorbed by the body. Exposure to lead in large enough quantities can kill in a matter of days. A condition affecting the brain may arise, known as acute encephalopathy that develops into seizures, coma, and death. A short-term exposure of this magnitude is highly unlikely, but not impossible. There is no sharp dividing line between developing acute and chronic health effects. Lead adversely affects numerous body systems and causes forms of health impairment and disease that arise after periods of exposure as short as days or as long as several years.

Long Term Overexposure (Chronic)

Chronic overexposure to lead may result in severe damage to your bloodforming, nervous, urinary, and reproductive systems.

Some common symptoms of chronic overexposure include

- Loss of appetite, metallic taste in the mouth, anxiety, constipation, nausea, excessive tiredness, weakness, insomnia, headache, nervous irritability, muscle and joint pain or soreness, fine tremors, numbness, dizziness, and hyperactivity. At this stage, a qualified physician may diagnose lead poisoning.

Human Reproductive & Fetal Health

- The medical and scientific community has recognized that lead exposure can have significant adverse health effects on an unborn fetus and the reproductive systems of males and females.
- At current acceptable OSHA blood-lead levels there are no known teratogenic effects that may result in birth defects or malformations, however, at higher blood-lead levels diverse effects have been reported.
- Some symptoms of lead overexposure affecting the male reproductive system may include a decrease in sexual drive, impotence, decreased ability to produce healthy sperm and sterility.
- With respect to females, these effects may include menstrual disturbances, decreased viability of the fertilized ovum and changes in reproductive capacity.

28.10 Reporting Problems or Incidents with Regard to Lead

- Immediately notify your supervisor if you develop potential signs or symptoms associated with lead poisoning.
- You should also notify your supervisor if you have difficulty breathing while wearing a respirator or suspect problems with other personal protective equipment.

28.11 Exposure Assessment

- Allied Environmental Services will determine if employees are exposed to concentrations of lead at or above the action level of 30 ug/m3 on an eight-hour TWA.
- The exposure determination shall be based on the following:
    - Personal exposure monitoring
    - Objective data demonstrating that the lead containing material, product, process, operation, or activity cannot result in exposure at or above the action level.
    - Historical measurements of airborne lead that have been taken within the last 12 months.
    - If the initial exposure determination reveals employee exposure to be at or below the PEL, monitoring will be performed at least every six months.

- If the exposure determination reveals employee exposure above the PEL, monitoring will be performed quarterly.
- Additional monitoring will take place if a change in an operations production process occurs which may result in additional exposure to lead. In addition, employees will be given written notification of the results of their exposure assessment within five working days.

28.12 Preventing Lead Absorption

- Proper control of exposure to lead is the responsibility of both Allied Environmental Services and the employee.
- All of the control methods discussed below are essential to minimize additional sources of lead absorption from inhalation or ingestion of lead that may accumulate on you, your clothing, or your possessions.
- High personal standards of cleanliness are necessary. Strict compliance with these provisions can virtually eliminate several sources of lead exposure that significantly contribute to excessive lead absorption.

Respiratory Protection

Exposure to hazardous materials requires special precautions against absorption of toxic compounds. While engineering controls (e.g. ventilation systems) are the primary means of controlling materials such as lead dust, fumes, vapors, and mists, it is often necessary to rely on respiratory protection.

- The respirator will give you the proper amount of protection based on the nature of the hazard. Only use respirators tested and certified by the National Institute for Occupational Safety & Health (NIOSH).
- The cartridges that come with the mask are approved for the environment in which you will be working.
- Never use a cartridge respirator in an atmosphere containing less than 19.5% oxygen or an atmosphere immediately dangerous to life and health (IDLH).
- In addition, observe the requirements of the Respiratory Protection Program. In extreme cases a NIOSH-certified air purifying respirators may be required.
- See Section 8.4.2 - Respiratory Protection Program.
- Personal Protective Equipment required to protect personnel is to be supplied at no cost to the employees.

Protective Work Clothing & Equipment

Protective clothing and equipment must be worn when the exposure to lead and lead compounds is above the PEL. All required PPE, including respirators, protective clothing and other related equipment and materials will be provided by Allied Environmental Services.

- If work clothing is provided, it will be given to you in a clean and dry condition at least weekly, and daily if your airborne exposure to lead is greater than 200 ug/m3.
- Protective work clothing and equipment can include coveralls, tyvek coveralls, gloves, hats, shoes, shoe coverlets, face shield or vented goggles.
- All clothing and equipment will be repaired, replaced, cleaned, laundered, or disposed of as necessary by the company.
- Contaminated work clothing and equipment must be removed in the designated change room and placed in the provided closed containers to be cleaned or disposed of.
- At no time may lead be removed from protective clothing or equipment by any means which disperses lead into the workplace air.

Hygiene Facilities & Practices
Employees exposed to lead above the PEL must change, shower, and eat in designated areas.

- After changing and showering no clothing or equipment worn during the shift should be carried home, this includes shoes and underwear.
- The change area will be equipped with separate storage facilities for protective work clothing and equipment and for street clothing to prevent cross-contamination.
- The container for lead contaminated clothing will be labeled as follows:

  CAUTION: CLOTHING CONTAMINATED WITH LEAD. DO NOT REMOVE DUST BY BLOWING OR SHAKING. DISPOSE OF LEAD CONTAMINATED WASH WATER IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, OR FEDERAL REGULATIONS.

- Lunchrooms may not be entered with protective clothing or equipment unless surface dust has been removed by vacuuming, down draft booth, or other accepted cleaning method.
- Finally, workers exposed above the PEL must wash both their hands and face prior to eating, drinking, smoking, or applying cosmetics.

Housekeeping & Cleaning Practices

- All surfaces will be maintained as free as practicable of accumulation of dust. In addition, the use of compressed air to clean floors and other surfaces is restricted.
- When vacuuming methods are used, take special precaution when emptying the vacuum to minimize the re-entry of lead into the workplace atmosphere.
- Where vacuuming methods are not feasible, shoveling, dry or wet sweeping, and brushing are acceptable.

Administrative Controls & Practices

- Based on the specific site lead assessment, the facility may implement a job rotation schedule as one means of reducing an employee's TWA exposure to lead.
- The schedule includes the name or identification number of each effected employee, the duration and exposure levels at each job or work station where effected employees are located, and any other information useful in assessing the reliability of the administrative controls used to reduce potential lead exposure.

28.13 Medical Surveillance

- The medical surveillance program is part of the comprehensive approach to the prevention of lead related disease.
- Its purpose is to supplement the lead program that is aimed at minimizing airborne concentrations of lead and sources of ingestion.
- Only medical surveillance can determine if the provisions of the lead program have effectively protected an employee. Periodic medical surveillance of individual employees will help detect those failures in the lead program and engineering techniques.

Biological Monitoring
The initial phase of the medical surveillance program includes blood-lead and zinc level tests. Biological monitoring will be made available to all employees who are exposed in excess of the action level for more than thirty days a year:

- At time of hire
- Every 2 months for the first six months.
- At least every six months.
- If the last blood sampling and analysis indicated a blood lead level at or above 40 ug/dl of whole blood, monitoring will continue every two months.
- Monitoring will continue until two consecutive blood samples and analysis indicate a blood lead level below 40 ug/dl of whole blood.
- Written notification of test results will be given to employees within five days indicating blood lead levels and be given medical removal protection benefits when blood sampling and analysis indicate a blood lead level at or above 40 ug/dl of whole blood.

Medical Examinations and Consultations

- The second phase of medical surveillance is medical examinations and consultations for employees who meet the following conditions:
    - Employees who are exposed in excess of the action level for more than thirty days a year or PEL on any one day.
    - At least annually for each employee for whom a blood-sampling test conducted at any time during the preceding 12 months indicated a blood level at or above 40 ug/dl.
    - Prior to the assignment for the first time to an area in which airborne concentrations of lead are at or above the action level.
    - As soon as possible, upon notification by an employee, that he/she has developed signs and symptoms commonly associated with lead intoxication, or desire medical advice concerning the effects of current or past exposure to lead and the ability to procreate a healthy child.
    - As medically appropriate for each employee either removed from exposure to lead due to risk of sustaining material impairment to health, or otherwise limited pursuant to a final medical determination
    - A licensed physician will perform all medical examinations and a laboratory licensed by the Center for Disease Control will perform consultations, sampling and analysis.

Medical Removal Protection

- Excessive lead absorption subjects employees to increased risk of disease.
- Medical Removal Protection (MRP) is a means of protecting employees when, for whatever reasons, such as engineering controls, work practices, and respirators, have failed to provide the needed protection.
- MRP involves the temporary removal of an employee from his or her regular job to a place of lower exposure without loss of earnings, seniority, or benefits.
- MRP is triggered by 1) Elevated Blood Lead Levels or 2) Final Medical Determination

28.14 Warning Signs

A warning sign must be illuminated, kept clean, and posted in work areas where the exposure to lead exceeds the PEL. The sign must read

DANGER-LEAD WORK AREA-MAY DAMAGE FERTILITY OR THE UNBORN CHILD, CAUSES DAMAGE TO THE CENTRAL NERVOUS SYSTEM, DO NOT EAT, DRINK OR SMOKE IN THIS AREA

28.15 Employee Training

- Information and training will be given to all employees who may be exposed to lead above the action level, or who may suffer skin or eye irritation from lead. The training program will inform employees of the following:

- Specific hazards associated with their work environment
- Personal protective equipment
- Lead exposure
- Lead Exposure Hieracrchy
    - Engineering Controls
    - Administrative Controls
    - Work Practice Controls
    - Personal Protective Equipment
- Dangers of lead
- Health hazards associated with lead overexposure
- Employee rights under the lead standard
- Documentation of employee information and training is kept on file at the corporate office.

28.16 Record Keeping

- The following records will be kept on file at the corporate office, if applicable:

    - Exposure monitoring for airborne lead
    - Name and job classification of employees measured
    - Details of the sampling and analytic techniques
    - Results of the sampling
    - Type of respiratory equipment worn
    - Records will be kept on file for 40 years or for at least 20 years after termination of employment, whichever is longer

Biological Monitoring and Medical Surveillance

- Names of employees and social security numbers
- Physician's written opinion
- Copy of exam results
- Records will be kept on file for 30 years beyond the term of employment.

Temporary Removal

- Name and social security number
- Date of removal and return
- How the removal was or is being accomplished
- Whether or not the removal was an elevated blood lead level
- Kept for duration of employment

Job Rotation Schedule

- Name and identification number of each effected employee
- Duration and exposure levels at each job or work station where each affected employee is located
- Any other information useful in assessing the effectiveness and reliability of the rotation schedule

Lead Job Site Assessment

- Description of the facility and potential lead exposure areas
- Job description of employees working in the potential lead exposure area
- Any specific operating and maintenance procedures
- Any engineering controls necessary or in place to prevent potential exposure to lead
- All air and emissions monitoring results of the area are copied for company records
- Any specific protective clothing and respiratory protection required

- Any job specific rotation schedules
- Necessary hygiene facilities and practices
- Mandatory housekeeping and cleaning practices
- All mechanical ventilation will be evaluated for effective performance
- Identification of safe work practice controls

29.0 Cadmium Exposure Prevention

29.1 General

Uses: Cadmium is a metal used in electroplating, in solder for aluminum, as a constituent of easily fusible alloys, as a deoxidizer in nickel plating, in process engraving, in cadmium-nickel batteries, and in reactor control rods. All Allied employees and their authorized representatives have access to this procedure, either by reviewing the Safety Manual issued to all employees upon hire or through the Operations Manager, Safety Manager or Human Resource Manager who can provide additional guidance or issue of another Safety Manual.

29.2 Exposure

Cadmium is well-absorbed by inhalation, but poorly by ingestion. It is not absorbed by the skin. Aside from occupational exposure, it is also present in:
1-Food
2-Cigarette smoke (the main source of contamination in the general population).
3-Urban atmospheric air (levels may be high in the vicinity of cadmium producing facilities)
4-Lichen and moss (they concentrate cadmium as well as other heavy metals).

Acute intoxication:

The diagnosis of the intoxication is based on:

1-Case history,

2–Search for proteinuria, in order to screen for a beginning renal impairment,

3-Measurements in biological tissues, such as blood and urine, more particularly to assess the chronic intoxication risk.

1-Metal fume fever:

Inhalation of cadmium oxide fumes, produced when cadmium metal and cadmium compounds are heated to high temperature, causes flu-like symptoms better known as « metal fume fever », a benign condition. Treatment is entirely symptomatic.

2-Pulmonary effects:

More severe exposures may cause lung damage and ultimately death.

Cadmium oxide fume is a severe pulmonary irritant; cadmium dust is a less potent irritant than cadmium fume because it has a larger particle size.

Inhalation exposure to high levels of cadmium fumes or dust is intensely irritating to respiratory tissue. Particle size appears to be a more important determinant of toxicity than chemical form. However, most acute intoxications have been caused by inhalation of cadmium fume at concentrations that did not provide sufficient warning symptoms of irritation so that workers could leave the contaminated workplace.

Concentrations of fume responsible for fatalities have been 40 to 50 mg/m3 for 1 hour or 9 mg/m3 for 5 hours. There have been non-fatal cases at lower concentrations.

Pulmonary symptoms and clinical signs reflect lesions ranging from nasopharyngeal and bronchial irritation to pulmonary edema, and death.

There also may be possibly: headache, chills, muscle aches, nausea, vomiting, and diarrhea.

3-Kidney effects:

Chronic exposure to cadmium, by inhalation or ingestion, results in renal damage which may continue to progress even after exposure ceases.

4-Pulmonary effects:

Long-term inhalation exposure at low levels leads to decreased lung function and emphysema.

5-Bone effects:

Even if absorption by ingestion is low, chronic exposure to high levels of cadmium in food has caused bone disorders, including osteoporosis and osteamalacia.

6-Miscellaneous:

Other consequences of cadmium exposure are: anemia, yellow discoloration of the teeth, rhinitis, occasional ulceration of the nasal septum, damage to the olfactory nerve, and anosmia.

Carcinogenesis and mutagenesis:

Occupational exposure to cadmium has been implicated in a significant increase of lung and prostate cancer. The IARC has determined that there is sufficient evidence in humans for the carcinogenicity of cadmium and cadmium compounds. It also appears that cadmium has the capability to alter genetic materials, particularly chromosomes.

Exposure :

The important thing is your level of exposure to cadmium. It certainly depends also on the amount used over a given period of time. In the wet state these compounds are certainly much less hazardous than as dust (main route of entry being inhalation).

Allied Environmental adheres to the action level and PEL to reduce employee exposure below the action level and PEL by means of engineering and work practice controls. Please see administrative and control measures below in section 29.3 and 29.4.

Prevention:

Good housekeeping is important. Avoidance of processes generating unnecessary dust is also important.

Depending on the severity of exposure, local ventilation should be used and the aspired air should be vented outside to avoid producing dust from work tables and the floor.

To minimize employee exposure to cadmium a job safety analysis shall be developed and implemented for maintenance of ventilation systems and changing of filters of these systems.

The wearing of an approved respirator when the exposure is hazardous is mandatory.

It should be forbidden to drink, eat or smoke in the work area.

29.3 Medical Surveillance

The action level for workplace exposure to cadmium is 2.5 micrograms per cubic meter of air (2.5 µg/m3) calculated as an 8-hour time-weighted average (TWA) exposure.

The PEL is a time-weighted average concentration that must not be exceeded during any 8-hour work shift of a 40-hour work week. The standard sets a PEL of 5 micrograms of cadmium per cubic meter of air (5 µg/m3) for all cadmium compounds, dust, and fumes.

Biological monitoring tests for populations exposed to cadmium in the industry & the environment

Parameter	Tissue	Normal value	Maximal allowable concentration	Significance
Cadmium	Blood	<0.5 µg/L	5 µg/L	Recent exposure
Cadmium	Urine	<2 µg/g creatinine	<5 µg/g creatinine	Body burden**
Bêta-2 micro-globulin*	Urine	<300 µg/g creatinine		Tubular impairment
Retinol carrying protein	Urine	<300 µg/g creatinine		Tubular impairment
Albumin	Urine	<20 mg/g creatinine		Glomerular impairment

* unstable if urinary pH < 5.6
** in case of moderate exposure and in the absence of renal damage

The following guidelines shall be utilized where there is a known or suspected exposure to cadmium:

Respiratory Protection. Where applicable, the employer must provide respirators at no cost to employees and ensure that they are used in compliance with the standard. Powered air-purifying respirators must be provided to employees who request them and where this respirator will provide adequate protection. Employers must ensure that employees use respirators in regulated areas and that respirators are properly fitted and used. Employees required to wear respirators must have limited medical exams prior to being assigned to an area where respiratory protection is required unless they have had a comparable exam within the preceding 12 months. Employees must be allowed to leave a regulated area to readjust face pieces and to change filters or to wash their faces to avoid skin irritation.

Emergency Situations – Emergency Response Plan. If there is a potential for a substantial release of airborne cadmium or an actual cadmium release occur, an emergency release/response plan is in place which includes controlling the release, potential exposures, and exposure prevention. This plan shall be reviewed by all employees prior to performing the job. The Emergency Release/Response Plan also includes the control measures indicated below:

- *Immediate Notification of Client, Safety Manager, and Operations Manager*
- *Control potential exposures*
- *Barricade area of release*
- *Personal Protective Equipment*
- *Decontamination*
- *Housekeeping and cleanup methods*
- *Personal and area air monitoring*
- *Disposal methods*

Protective Work Clothing and Equipment. Employers must provide protective clothing and equipment—such as coveralls, shoe covers, head coverings, and goggles—for employees exposed above the PEL and for employees with skin and eye irritation from cadmium exposure. The employer must ensure that contaminated clothing and equipment are placed in closed containers in change rooms prior to cleaning, laundering, maintaining, or discarding. The employer must provide clean and dry personal protective clothing and equipment at least weekly, or more often, as necessary to maintain effectiveness. The employer must notify those who launder or clean these items of the potential hazards of cadmium exposure.

Housekeeping. Employers must maintain all surfaces as free as practicable of accumulations of cadmium and clean up spills promptly. Compressed air may be used to clean up accumulations of cadmium if it does not disperse cadmium into the air; vacuuming using a high-efficiency particulate air filter is preferable. The employer also must ensure that waste, scrap, debris, bags, containers, equipment, and clothing contaminated with cadmium and consigned for disposal be collected and disposed of in sealed impermeable bags or other closed impermeable containers. These bags and containers must be labeled according to the provisions of the rule, and disposed of according to applicable federal, state, and local regulations.

Hygiene Facilities and Practices. The employer must provide facilities for showering and handwashing, change rooms, and lunch rooms for employees exposed above the TWA PEL. Change rooms must be equipped with separate storage facilities for street clothes and personal protective clothing/equipment and must be designed to prevent dispersing cadmium and contaminating the employee's street clothes. The lunch area should be readily accessible to employees. The level of cadmium in lunch areas must be below the action level of 2.5 $\mu g/m^3$. Before entering the lunch area, employees must clean or remove their protective clothing by HEPA vacuuming or some other removal method that does not disperse cadmium into the air. Also, employees exposed to cadmium above the PEL must shower at the end of the work shift and must wash their hands and faces prior to eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics.

29.4 Regulated Areas

Whenever an employee is or can reasonably be expected to be exposed to cadmium in excess of the PEL, the employer is required to establish a regulated area alerting employees to the hazards. (Emergency Precautions and Exposure Control)

Regulated areas must:

- Be set apart from the rest of the workplace in a way that establishes and alerts employees to the boundaries of the area;
- Be entered ONLY by authorized persons;
- Be entered ONLY by persons using proper respirators; and,
- Be accessible to employees who refrain from eating, drinking, smoking, chewing tobacco or gum and applying cosmetics in such areas. Employees must not carry, store, or use products associated with such activities in these areas.

Warning signs bearing the following information must be posted at all approaches to regulated areas:

DANGER...CADMIUM...CANCER
HAZARD...CAN
CAUSE LUNG AND KIDNEY DISEASE...
AUTHORIZED PERSONNEL
ONLY...RESPIRATORS
REQUIRED IN THIS AREA.

29.5 Training

Employers in the construction industry must communicate to employees the hazards of occupational exposure to cadmium. In a multi-employer workplace, however, an employer who produces, uses, or stores cadmium in a manner that may expose the employees of other employers to cadmium is required to notify the other employers of the potential hazard in accordance with the provisions outlined in the hazard communication standard for construction in 29 CFR 1926.59.

The cadmium standard requires regulated areas to be posted with appropriate warning signs. Because the nature of construction work and the hazards often associated with it often change dramatically in the course of completing a project, regulated areas also may need to be established on a temporary basis. Therefore, using warning signs is especially important because employees who are regularly scheduled to work in or near these areas need to be warned about exposure to cadmium at or above the PEL.

Documentation of initial cadmium awareness training and annual exposure training must be maintained with sign-in sheets of those employees attending the training, person presenting the training, and date of training.

29.6 Recordkeeping

Recordkeeping provisions in the cadmium standard for construction require employers to establish and keep an accurate record of all air monitoring for cadmium in the workplace. The employer must maintain this record for at

least 30 years in accordance with the requirements for access to employee exposure and medical records (29 CFR 1910.20). In addition, under the cadmium standard, employers must provide a copy of the employee's air monitoring results to an industry trade association and to the employee's union or a comparable organization that is competent to maintain such records and is reasonably accessible to employers and employees in the industry.

The employer also must establish and maintain an accurate record for each employee covered by the medical surveillance provisions of the cadmium standard [29 CFR 1926.1127 (l)(1)(i)]. The employer must maintain these records for the duration of employment plus 30 years in accordance with 29 CFR 1910.20. The cadmium standard also requires that the employer, at the employee's request, provide a copy of the employee's medical record or update, as appropriate, to a medical doctor or union specified by the employee.

This program shall be reviewed and updated at least annually or if there are changes to the program or prevention controls.

These provisions help ensure that workers in an industry with short-term employment, relatively high rates of turnover, and mobile job sites have a stable backup source for obtaining these records, if needed.

30.0 Benzene Exposure Control

30.1 General

- Benzene is a chemical with a specific OSHA regulation
- Benzene has been classified as a High hazard carcinogen
- Use of this chemical must be registered and controlled
- The Program Director, assistants, affected employees and designated employee representatives shall have access to this written plan.

30.2 Characteristics

- Benzene is a clear, sweet-smelling, highly flammable liquid
- It is also known as benzol, benzole, coal naphtha, cyclohexatriene, phene, phenyl hydride, and pyrobenzol
- Benzene is harmful if it is inhaled, absorbed through the skin or swallowed

Although benzene is carcinogenic, it can be used with little risk to health if used properly

30.3 Monitoring

- Whenever benzene is used outside an approved laboratory fume hood, air sampling should be performed
- The permissible exposure level (PEL) for benzene is 1 ppm averaged over an 8-hour workday
- Additional precautions must be taken if benzene levels exceed the PEL and engineering/work practices cannot maintain levels below the PEL.

- Results of benzene monitoring must be documented, including:
    - Dates, number, and results of testing;
    - Methods used in testing and taking air samples;
    - Description of the type of any respirators worn;
    - Names and social security numbers of the people exposed
- Monitoring documentation must be kept on file for at least 30 years
- Written results of all benzene testing shall be provided to all affected workers
- Notification must be made within 15 working days after receiving the results and must include actions to reduce the benzene level if the PEL has been exceeded
- All employees who work with benzene have the right to observe the testing procedures

30.4 Training

- Before workers use or work around benzene, they must be given information and training about how to use and work around the chemical safely
- Reviewing and understanding this section will meet the minimum benzene training requirement
- Additional information about benzene is available from the client/owner

30.5 Health Hazards of Benzene

- Short-term exposure to benzene, well above the levels where it can be smelled can cause breathless, irritable, euphoric, or giddy feelings
- Throat, eyes, and nose may become irritated
- Symptoms include feeling dizzy, nauseated, intoxicated, or a headache
- Severe exposure can cause unconsciousness or convulsions
- Long-term exposure, even at very low concentrations, may cause incurable, fatal blood disorders such as anemia or leukemia.
- Many of these disorders associated with benzene develop without early symptoms.

30.6 Protective Clothing and Equipment

- A respiratory protection program shall be established in accordance with 29 CFR 1910.134
- Respirators are required where local exhaust systems cannot be used, during the time period necessary to implement engineering controls or work practices, when control by engineering and work practices is not feasible, and in emergencies
- Respirators must be approved for use with benzene and properly fitted and cartridges must be replaced before their service life ends

- Respirators shall be NIOSH approved and selected according to airborne concentrations of benzene or condition of use
- Wearers must be trained in use and understand limitations before using any respirator.
- Respirator use is further described in section 8.4
- Never enter an area without proper safety equipment if the area may have benzene concentrations that are too high
- Protective clothing should be worn to prevent skin contact if working with benzene
- Use boots, gloves, sleeves, aprons, etc. over any part of the body that might contact liquid benzene
- Eye and Face protection should be worn to prevent benzene from being splashed into eyes
- Gear includes safety glasses, splash-proof safety goggles, or a face shield. All PPE shall meet the requirements of 29 CFR 1910.133 and provided at no cost to the employees

30.7 Emergency and First Aid Procedures

- **Splashed in eyes**
    - Wash out immediately with large amounts of water
    - If eyes remain irritated or vision becomes blurry, see a doctor as soon as possible
- **Spilled on body**
    - Take off the contaminated clothing
    - Thoroughly wash the contacted skin with soap and water immediately
    - Wash contaminated clothes before wearing them again
- **Inhaled large amounts**
    - Quickly get the exposed person to fresh air
    - Apply artificial respiration if the person has stopped breathing
    - Call for medical assistance
- **Swallowed**
    - **Do not** induce vomiting
    - Call for medical assistance

30.8 Precautions for Safe Use, Handling, and Storage

- Benzene is highly flammable
- Store in tightly closed containers in a cool, well-ventilated area away from sparks or flames

- Transfer of benzene from one container to another must be done in well ventilated area
- Transfer only with grounded, non-sparking equipment
- Benzene vapors are heavier than air so vapors may travel along the ground and ignite somewhere away from where it is being handled
- Fire extinguishers must be readily available

30.9 Signs and Labels

- Warning signs must be posted at entrances to areas where exposure to benzene might reasonably be expected to exceed the PEL
- Signs must contain the following wording:

DANGER
BENZENE
CANCER HAZARD
FLAMMABLE--NO SMOKING
AUTHORIZED PERSONNEL ONLY
RESPIRATOR REQUIRED

- All benzene containers must be labeled with:

DANGER
BENZENE
FLAMMABLE
INHALATION & CANCER HAZARD

30.10 Spill and Disposal Procedure

- Contact the Operations Manager for assistance in dealing with all benzene spills of more than 500 ml
- Small spills should be immediately cleaned up using an appropriate absorbent
- Waste material should be contained and disposed of through the hazardous waste disposal program
- Benzene must not be poured down the sewer system.

30.11 Medical Surveillance

- A medical surveillance program must be established for employees who are or may be exposed to benzene at or above the action level 30 or more days per year-above the PEL 10 or more days-for employees who have been exposed to more than 10 PPM of benzene for 30 or more days in a year prior to effective date
- Contact the Operations Manager for the specific benzene levels and program procedures

31.0 Hydrogen Sulfide (H_2S) Exposure Control

31.1 General

The purpose of this program is to reduce employee hydrogen sulfide (H2S) exposure to below the Permissible Exposure Limits by means of engineering and work practice controls for Allied Environmental Services personnel. This program meets the requirements of OSHA Standard 29CFR 1910.1000 Table Z-2.

31.2 Definitions

Acceptable ceiling concentration: airborne concentration that should not be exceeded at anytime during an 8-hour shift.

Acceptable maximum peak concentration: The maximum airborne concentration allowed over a short time period if there is no other measurable exposure over any 8-hour shift.

Container**:** any barrel, bottle, can, cylinder, drum, reaction vessel, storage tank, or the like, but does not include piping systems.

Emergency**:** any occurrence such as equipment failure, rupture of containers, or failure of control equipment that may or does result in an unexpected significant release of hydrogen sulfide.

Employee exposure**:** exposure to airborne hydrogen sulfide that would occur if the employee were not using respiratory protective equipment.

Permissible Exposure Limit (PEL): the OHSA limit for exposure to airborne hazards. For benzene the limits are 10 ppm TWA, 15 ppm STEL20 ppm acceptable ceiling and 50-ppm acceptable maximum peak above ceiling once for 10 min if no other exposure occurs.

Route of exposure**:** the route by which air contaminants enter the body. Exposure routes include inhalation, ingestion or skin absorption.

Short Term Exposure Limit (STEL): airborne concentration measured over any 15 minute time period.

Time-weighted Average (TWA): airborne concentration averaged over an 8-hour time period.

31.3 Responsibilities

Allied Environmental Services Operations Manager will:

- Issue and implement this program and ensure that it meets applicable requirements
- Provide Hazard Communication training for hydrogen sulfide
- Implement engineering and work practice controls to prevent exposure to hydrogen sulfide
- Provide appropriate personal protective equipment for exposed employees
- Maintain exposure monitoring records according to the recordkeeping section of this Program

Allied Environmental Services Site Superintendents will:

- Know and understand the hazards of hydrogen sulfide exposure
- Review potential locations where Hydrogen Sulfide may be present with site representatives
- Comply with all engineering and work practice controls in place to prevent hydrogen sulfide exposure
- Ensure the availability and use of appropriate personal protective equipment for exposed employees

Allied Environmental Services Employees will:

- Comply with all aspects of this hydrogen sulfide exposure control program
- Attend scheduled Hazard Communication Training and hydrogen sulfide training
- Use engineering and work practice controls in place to prevent hydrogen sulfide exposure
- Use personal protective equipment as necessary to prevent hydrogen sulfide exposure

31.4 Hazard Recognition

Allied Environmental Services works to ensure that employees are not exposed to hydrogen sulfide above OSHA exposure limits at any time. Hydrogen sulfide, or H2S, is a colorless, flammable gas that has a distinctive "rotten egg" odor. It is also referred to as dihydrogen sulfide, sulfur hydride, sewer gas and stink damp. The physical characteristics of Hydrogen sulfide gas are below:

H2S Characteristic

- Color: Colorless
- Odor: "Rotten eggs" (detectable at 10 ppb)
- Toxicity: Highly toxic
- Flammability: Flammable
- Solubility: 0.4%
- Incompatibilities: Strong oxidizers, strong nitric acid, metals
- Hydrogen sulfide is produced naturally by decaying organic matter, released from liquid manure and natural gas, a byproduct of industrial processes including petroleum refining, mining, tanning, wood pulp processing, and used to produce elemental sulfur, sulfuric acid, heavy water for nuclear reactors. Hydrogen sulfide exposure could occur as a result of the following processes:
  - Drilling operations
  - Recycling drilling mud
  - Contact with water from crude wells
  - Blowouts
  - Tank Gauging
  - Routine maintenance at refining operations

Exposure to hydrogen sulfide above published limits can result in adverse health effects including:

- Eye irritation
- Lung effects
- Central Nervous System effects on parts of the brain that control breathing
- Shock, convulsions and death at high exposures

Symptoms of hydrogen sulfide exposure include:

- Eye irritation
- Nose and throat irritation
- Headache, dizziness
- Nausea
- Cough, breathing difficulty

31.5 Hazard Evaluation

31.5.1 Monitoring

Monitoring for airborne concentrations of hydrogen sulfide at Allied Environmental Services jobsites is conducted using a four-gas meter. Gas monitors will be set to alarm when airborne hydrogen sulfide concentrations exceed the OSHA STEL limit of 20ppm.

31.6 Hazard Control

Allied Environmental Services employees shall be required to wear personal hydrogen sulfide monitors while in operating areas of all refineries. If required by the owner, the personal hydrogen sulfide monitor may have to be worn at all times while on company property. This monitor shall be calibrated (bump tested as per the manufacturer's instructions).

Allied Environmental Services employees will not work in areas with airborne concentrations above OSHA Permissible Exposure Limits.

If circumstances require an exception to the above, NIOSH approved self contained breathing apparatus or air-supplied respirators will be used.
In confined spaces such as tanks vessels and pits, hydrogen sulfide hazards will be controlled in accordance with the Allied Environmental Services Confined Space Entry program. Controls include but are not limited to dilution ventilation, forced air ventilation and the use of NIOSH approved respiratory protection (SCBA and air supplied only).

Other safety precautions include:

- Whenever the four-gas monitor alarms leave the area immediately to a fresh air area and do not reenter until conditions are proven safe or appropriate respiratory protection is donned.
- Upon commencing operations at a work site, obtain, know and understand the facility's contingency plan.

31.7 Training

Allied Environmental Services employees will be trained in the hazards and safe control of hydrogen sulfide exposure using the training materials included in this program.

During Safety Orientation, owners of facilities where h2s may be present will provide procedures for prevention of exposure and emergency actions in the event of an emergency.

Training is documented according to the recordkeeping section of this program as well as the recordkeeping sections of the Hazard Communication Program.

31.8 Recordkeeping

Training records included in this program are retained with and according to the requirements of the Allied Environmental Services Hazard Communication Program.

Hydrogen sulfide monitoring results are documented and retained according to the Allied Environmental Services Confined Space Entry Program (on the permit).

32.0 Naturally Occurring Radioactive Materials (NORM)

32.1 General

NORM stands for "Naturally Occurring Radioactive Materials", and NORM Awareness is something that all workers in the petroleum industry need to have.

Oil and gas NORM are created in the production process, when produced fluids from reservoirs carrying Barium sulfates up to the surface. Barium, Calcium and Strontium sulfates are larger compounds, and the smaller atoms, such as Radium 226 and Radium 228 can fit into the empty spaces of the compound and be carried through the produced fluids. As the fluids approach the surface, changes in the temperature and pressure cause the Barium and Radium sulfates to precipitate out of solution and form scale on the inside, or on occasion, the outside of the tubulars. Using production tubulars in the production

process that are NORM contaminated does not cause a health hazard if the scale is inside the tubulars. Concentrations of the radium 226 and 228 may also occur in sludge that accumulates in oilfield pits, tanks and lagoons. Radon gas in the natural gas streams concentrate as NORM in gas processing activities. Radon decays to Lead 210, then to Bismuth 210, Polonium 210 and stabilizes with Lead 206. Radon decay elements occur as a shiny film on the inner surface of inlet lines, treating units, pumps and valves associated with propylene, ethane and propane processing systems.

NORM characteristics vary depending on the nature of the waste. NORM may be created in a crystalline form, which is brittle and thin, and can cause flaking to occur in turbulars. NORM formed in carbonate matrix can have a density of 3.5 grams/cubic centimeters and must be noted when packing for transportation. NORM scales may be white or a brown solid, or thick sludge to solid, dry flaky substances.

Cutting and reaming oilfield pipe, removing solids from tanks and pits, and refurbishing gas processing equipment may expose employees to particles containing increased levels of alpha emitting radionuclides that could pose health risks if inhaled or ingested.

32.2 Hazards

- The hazards associated with NORM are inhalation and ingestion routes of entry. Therefore, outside layers of protective personal clothing are not necessary precautions, except for hazards other than NORM exposure. Respirators may be necessary in dry processes, where NORM scales and dust become air borne and have a significant chance to enter the body.

- The hazardous elements found in NORM are Radium 226, 228 and Radon 222 and also daughter products from these radionuclides. The elements are referred to as "bone seekers" which when inside the body migrate to the bone tissue and concentrate. This exposure can cause bone cancers and other bone abnormalities. The concentration of Radium and other daughter products build over time, with several years of excessive exposures. Radium radionuclides emit alpha and beta particles as well as gamma rays. The radiation emitted from a Radium 226 atom is 96% alpha particle and 4% gamma ray. The alpha particle is the most dangerous particle associated with NORM. Alpha particles are large, similar in size and structure to a helium atom; containing two neutrons and two protons. Alpha particles travel short distances in air, of only 2-3 centimeters and cannot penetrate through a dead layer of skin on the human body. However, alpha particles are "bone seekers" do to Radium possessing a high affinity for Chloride ions. In the case that Radium atoms are not expelled from the body, they concentrate in areas where Chloride ions are prevalent, such as bone tissue. The half-life for Radium 226 is approximately 1620 years, and will remain in the body for the lifetime of the human; a significant length of time to cause damage.

- Alpha particles are also tissue destroyers inside the body by entering into chemical bonds with Oxygen. The list of combinations of alpha particles and Oxygen include, but are not limited to, hydrogen peroxide, alcohol and the breaking of H2O bonds causing more reactions. The damage caused by alpha particles could be potentially unstoppable. The gamma rays emitted from Radium 226, accounting for 4% of the radiation are in non-hazardous concentrations and are naturally not harmful to humans. Gamma rays are highly penetrating and pass through metals, so Geiger counters with a scintillation probe are used to measure gamma ray exposures when monitoring for NORM.

- Radium 228 emits 100% beta particles, which are also a concern for human health through inhalation and ingestion. Beta particles are similar in size to an

electron and travel farther than alpha particles in air. Beta particles can breach a thin sheet of paper, but are still prevented by a dead layer of skin on humans.

- Alpha and Beta particles are harmful once inside the body. Breathing NORM contaminates from dusts should be prevented by wearing respirators with particulate filters. In the case of occupational NORM workers, air monitoring and analysis may be necessary. These measurements, ALI and DAC, are calculated values based on the dose an average employee working 2000 hours a year may be exposed to. The current legal limit exposure in the United States is 1 ALI, or 5 REMs. A Rem, or Roentgen Equivalent Man, is a measurement of absorption of radiation on parts of the body over an extended period of time. A DAC is a concentration of alpha and beta particles that an average working employee is exposed to for 2000 hours of light work. If an employee is exposed to over 10% of an ALI, 500 mREM, then the employee's dose must be documented under instructions with federal and state regulations.

32.3 Awareness Training

Awareness Training is required training for:
☐All Allied Environmental Services employees who frequently enter radiation use areas.
***Note**: Radiological Worker Training (RWT) is required for personnel identified as radiological workers.*

- Personnel responsibilities for observing and obeying radiological postings and procedures are emphasized throughout this training.

- All personnel, both non-radiological workers and radiological workers, play an active part in maintaining exposure to radiation and radioactive material as low as reasonably achievable.

- Although most personnel will probably not be exposed to radiation and radioactive material, all personnel must have an understanding of and respect for the procedures designed to keep radiation exposure at job sites as low as reasonably achievable.

- The risk of radiation exposure at most job sites is low.

- Adverse health effects from chronic radiation doses may occur in the exposed individual or in the future children of the exposed individual.

Exposed Individual

- There is a slight risk that cancer may be caused by chronic radiation doses.
- This risk is small when compared to the total cancer risk.

Future Children of the Exposed Individual

- Genetic effects caused by radiation exposure have been studied extensively in plants and animals including humans, but there have been no genetic effects clearly caused by radiation observed in human populations.

32.4 Recordkeeping

Documentation of the training along with sign in sheets for attendees shall be maintained at the job site as well as Allied Environmental Services Corporate Offices.

Results of monitoring performed on areas where employees are working shall be maintained at the jobsite as well as Allied Environmental Services Corporate Offices.

Results and other records of personal dosimeter or personal monitoring of employees potentially exposed to NORM shall also be maintained at the jobsite as well as Allied Environmental Services Corporate Offices.

33.0 HAZWOPER

An effective and comprehensive safety and health program is essential in reducing work-related injuries and illnesses and in maintaining a safe and healthful work environment. The standard, therefore, requires each employer to develop and implement a written safety and health program that identifies, evaluates, and controls safety and health hazards and provides emergency response procedures for each hazardous waste site or treatment, storage, and disposal facility. This written program must include specific and detailed information on the following topics:

- An organizational workplan,
- Site evaluation and control,
- A site-specific program,
- Information and training program,
- Personal protective equipment program,
- Monitoring,
- Medical surveillance program,
- Decontamination procedures, and
- Emergency response program.

The written safety and health program must be periodically updated and made available to all affected employees, contractors, and subcontractors. The employer also must inform contractors and subcontractors, or their representatives, of any identifiable safety and health hazards or potential fire or explosion hazards before they enter the work site.

Each of the components of the safety and health program is discussed in the following paragraphs.

33.1 Workplan

Planning is the key element in a hazardous waste control program. Proper planning will greatly reduce worker hazards at waste sites. A workplan should support the overall objectives of the control program and provide procedures for implementation and should incorporate the employer's standard operating procedures for safety and health. Establishing a chain of command will specify employer and employee responsibilities in carrying out the safety and health program. For example, the plan should include the following:

- Supervisor and employee responsibilities and means of communication,
- Name of person who supervises all of the hazardous waste operations, and
- The site supervisor with responsibility for and authority to develop and implement the site safety and health program and to verify compliance.

In addition to this organizational structure, the plan should define the tasks and objectives of site operation as well as the logistics and resources required to fulfill these tasks. For example, the following topics should be addressed:

- The anticipated clean-up and/or operating procedures;
- A definition of work tasks and objectives and methods of accomplishment;
- The established personnel requirements for implementing the plan; and
- Procedures for implementing training, informational programs, and medical surveillance requirements.

Necessary coordination between the general program and site-specific activities also should be included in the actual operations workplan.

33.2 Site Evaluation and Control

Site evaluation, both initial and periodic, is crucial to the safety and health of workers. Site evaluation provides employers with the information needed to identify site hazards so they can select appropriate protection methods for employees.

It is extremely important, and a requirement of the standard, that a trained person conduct a preliminary evaluation of an uncontrolled hazardous waste site before entering the site. The evaluation must include all suspected conditions that are immediately dangerous to life or health or that may cause serious harm to employees (e.g., confined space entry, potentially explosive or flammable situations, visible vapor clouds, etc.). As available, the evaluation must include the location and size of the site, site topography, site accessibility by air and roads, pathways for hazardous substances to disperse, a description of worker duties, and the time needed to perform a given task, as well as the present status and capabilities of the emergency response teams.

Periodic reevaluations should also be conducted for treatment, storage, and disposal facilities, as conditions or operations change.

Controlling the activities of workers and the movement of equipment is an important aspect of the overall safety and health program. Effective control of the site will minimize potential contamination of workers, protect the public from hazards, and prevent vandalism. The following information is useful in implementing the site control program: a site map, site work zones, site communication, safe work practices, and the name, location and phone number of the nearest medical assistance.

The use of a "buddy system" also is required as a protective measure to assist in the rescue of an employee who becomes unconscious, trapped, or seriously disabled on site. In the buddy system, two employees must keep an eye on each other and only one should be in a specific dangerous area at one time, so that if one gets in trouble, the second can call for help.

33.3 Site-Specific Safety and Health Plan

A site-specific safety and health plan is a complementary program element that aids in eliminating or effectively controlling anticipated safety and health hazards. The site-specific plan must include all of the basic requirements of the overall safety and health program, but with attention to those characteristics unique to the particular site. For example, the site-specific plan may outline procedures for confined space entry, air and personal monitoring and environmental sampling, and a spill containment program to address the particular hazards present at the site.

The site safety and health plan must identify the hazards of each phase of the specific site operation and must be kept at the work site. Pre-entry briefings must be conducted prior to site entry and at other times as necessary to ensure that employees are aware of the site safety and health plan and its implementation. The employer also must ensure that

periodic safety and health inspections are made of the site and that all known deficiencies are corrected prior to work at the site.

33.4 Information and Training Program

As part of the safety and health program, employers are required to develop and implement a program to inform workers (including contractors and subcontractors) performing hazardous waste operations of the level and degree of exposure they are likely to encounter. Training shall be provided by personnel having the training and/or academic credentials and instructional experience to demonstrate competency.

Training makes workers aware of the potential hazards they may encounter and provides the necessary knowledge and skills to perform their work with minimal risk to their safety and health. The employer must develop a training program for all employees exposed to safety and health hazards during hazardous waste operations. Both supervisors and workers must be trained to recognize hazards and to prevent them; to select, care for and use respirators properly as well as other types of personal protective equipment; to understand engineering controls and their use; to use proper decontamination procedures; to understand the emergency response plan, medical surveillance requirements, confined space entry procedures, spill containment program, and any appropriate work practices. Workers also must know the names of personnel and their alternates responsible for site safety and health. The amount of instruction differs with the nature of the work operations, as indicated in Tables 1 and 2.

Employees at all sites must not perform any hazardous waste operations unless they have been trained to the level required by their job function and responsibility and have been certified by their instructor as having completed the necessary training. All emergency responders must receive refresher training, sufficient to maintain or demonstrate competency, annually. Employee training requirements are further defined by the nature of the work (e.g., temporary emergency response personnel, firefighters, safety officers, HAZMAT personnel, and incident commanders). These requirements may include recognizing and knowing the hazardous materials and their risks, knowing how to select and use appropriate personal protective equipment, and knowing the appropriate control, containment, or confinement procedures and how to implement them. The specific training and competency requirements for each personnel category are explained fully in the final rule (***FR54 42:9294, March 6, 1989***). For a brief summary of training requirements, see Tables 1 and 2.

Table 1. Training Requirements

Hazardous Waste Clean-Up Sites	
Staff	
• Routine site employees	40 hours initial 24 hours field 8 hours annual refresher
• Routine site employees (minimal exposure)	24 hours initial 8 hours field 8 hours annual refresher
• Non-routine site employees	24 hours initial 8 hours field 8 hours annual refresher
Supervisors/Managers of	
• Routine site employees	40 hours initial 24 hours field 8 hours hazardous waste management 8 hours annual refresher
• Routine site employees (minimal exposure)	24 hours initial 8 hours field 8 hours hazardous waste management 8 hours annual refresher
• Non-routine site employees	24 hours initial 8 hours field 8 hours hazardous waste management 8 hours annual refresher
Treatment, Storage, and Disposal Sites Staff	
• General Site employees	24 hours initial or equivalent 8 hours annual refresher
• Emergency response personnel	Trained to a level of competency Annual refresher

Note: See *29 CFR* 1910.120 (e) and (p)(7).

Table 2. Training Requirements

Other Emergency Response Staff	
Level 1 - First responder (awareness) level[1]	Sufficient training or proven experience in specific competencies Annual refresher
Level 2 - First responder (operations level)[2]	Level 1 competency and 8 hours initial or proven experience in specific competencies Annual refresher
Level 3 - HAZMAT technician[3]	24 hours of Level 2 and proven experience in specific competencies Annual refresher
Level 4 - HAZMAT specialist[4]	24 hours of Level 3 and proven experience in specific competencies Annual refresher
Level 5 - On-the-scene incident commander[5]	24 hours of Level 2 and additional competencies Annual refresher

Note: See *29 CFR* 1910.120 (q) (6).

[1] Witnesses or discovers a release of hazardous materials and who are trained to notify the proper authorities.
[2] Responds to releases of hazardous substances in a defensive manner, without trying to stop the releases.
[3] Responds aggressively to stop the release of hazardous substances.
[4] Responds with and in support to HAZMAT technicians, but who have specific knowledge of various hazardous substances.
[5] Assumes control of the incident scene beyond the first-responder awareness level.

Employees who receive the training specified (see Table 1) must receive a written certificate upon successful completion of that training. That training need not be repeated if the employee goes to work at a new site; however, the employee must receive whatever additional training is needed to work safely at the new site. Employees who worked at hazardous waste sites before 1987 and received equivalent training need not repeat the initial training specified in Table 1, if the employer can demonstrate that in writing and certify that the employee has received such training.

33.5 Personal Protective Equipment Program

The standard further requires the employer to develop a written personal protective equipment program for all employees involved in hazardous waste operations. As mentioned earlier, this program also is part of the site-specific safety and health program. The personal protective equipment program must include an explanation of equipment selection and use, maintenance and storage, decontamination and disposal, training and proper fit, donning and doffing procedures, inspection, in-use monitoring, program evaluation, and equipment limitations.

The employer also must provide and require the use of personal protective equipment where engineering control methods are infeasible to reduce worker exposures at or below the permissible exposure limit. Personal protective equipment must be selected that is appropriate to the requirements and limitations of the site, the task-specific conditions and duration, and the hazards and potential hazards identified at the site. As necessary, the employer must furnish the employee with positive-pressure self-contained breathing apparatus or positive-pressure air-line respirators equipped with an escape air supply, and with totally encapsulating chemical protective suits.

33.6 Monitoring

Airborne contaminants can present a significant threat to employee safety and health, thus making air monitoring an important component of an effective safety and health program. The employer must conduct monitoring before site entry at uncontrolled hazardous waste sites to identify conditions immediately dangerous to life and health, such as oxygen-deficient atmospheres and areas where toxic substance exposures are above permissible limits. Accurate information on the identification and quantification of airborne contaminants is useful for the following:

- Selecting personal protective equipment,
- Delineating areas where protection and controls are needed,
- Assessing the potential health effects of exposure, and
- Determining the need for specific medical monitoring.

After a hazardous waste cleanup operation begins, the employer must periodically monitor those employees who are likely to have higher exposures to determine if they have been exposed to hazardous substances in excess of permissible exposure limits. The employer also must monitor for any potential condition that is immediately dangerous to life and health or for higher exposures that may occur as a result of new work operations.

33.7 Medical Surveillance

A medical surveillance program will help to assess and monitor the health and fitness of employees working with hazardous substances. The employer must establish a medical surveillance program for the following:

- All employees exposed or potentially exposed to hazardous substances or health hazards above permissible exposure limits for more than 30 days per year;
- Workers exposed above the published exposure levels (if there is no permissible exposure limit for these substances) for 30 days or more a year;
- Workers who wear approved respirators for 30 or more days per year on site;
- Workers who are exposed to unexpected or emergency releases of hazardous wastes above exposure limits (without wearing appropriate protective equipment) or who show signs, symptoms, or illness that may have resulted from exposure to hazardous substances; and
- Members of hazardous materials (HAZMAT) teams.

All examinations must be performed under the supervision of a licensed physician, without cost to the employee, without loss of pay and at a reasonable time and place. Examinations must include a medical and work history with special emphasis on symptoms related to the handling of hazardous substances and health hazards and to fitness for duty including the ability to wear any required personal protective equipment under conditions that may be expected at the work site. These examinations must be given as follows:

- Prior to job assignment and annually thereafter (or every 2 years if a physician determines that is sufficient),
- At the termination of employment,

- Before reassignment to an area where medical examinations are not required,
- If the examining physician believes that a periodic follow up is medically necessary, and
- As soon as possible for employees injured or becoming ill from exposure to hazardous substances during an emergency, or who develop signs or symptoms of overexposure from hazardous substances.

The employer must give the examining physician a copy of the standard and its appendices, a description of the employee's duties relating to his or her exposure, the exposure level or anticipated exposure level, a description of any personal protective and respiratory equipment used or to be used, and any information from previous medical examinations. The employer must obtain a written opinion from the physician that contains the results of the medical examination and any detected medical conditions that would place the employee at an increased risk from exposure, any recommended limitations on the employee or upon the use of personal protective equipment, and a statement that the employee has been informed by the physician of the medical examination. The physician is not to reveal, in the written opinion given to the employer, specific findings or diagnoses unrelated to employment.

33.8 Decontamination Procedures

Decontamination procedures are a component of the site-specific safety and health plan and, consequently, must be developed, communicated to employees, and implemented before workers enter a hazardous waste site. As necessary, the site safety and health officer must require and monitor decontamination of the employee or decontamination and disposal of the employee's clothing and equipment, as well as the solvents used for decontamination, before the employee leaves the work area. If an employee's non-impermeable clothing becomes grossly contaminated with hazardous substances, the employee must immediately remove that clothing and take a shower. Impermeable protective clothing must be decontaminated before being removed by the employee.

Protective clothing and equipment must be decontaminated, cleaned, laundered, maintained, or replaced to retain effectiveness. The employer must inform any person who launders or cleans such clothing or equipment of the potentially harmful effects of exposure to hazardous substances.

Employees who are required to shower must be provided showers and change rooms that meet the requirements of 29 CFR 1910.141, ***Subpart J -- General Environmental Controls.*** In addition, unauthorized employees must not remove their protective clothing or equipment from change rooms unless authorized to do so.

33.9 Emergency Response

Proper emergency planning and response are important elements of the safety and health program that help minimize employee exposure and injury. The standard requires that the employer develop and implement a written emergency response plan to handle possible emergencies before performing hazardous waste operations. The plan must include, at uncontrolled hazardous waste sites and at treatment, storage, and disposal facilities, the following elements:

- Personnel roles, lines of authority, and communication procedures,
- Pre-emergency planning,
- Emergency recognition and prevention,

- Emergency medical and first-aid treatment,
- Methods or procedures for alerting onsite employees,
- Safe distances and places of refuge,
- Site security and control,
- Decontamination procedures,
- Critique of response and follow up,
- Personal protective and emergency equipment, and
- Evacuation routes and procedures.

In addition to the above requirements, the plan must include site topography, layout, and prevailing weather conditions; and procedures for reporting incidents to local, state, and federal government agencies.

The procedures must be compatible with and integrated into the disaster, fire and/or emergency response plans of the site's nearest local, state, and federal agencies. Emergency response organizations may use the local or state emergency response plans, or both, as part of their emergency response plan to avoid duplication of federal regulations.

The plan requirements also must be rehearsed regularly, reviewed periodically, and amended, as necessary, to keep them current with new or changing site conditions or information. A distinguishable and distinct alarm system must be in operation to notify employees of emergencies. The emergency plan also must be made available for inspection and copying by employees, their representatives, OSHA personnel, and other governmental agencies with relevant responsibilities.

When deemed necessary, employees must wear positive-pressure self-contained breathing apparatus and approved self-contained compressed-air breathing apparatus with approved cylinders. In addition, back-up and first-aid support personnel must be available for assistance or rescue.

33.9.1 Emergency Response Organization

The senior emergency response official responding to an emergency shall become the individual in charge of a site-specific Incident Command System (ICS). All emergency responders and their communications shall be coordinated and controlled through the individual in charge of the ICS assisted by the senior official present for each employer.

The "senior official" at an emergency response is the most senior official on the site who has the responsibility for controlling the operations at the site. Initially it is the senior officer on the first-due piece of responding emergency apparatus to arrive on the incident scene. As more senior officers arrive (i.e. , battalion chief, fire chief, state law enforcement official, site coordinator, etc.) the position is passed up the line of authority which has been previously established.

The individual in charge of the ICS shall identify, to the extent possible, all hazardous substances or conditions present and shall address as appropriate site analysis, use of engineering controls, maximum exposure limits, hazardous substance handling procedures, and use of any new technologies.

Based on the hazardous substances and/or conditions present, the individual in charge of the ICS shall implement appropriate emergency operations, and assure that the personal protective equipment worn is appropriate for the hazards to be encountered. However, personal protective equipment shall meet, at a minimum, the criteria contained in 29 CFR 1910.156(e) when worn while performing fire fighting operations beyond the incipient stage for any incident.

Employees engaged in emergency response and exposed to hazardous substances presenting an inhalation hazard or potential inhalation hazard shall wear positive pressure self-contained breathing apparatus while engaged in emergency response, until such time that the individual in charge of the ICS determines through the use of air monitoring that a decreased level of respiratory protection will not result in hazardous exposures to employees.

The individual in charge of the ICS shall limit the number of emergency response personnel at the emergency site, in those areas of potential or actual exposure to incident or site hazards, to those who are actively performing emergency operations. However, operations in hazardous areas shall be performed using the buddy system in groups of two or more.

Back-up personnel shall be standing by with equipment ready to provide assistance or rescue. Qualified basic life support personnel, as a minimum, shall also be standing by with medical equipment and transportation capability.
The individual in charge of the ICS shall designate a safety officer, who is knowledgeable in the operations being implemented at the emergency response site, with specific responsibility to identify and evaluate hazards and to provide direction with respect to the safety of operations for the emergency at hand.

When activities are judged by the safety officer to be an IDLH and/or to involve an imminent danger condition, the safety officer shall have the authority to alter, suspend, or terminate those activities. The safety official shall immediately inform the individual in charge of the ICS of any actions needed to be taken to correct these hazards at the emergency scene.

After emergency operations have terminated, the individual in charge of the ICS shall implement appropriate decontamination procedures.

33.10 Engineering Controls and Work Practices

To the extent feasible, the employer must institute engineering controls and work practices to help reduce and maintain employee exposure at or below permissible exposure limits. To the extent not feasible, engineering and work practice controls may be supplemented with personal protective equipment. Examples of suitable and feasible engineering controls include the use of pressurized cabs or control booths on equipment, and/or remotely operated materials handling equipment. Examples of safe work practices include removing all non-essential employees from potential exposure while opening drums, wetting down dusty operations, and placing employees upwind of potential hazards.

33.11 Handling and Labeling Drums and Containers

Prior to handling a drum or container, the employer must assure that drums or containers meet the required OSHA, EPA (40 ***CFR*** Parts 264-265 and 300), and Department of Transportation (DOT) regulations (49 ***CFR*** Parts 171-178), and are properly inspected and labeled. Damaged drums or containers must be emptied of their contents, using a device classified for the material being transferred, and must be properly discarded. In areas where spills, leaks or ruptures occur, the employer must furnish employees with salvage

drums or containers, a suitable quantity of absorbent material, and approved fire-extinguishing equipment in the event of small fires. The employer also must inform employees of the appropriate hazard warnings of labeled drums, the removal of soil or coverings, and the dangers of handling unlabeled drums or containers without prior identification of their contents. To the extent feasible, the moving of drums or containers must be kept to a minimum, and a program must be implemented to contain and isolate hazardous substances being transferred into drums or containers. In addition, an approved EPA ground-penetrating device must be used to determine the location and depth of any improperly discarded drums or containers.

The employer also must ensure that safe work practices are instituted before opening a drum or container. For example, air-line respirators and approved electrical equipment must be protected from possible contamination, and all equipment must be kept behind any existing explosion barrier.

Only tools or equipment that prevent ignition shall be used. All employees not performing the operation shall be located at a safe distance and behind a suitable barrier to protect them from accidental explosions. In addition, standing on or working from drums or containers is prohibited. Special care also must be given when an employee handles containers of shock-sensitive waste, explosive materials, or laboratory waste packs. Where an emergency exists, the employer must ensure the following:

- Evacuate non-essential employees from the transfer area;
- Protect equipment operators from exploding containers by using a barrier, and
- Make available a continuous means of communication (e.g., suitable radios or telephones), and a distinguishable and distinct alarm system to signal the beginning and end of activities where explosive wastes are handled.

If drums or containers bulge or swell or show crystalline material on the outside, they must not be moved onto or from the site unless appropriate containment procedures have been implemented. In addition, lab packs must be opened only when necessary and only by a qualified person. Prior to shipment to a licensed disposal facility, all drums or containers must be properly labeled and packaged for shipment. Staging areas also must be kept to a minimum and provided with adequate access and egress routes.

33.12 Sanitation of Temporary Workplaces

Each temporary worksite must have a supply of potable water that is stored in tightly closed and clearly labeled containers and equipped with a tap. Disposable cups and a receptacle for cup disposal also must be provided. The employer also must clearly mark all water outlets that are unsafe for drinking, washing, or cooking. Temporary worksites must be equipped with toilet facilities. If there are no sanitary sewers close to or on the hazardous waste site, the employer must provide the following toilet facilities unless prohibited by local codes:

- Privies,
- Chemical toilets,
- Recirculating toilets, or
- Combustion toilets.

Heated, well-ventilated, and well-lighted sleeping quarters must be provided for workers who guard the worksite. In addition, washing facilities for all workers must be near the worksite, within controlled work zones, and so equipped to enable employees to remove

hazardous substances. The employer also must ensure that food service facilities are licensed.

33.13 Recordkeeping

In 1988, OSHA revised the standard requiring employers to provide employees with information to assist in the management of their own safety and health. The standard, ***Access to Employee Exposure and Medical Records*** (29 CFR 1910.20), permits direct access to these records by employees exposed to hazardous materials, or by their designated representatives, and by OSHA. The rule applies to, but does not require, medical and exposure records maintained by the employer.

The employer must keep exposure records for 30 years and medical records for at least the duration of employment plus 30 years. Records of employees who have worked for less than 1 year need not be retained after employment, but the employer must provide these records to the employee upon termination of employment. First-aid records of one-time treatment need not be retained for any specified period.

The employer must inform each employee of the existence, location, and availability of these records. Whenever an employer plans to stop doing business and there is no successor employer to receive and maintain these records, the employer must notify employees of their right to access to records at least 3 months before the employer ceases to do business. At the same time, employers also must notify the National Institute for Occupational Safety and Health.

Under the hazardous waste standard, at a minimum, medical records must include the following information:

- Employee's name and social security number,
- Physicians' written opinions,
- Employee's medical complaints related to exposure to hazardous substances, and
- Information provided to the treating physician.

34.0 RCRA (Resource Conservation and Recovery Act)

34.1 General

This section is designed to give you an understanding of the Resource Conservation and Recovery Act (RCRA) and how the Act affects Allied Environmental Services, Inc. as an industry that generates or transports “hazardous” wastes. The setions’s intent is to provide you with basic guidance about applicable RCRA provisions. However, due to the Act’s technical complexity, its staggered deadline for program implementation and compliance, and the potential for State hazardous waste management program requirements to differ from Federal regulation, questions will undoubtedly arise that require assistance beyond the section’s scope. Questions or problems not completely addressed here should be referred to the State solid waste management office or the appropriate EPA Regional office.

Congress enacted the Resource Conservation and Recovery Act in 1976 (and subsequently amended it in 1978, 1980, and 1984) to define a Federal role in solid waste and resource management and recovery. The Act’s primary goals are: (1) to protect human health and the environment from hazardous and other solid wastes; and (2) to protect and preserve natural resources through programs of resource conservation and recovery. Its principal

regulatory focus is to control hazardous waste. To this end, RCRA mandates a comprehensive system to identify hazardous wastes and to trace and control their movement from generation through transport, treatment, storage, and ultimate disposal.

Extensive hazardous waste regulations have been promulgated under RCRA's authority. These regulations are codified under 40 CFR Parts 260, 261, 262, 263, 264, 265, 266, and 270. Specifically, RCRA provisions are focused in the following way:

- Part 260: General
- Part 261: Hazardous waste identification and listing
- Part 262: Hazardous waste generators
- Part 263: Hazardous waste transporters
- Part 264-265: Owners and operators of hazardous waste facilities
- Part 266: Special requirements
- Part 270: Hazardous waste permits.

34.2 Training

Employees must be thoroughly trained before being allowed to work when involved in RCRA field activities. Training must be conducted by a knowledgeable person with appropriate documentation maintained. Training for general site workers (equipment operators, general laborers and supervisors) should include a minimum of 40 hours of instruction and 3 days of field experience. Occasional workers (ground water monitoring, land surveying, & geophysical surveying, etc.) should receive 24 hours of instruction & 1 day of field experience.

Workers that have to wear respirators are required to have an additional 16 hours & 2 days of field experience. Management & supervisors are to have 40 hours of initial training & 3 days of field experience. Proof of training must be documented & available.

34.3 Medical Surveillance

The program shall be provided at no cost to the employees. Employees who may be exposed to health hazards for 30 days or more a year or wear a respirator 30 or more days a year shall be covered under the medical surveillance program.

The medical surveillance program shall cover employees who are injured or develop symptoms due to exposure to hazards. Members of HAZMAT teams shall also be covered by the medical surveillance program.

34.4 Recycling Activities

34.4.1 The following four types of recycling activities are potentially subject to RCRA regulation:

- Uses which actually constitute ultimate disposal (for example, land spreading of wastewater treatment sludges for fertilizer)
- Burning waste or waste fuels for energy recovery or using wastes to produce a fuel

- Reclamation -- regeneration of wastes or the recovery of material from wastes

- Speculative accumulation -- either accumulating wastes that are potentially recyclable but for which no recycling (or no feasible recycling) market exists, or accumulating wastes before recycling unless 75 percent of the accumulated material is recycled during a one-year period.

34.4.2 Five categories of recycled (termed secondary) materials also fall under this solid waste definition:

- Spent material -- materials that have been used and no longer serve the purpose for which they were originally produced without being regenerated, reclaimed, or otherwise reprocessed. Examples include spent solvents and spent acids.

- Sludges -- residues from pollution control processes, such as wastewater treatment sludges and air emission control wastes.

- By-products -- residual materials resulting from industrial, commercial, mining, and agricultural operations that are not primary products, are not produced separately, and are not fit for a desired end use without substantial further processing. Examples are process residues from manufacturing or mining processes, such as distillation, column residues or mining slags.

- Commercial chemical products -- products listed in 40 CFR Part 261.33 when they are recycled in ways that differ from their normal use.

- Scrap metal -- metal parts discarded after consumer use or that result from metal processing operations. Examples include scrap automobiles and scrap radiators.

34.4.3 Some materials, however, are NOT considered solid wastes under RCRA, including domestic sewage or any mixture of domestic sewage and other wastes that pass through a sewer system to a POTW. Also excluded are wastes regulated under other Federal laws, such as industrial wastewater discharge directly to public waters (which must be properly permitted) and many nuclear or radioactive materials (regulated by the Department of Energy and/or the Nuclear Regulatory Commission).

There are two ways to know if waste is regulated as a hazardous waste under Federal law:

- If it exhibits one or more of the following four characteristics – ignitability, corrosivity, reactivity, and toxicity (based on EPA extraction procedures) – it is considered a characteristic waste under RCRA.

- If it (or any part of it) is listed in 40 CFR 261.31-261.33, it is commonly called a listed waste in RCRA regulations. EPA developed these lists of hazardous wastes based on what was known about specific chemicals and wastestreams. Whether or not a waste is hazardous according to the characteristic wastes criteria, if waste appears on any of the lists, it is considered a listed hazardous waste. Thus, we must comply with the notification requirements of RCRA Section 3010 and

with the requirements outlined in 40 CFR 262-266 and 270-271 (described below). Most listed substances are considered toxic; however, some wastes or substances appear on the list solely because they exhibit one or more of the characteristics of hazardous waste.

Whether a waste is regulated as a hazardous waste may also depend on two other factors. First, as 1984 RCRA amendments go into effect, some new wastes that previously were not regulated will come under hazardous waste regulations. Second, some States apply their own hazardous waste regulations to wastes in addition to those listed in Federal regulations. Thus, if in doubt about whether your waste is regulated under Federal or State hazardous waste regulations, you should contact the State hazardous waste agency or EPA Regional office.

34.5 Off-Site Disposal of Hazardous Wastes

If Allied Environmental Services Inc., generates, transports, treats, stores or disposes of any hazardous wastes (and the waste activities are not exempt from regulation), we must comply with applicable Federal, State, and local hazardous waste management requirements, both when the waste remains on company property and when it is transported off-site. Basic requirements for the off-site disposal of hazardous wastes include:

- Obtain EPA Identification Number -- Most Federally regulated generators and transporters of hazardous waste must have EPA identification numbers. An EPA identification number is required prior to any transportation, treatment, storage, or disposal of hazardous waste. A generator must not deliver hazardous waste to any transporter or TSDF without an EPA identification number.

- Complete Manifests -- Generators of hazardous waste are required to prepare a manifest containing the following information for each load of hazardous waste transported:

    - Generator name, address, telephone number and EPA identification number

    - Transporter name and EPA identification number Name, address, and EPA identification number of permitted facilities receiving waste

    - Description of hazardous wastes transported

    - Waste quantities, types and number of containers

    - Certification for proper packaging, marking, labeling and transportation

    - Waste minimization certification

    - Manifest document number.

Upon delivery of waste to the transporter, the generator should sign and date the manifest, have the transporter sign the manifest, retain one copy, and provide the transporter with all remaining copies. A generator who does not receive, within 35 days, a manifest copy signed by the facility designated to receive the waste must contact the transporter or designated facility to determine what happened to the waste. A generator who has not received, within 45 days, a signed manifest copy must submit an exception report to the EPA Region.

It is important to remember that, before transporting any hazardous waste off-site, a generator must comply with packaging, labeling, marking, and placarding requirements. RCRA pre-transport requirements generally incorporate U.S. Department of Transportation regulations, described in 49 CFR Part 171-172. In addition, all generators must keep records of any test results, waste analyses, or other determinations made in accordance with 40 CFR Part 262.11 for at least three years.

34.6 Transportation of Hazardous Waste

EPA, the U.S. Department of Transportation, and many States regulate transportation of hazardous waste in order to protect human health and the environment from hazardous waste releases. EPA's regulatory authority for transporters is based on Section 3003 of RCRA. EPA and the Department of Transportation have jointly set standards for hazardous waste transportation, which are described in 40 CFR Parts 262 and 263, and 49 CFR Parts 171 and 172. These standards include recordkeeping, labeling, and manifest requirements, as well as the requirement to transport hazardous wastes only to permitted facilities for treatment, as designated on hazardous waste shipping manifests. Hazardous waste transporters hauling wastes to POTW collection systems or treatment plants must ensure that these wastes meet all local, State, and Federal pretreatment standards, in addition to RCRA requirements.

34.6.1 Notification to EPA and EPA Identification Number

If Allied transports hazardous waste, you must notify EPA or an authorized State hazardous waste agency and obtain an EPA identification number. Transporters must not move hazardous wastes without an EPA identification number. EPA Regional Offices have special procedures to issue provisional identification numbers to generators and transporters of hazardous waste under emergency or other unusual circumstances when it becomes necessary to transport the waste to an authorized hazardous waste management facility. In emergency situations, the transporters should telephone the EPA Regional Office and obtain a provisional identification number and additional instructions.

34.6.2 Manifests and Reports

Transporters may not accept hazardous waste from generators unless each load is accompanied by a completed manifest. The manifest must accompany the hazardous waste at all times. Upon delivery of the hazardous waste to another transporter or designated facility, transporters must:

- Have the transporter or owner/operator of the designated facility sign and date the manifest
- Retain one copy of the manifest and give the remaining copies to the transporter or facility accepting the waste.

34.6.3 Transporter or Generator Agreements With Designated Facilities

In many cases, treatment, storage, and disposal facilities (including POTWs) will accept deliveries of hazardous waste only if they have agreements with transporters and/or generators. These agreements may designate types, strengths, and quantities of hazardous waste which the facility will accept, limit conditions of waste to be accepted (for example, "no liquid hazardous wastes"), designate times and locations for accepting deliveries, and designate treatment, storage, or disposal fees.

Hazardous waste transporters are legally responsible for delivery of the entire quantity of hazardous waste accepted from a generator or another transporter to the facility designated by the manifest, or to designated alternate facilities. Before accepting any consignment of hazardous waste for transportation, you should make sure that the treatment, storage, or disposal facility designated on the manifest or an alternate designated facility will accept delivery of the waste.

34.7 Allied Environmental Services RCRA Program Elements

The following program elements are included for guidance:

Medical Surveillance

- When employees are involved in field activities involving RCRA sites, medical surveillance will be provided specific for the exposures which are or may be encountered.

Engineering Controls and Work Practices

- When feasible, engineering controls (including the use of pressurized cabs or control booths on equipment, and/or the use of remotely operated material handling equipment) and work practices shall be used. However when unable to reduce and maintain acceptable exposure limits, PPE shall be worn to reduce and maintain exposure.

Exposure Monitoring

- When personnel are exposed at or above the exposure limits, air monitoring shall be used to identify and qualify airborne levels of hazardous substances. Monitoring shall address initial entry, periodic monitoring, possible IDLH conditions, and shall be conducted whenever exposure may be a possibility.

Decontamination

- Decontamination procedures shall be developed, communicated to all employees, and implemented as necessary before any employees or equipment may enter areas where potential for exposure to hazardous substances exits – procedures found in section 27.8 can be utilized.
- Job foreman or supervisor must monitor the decontamination process to ensure procedures are followed. When such procedures are found to be ineffective, appropriate steps shall be taken to correct deficiencies.
- Decontamination shall be performed in geographical areas that will minimize the exposure of uncontaminated employees or equipment to contaminated employees or equipment.
- All employees leaving a contaminated area shall be appropriately decontaminated; PPE and protective clothing shall be decontaminated, cleaned or laundered to maintain their effectiveness. If damaged or worn equipment and gear is detected, it shall be disposed of. Non-impermeable clothing that becomes wetted with hazardous substances shall immediately removed from the employee and that employes shall proceed immediately to the shower. The clothing shall be disposed of or decontaminated before it is removed from the work zone.
- All contaminated materials and equipment must be handled and removed from decontamination areas by a qualified person. All other personnel shall be prohibited from entry and material handling.
- Appropriate washing facilities shall be made available at all sites involved with hazardous waste clean-up operations where potential exposure may occur. If temperature conditions prevent the effective use of water, then other effective means for cleansing shall be provided and used.

35.0 Process Safety Management

35.1 General

Process safety management (PSM) is addressed in specific standards for the general and construction industries. OSHA's standard (29 CRF 1910.119) emphasizes the management of hazards associated with highly hazardous chemicals and establishes a comprehensive management program that integrates technologies, procedures, and management practices. This page highlights OSHA standards, preambles to final rules (background to final rules), directives (instructions for compliance officers), standard interpretations (official letters of interpretation of the standards), other federal standards, and national consensus standards related to PSM.

Unexpected releases of toxic, reactive, or flammable liquids and gases in processes involving highly hazardous chemicals have been reported for many years in various industries that use chemicals with such properties. Regardless of the industry that uses these highly hazardous chemicals, there is a potential for an accidental release any time they are not properly controlled, creating the possibility of disaster.

To help ensure safe and healthful workplaces, OSHA has issued the Process Safety Management of Highly Hazardous Chemicals standard (29 CFR 1910.119), which contains requirements for the management of hazards associated with processes using highly hazardous chemicals.

Although Allied Environmental Services does not meet the criteria for implementing a Process Safety Management Program, all employees working on a site that falls under the umbrella of the PSM standard will adhere to the requirements of the owner and the standard. The owner of the facility that is required to implement and maintain a PSM Program will inform Allied Environmental Services employees of the requirements for that particular facility. The following program provides guidance and a detailed explanation of the PSM process.

This program contains requirements for preventing or minimizing the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals. These releases may result in toxic, fire, or explosion hazards.

This program applies to the following:

- A process which involves a chemical at or above the specified threshold quantities.
- A process which involves a flammable liquid or gas on site in one location, in a quantity of 10,000 pounds (4535.9 kg) or more except for:
- Hydrocarbon fuels used solely for workplace consumption as a fuel (e.g., propane used for comfort heating, gasoline for vehicle refueling), if such fuels are not a part of a process containing another highly hazardous chemical covered by this standard;
- Flammable liquids stored in atmospheric tanks or transferred which are kept below their normal boiling point without benefit of chilling or refrigeration.

This program does not apply to:

- Retail facilities;
- Oil or gas well drilling or servicing operations; or
- Normally unoccupied remote facilities.

35.2 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 part, 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 Products, ASTM D-86-62, 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.

“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 owner's business, and that gives the owner an opportunity to obtain an advantage over competitors who do not know or use it.

35.3 Employee participation

Owners shall develop a written plan of action regarding the implementation of the employee participation required by this program.

Owners 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.

Owners shall provide to employees and their representatives access to process hazard analyses and to all other information required to be developed under this standard.

35.4 Process safety information

The owner 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 owner and the affected 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:

- Toxicity information;
    - Permissible exposure limits;
        - Physical data;
        - Reactivity data;
        - Corrosivity data;
        - Thermal and chemical stability data; and
        - Hazardous effects of inadvertent mixing of different materials that could foreseeably occur.

Note: Safety Data Sheets or Material Safety Data Sheets may be used to comply with this requirement to the extent they contain the information required by this program.

- 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 (see example later in this program)
            - Process chemistry;
            - Maximum intended inventory;
            - Safe upper and lower limits for such items as temperatures, pressures, flows, or compositions; and
            - 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:
        - Materials of construction;
        - Piping and instrument diagrams (P&IDs);

- Electrical classification;
- Relief system design and design basis;
- Ventilation system design;
- Design codes and standards employed;
- Material and energy balances for processes built after May 26, 1992; and
- Safety systems (e.g., interlocks, detection, or suppression systems).

- The owner 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 owner shall determine and document that the equipment is designed, maintained, inspected, tested, and operating in a safe manner.

35.5 Process Hazard Analysis

The owner 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. Owners 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 owner 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.

The owner 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 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 of this section, to assure that the process hazard analysis is consistent with the current process.

Owners shall retain process hazards analyses and updates or revalidations for each process covered by this part, as well as the documented resolution of recommendations described in this section for the life of the process.

35.6 Operating Procedures

The owner is required to 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;
- Normal operations;
- 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;
- Emergency operations;
- Normal shutdown; and
- Startup following a turnaround, or after an emergency shutdown.
    - Operating limits:
        - Consequences of deviation; and
        - Steps required to correct or avoid deviation.

- Safety and health considerations:
    - Properties of, and hazards presented by, the chemicals used in the process;
    - Precautions necessary to prevent exposure, including engineering controls, administrative controls, and personal protective equipment;
    - 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
    - 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 owner shall certify annually that these operating procedures are current and accurate.
- The owner 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.

35.7 Training

- 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.
- Refresher training. Refresher training shall be provided at least every three years, 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 owner, in consultation with the employees involved in operating the process, shall determine the appropriate frequency of refresher training.
- Training documentation. The owner and Allied Environmental Services shall ascertain that each employee involved in operating a process has received and understood the training required by this section. The owner 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.

35.8 Requirements for the Owner, Allied Environmental Services and Other Contractors

- Application. This section applies to contractors 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.

- Owner responsibilities.
    - The owner, when selecting a contractor, shall obtain and evaluate information regarding the contract employer's safety performance and programs.
    - The owner shall inform contract employers of the known potential fire, explosion, or toxic release hazards related to the contractor's work and the process.
    - The owner shall explain to contract employers the applicable provisions of the emergency action plan.
    - The owner shall develop and implement safe work practices to control the entrance, presence, and exit of contract employers and contract employees in covered process areas.
    - The owner shall periodically evaluate the performance of contract employers in fulfilling their obligations.
    - The owner shall maintain a contract employee injury and illness log related to the contractor's work in process areas.
- Contract employer responsibilities.
    - The contract employer shall assure that each contract employee is trained in the work practices necessary to safely perform his/her job.
    - The contract employer shall assure that each contract employee is instructed in the known potential fire, explosion, or toxic release hazards related to his/her job and the process, and the applicable provisions of the emergency action plan.
    - The contract employer shall document that each contract employee has received and understood the training required by this paragraph. The contract employer shall prepare a record which contains the identity of the contract employee, the date of training, and the means used to verify that the employee understood the training.
    - The contract employer shall assure that each contract employee follows the safety rules of the facility including the safe work.
    - The contract employer shall advise the employer of any unique hazards presented by the contract employer's work, or of any hazards found by the contract employer's work.

35.9 Prestartup Safety Review

- The owner shall perform a prestartup 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 prestartup 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, and emergency procedures are in place and are adequate;
    - For new facilities, a process hazard analysis has been performed and recommendations have been resolved or implemented before startup; and modified facilities meet the requirements contained in management of change.
    - Training of each employee involved in operating a process has been completed.

35.10 Mechanical Integrity

- Applies to the following process equipment:

    - 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 owner shall establish and implement written procedures to maintain the ongoing integrity of process equipment.
- Training for process maintenance activities. The owner and Allied Environmental Services shall train each employee involved in maintaining the ongoing 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 owner 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 owner shall correct deficiencies in equipment that are outside acceptable limits 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 owner 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 owner shall assure that maintenance materials, spare parts and equipment are suitable for the process application for which they will be used.

35.11 Hot Work

- The owner shall 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 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.

35.12 Management of Change

- The owner 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 contract 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 section results in a change in the process safety information, such information shall be updated accordingly.

- If a change covered by this section results in a change in the operating procedures or practices, such procedures or practices shall be updated accordingly.

35.13 Emergency planning and response

- The owner shall establish and implement an emergency action plan for the entire plant or facility. In addition, the emergency action plan shall include procedures for handling small releases.

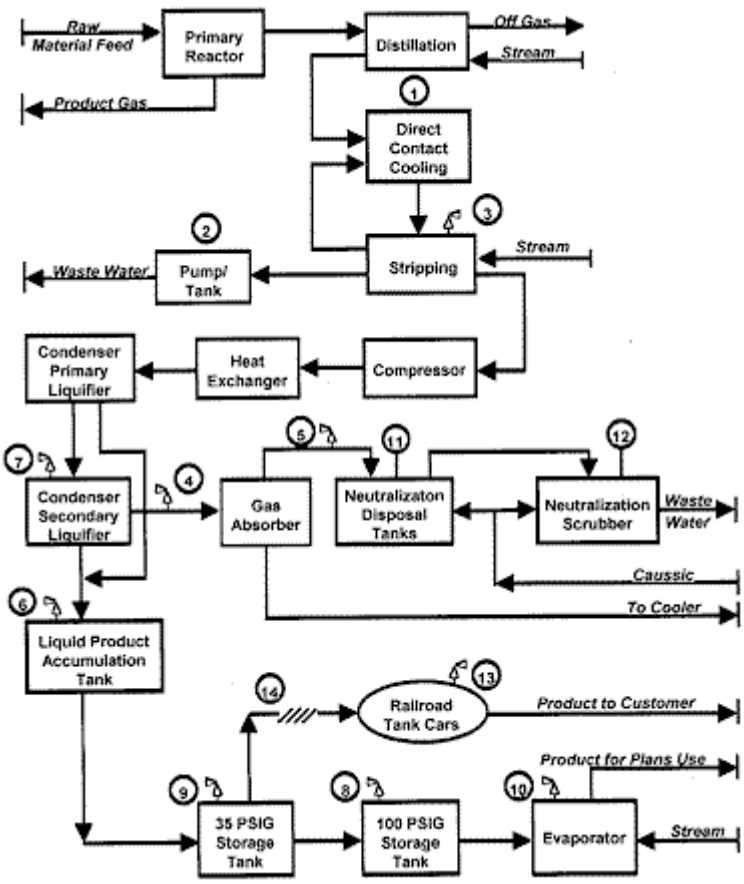
35.14 Trade Secrets

- Owners 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.

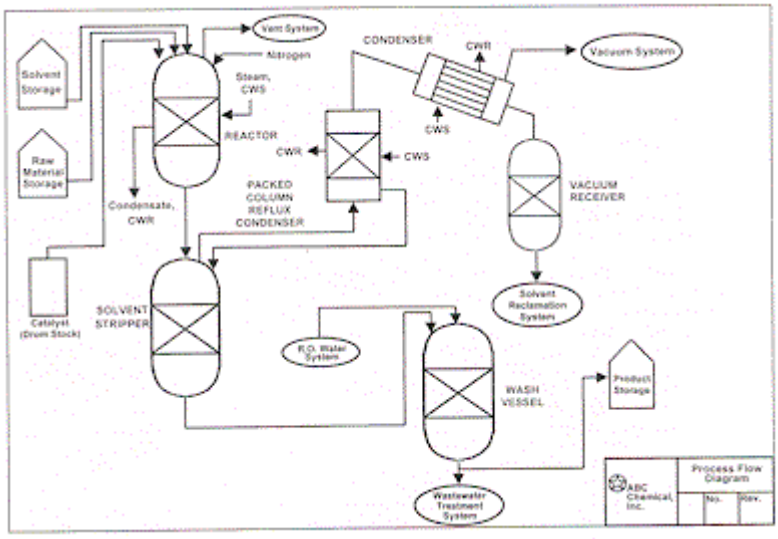
- Nothing in this section shall preclude the owner from requiring the persons to whom the information is made available to enter into confidentiality agreements not to disclose the information.

- 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.

EXAMPLE OF A BLOCK FLOW DIAGRAM



EXAMPLE OF A PROCESS FLOW DIAGRAM



Appendix A to 1926.1101

OSHA Reference Method – Mandatory

This mandatory appendix specifies the procedure for analyzing air samples for asbestos and specifies quality control procedures that must be implemented by laboratories performing the analysis. The sampling and analytical methods described below represent the elements of the available monitoring methods. All employers who are required to conduct air monitoring under paragraph (f) of the standard are required to utilize analytical laboratories that use this procedure, or an equivalent method, for collecting and analyzing samples.

Sampling and Analytical Procedure

1. The sampling medium for air samples shall be mixed cellulose ester filter membranes. These shall be designated by the manufacturer as suitable for asbestos counting. See below for rejection of blanks.

2. The preferred collection device shall be the 25-mm diameter cassette with an open-faced 50-mm electrically conductive extension cowl. The 37-mm filter cassette accompanies the sample results in the employee's exposure monitoring record. Don not reuse or reload cassettes for asbestos sample collection.

3. An air flow rate between 0.5 liter/min and 2.5 liters/min shall be selected for the 25/mm cassette. If the 37-mm cassette is used, an air flow rate between 1 liter/mn and 2.5 liters/min shall be selected.

4. Where possible, a sufficient air volume for each air sample shall be collected to yield between 100 and 1,300 fibers per square millimeter on the membrane filter. If a filter darkens in appearance or if loose dust is seen on the filter, a second sample shall be started.

5. Ship the samples in a rigid container with sufficient packing material to prevent dislodging the collected fibers. Packing material that has a high electrostatic charge on its surface (e.g. expanded polystyrene) cannot be used because such material can cause loss of fibers to the sides of the cassette.

6. Calibrate each personal sampling pump before and after use with a represernative filter cassette installed between the pump and the calibration devices.

7. Personal samples shall be taken in the "breathing zone" of the employee (i.e., attached to or near the collar or lapel near the worker's face).

8. Fiber counts shall be made by positive phase contrast using a microscope with an 8 to 10 X eyepiece and a 40 to 45 X objective for a total magnification of approximately 400 X and a numerical aperture of 0.65 to 0.75. The microscope shall also be fitted with a green or blue filter.

9. The microscope shall be fitted with a Walton-Beckett eyepiece graticule calibrated for a field diameter of 100 micrometers (+/-2 micrometers_.

10. The phase-shift detection limit of the microscope shall be about 3 degrees measured using the HSE phase shift test slide as outlined below.

a. Place the test slide on the microscope stage and center it under the phase objective.

b. Bring the blocks of grooved lines into focus.

NOTE: The slide consists of seven sets of grooved lines (ca. 20 grooves to each block) in descending order of visibility from sets 1 to 7, seven being the least visible. The requirements for asbestos counting are that the

microscope optics must resolve the grooved lines in sets 6 and 7 must be invisible. Sets 4 and 5 must be at least partially visible but may vary slightly in visibility between microscopes. A microscope that fails to meet these requirements has either too low or too high a resolution to be used for asbestos counting.

c. If the image deteriorates, clean and adjust the microscope optics. If the problem persists, consult the microscope manufacturer.

11. Each set of samples taken will include 10% field blanks or a minimum of 2 field blanks. These blanks must come from the same lot as the filters used for sample collection. The field blank results shall be averaged and subtracted from the analytical results before reporting. A set consists of any sample or group of samples for which an evaluation for this standard must be made. Any samples represented by a field blank having a fiber count in excess of the detection limit of the method being used shall be rejected.

12. The samples shall be mounted by the acetone/triacetin method or a method with an equivalent index of refraction and similar clarity.

13. Observe the following counting rules.

a. Count only fibers equal to or longer than 5 micrometers. Measure the length of curved fibers along the curve.

b. In the absence of other information, count all particles as asbestos that have a length-to-width ratio (aspect ratio) of 3:1 or greater.

c. Fibers lying entirely within the boundary of the Walton-Beckett graticule field shall receive a count of 1. Fibers crossing the boundary once, having one end within the circle, shall receive the count of one half (1/2). Do not count any fiber that crosses the graticule boundary more than once. Reject and do not count any other fibers even though they may be visible outside the graticule area.

d. Count bundles of fibers as one fiber unless individual fibers can be identified by observing both ends of an individual fiber.

e. Count enough graticule fields to yield 100 fibers. Count a minimum of 20 fields; stop counting at 100 fields regardless of fiber count.

14. Blind recounts shall be conducted at the rate of 10 percent.

Quality Control Procedures

1. Intralaboratory program. Each laboratory and/or each company with more than one microscopist counting slides shall establish a statistically designed quality assurance program involving blind recount and comparisons between microscopist to monitor the variability of counting by each microscopist and between microscopists. In a company with more than one laboratory, the program shall include all laboratories, and shall also evaluate the laboratory-to-laboratory variability.

2. a. Interlaboratory program. Each laboratory analyzing asbestos samples for compliance determination shall implement an interlaboratory quality assurance program of at least two other independent laboratories. Each laboratory shall participate in round robin testing at least once every 6 months with at least all the other laboratories in its interlaboratory quality assurance group. Each laboratory shall submit slides typical of its own workload for use in this program. The round robin shall be designed and results analyzed using appropriate statistical methodology.

b. All laboratories ahould also participate in a national sample testing scheme such as the Proficiency Analytical Testing Program (PAT), or the Asbestos Registry sponsored by the American Industrial Hygiene Association (AIHA).

3. All individuals performing asbestos analysis must have taken the NIOSH course for sampling and evaluating airborne asbestos dust or an equivalent course.

4. When the use of different microscopes contributes to differences between counters and laboratories, the effect of the different microscope shall be evaluated and the microscope shall be replaced, as necessary.

5. Current results of these quality assurance programs shall be posted in each laboratory to keep the microscopists informed.

Appendix B to 1926.65

- **Part Number:** 1926
- **Part Title:** Safety and Health Regulations for Construction
- **Subpart:** D
- **Subpart Title:** Occupational Health and Environmental Controls
- **Standard Number:** 1926.65 App B
- **Title:** General Description and Discussion of the Levels of Protection and Protective Gear

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This appendix sets forth information about personal protective equipment (PPE) protection levels which may be used to assist employers in complying with the PPE requirements of this section.

As required by the standard, PPE must be selected which will protect employees from the specific hazards which they are likely to encounter during their work on-site.

Selection of the appropriate PPE is a complex process which should take into consideration a variety of factors. Key factors involved in this process are identification of the hazards, or suspected hazards; their routes of potential hazard to employees (inhalation, skin absorption, ingestion, and eye or skin contact); and the performance of the PPE materials (and seams) in providing a barrier to these hazards. The amount of protection provided by PPE is material-hazard specific. That is, protective equipment materials will protect well against some hazardous substances and poorly, or not at all, against others. In many instances, protective equipment materials cannot be found which will provide continuous protection from the particular hazardous substance. In these cases the breakthrough time of the protective material should exceed the work durations.

Other factors in this selection process to be considered are matching the PPE to the employee's work requirements and task-specific conditions. The durability of PPE materials, such as tear strength and seam strength, should be considered in relation to the employee's tasks. The effects of PPE in relation to heat stress and task duration are a factor in selecting and using PPE. In some cases layers of PPE may be necessary to provide sufficient protection, or to protect expensive PPE inner garments, suits or equipment.

The more that is known about the hazards at the site, the easier the job of PPE selection becomes. As more information about the hazards and conditions at the site becomes available, the site supervisor can make decisions to up-grade or down-grade the level of PPE protection to match the tasks at hand.

The following are guidelines which an employer can use to begin the selection of the appropriate PPE. As noted above, the site information may suggest the use of combinations of PPE selected from the different protection levels (i.e., A, B, C, or D) as being more suitable to the hazards of the work. It should be cautioned that the listing below does not fully address the performance of the specific PPE material in relation to the specific hazards at the job site, and that PPE selection, evaluation and re-selection is an ongoing process until sufficient information about the hazards and PPE performance is obtained.

Part A. Personal protective equipment is divided into four categories based on the degree of protection afforded. (See Part B of this appendix for further explanation of Levels A, B, C, and D hazards.)

I. Level A - To be selected when the greatest level of skin, respiratory, and eye protection is required.

The following constitute Level A equipment; it may be used as appropriate;

1. Positive pressure, full face-piece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA, approved by the National Institute for Occupational Safety and Health (NIOSH).

2. Totally-encapsulating chemical-protective suit.

3. Coveralls.(1)

4. Long underwear.(1)

5. Gloves, outer, chemical-resistant.

6. Gloves, inner, chemical-resistant.

7. Boots, chemical-resistant, steel toe and shank.

8. Hard hat (under suit).(1)

9. Disposable protective suit, gloves and boots (depending on suit construction, may be worn over totally-encapsulating suit).

II. Level B - The highest level of respiratory protection is necessary but a lesser level of skin protection is needed.

The following constitute Level B equipment; it may be used as appropriate.

1. Positive pressure, full-facepiece self-contained breathing apparatus (SCBA), or positive pressure supplied air respirator with escape SCBA (NIOSH approved).

2. Hooded chemical-resistant clothing (overalls and long-sleeved jacket; coveralls; one or two-piece chemical-splash suit; disposable chemical-resistant overalls).

3. Coveralls.(1)

4. Gloves, outer, chemical-resistant.

5. Gloves, inner, chemical-resistant.

6. Boots, outer, chemical-resistant steel toe and shank.

7. Boot-covers, outer, chemical-resistant (disposable).(1)

8. Hard hat.(1)

9. [Reserved]

10. Face shield.(1)

III. Level C - The concentration(s) and type(s) of airborne substance(s) is known and the criteria for using air purifying respirators are met.

The following constitute Level C equipment; it may be used as appropriate.

1. Full-face or half-mask, air purifying respirators (NIOSH approved).

2. Hooded chemical-resistant clothing (overalls; two-piece chemical-splash suit; disposable chemical-resistant overalls).

3. Coveralls.(1)

4. Gloves, outer, chemical-resistant.

5. Gloves, inner, chemical-resistant.

6. Boots (outer), chemical-resistant steel toe and shank.(1)

7. Boot-covers, outer, chemical-resistant (disposable).(1)

8. Hard hat.(1)

9. Escape mask.(1)

10. Face shield.(1)

IV. Level D - A work uniform affording minimal protection, used for nuisance contamination only.

The following constitute Level D equipment; it may be used as appropriate:

1. Coveralls.

2. Gloves.(1)

3. Boots/shoes, chemical-resistant steel toe and shank.

4. Boots, outer, chemical-resistant (disposable).(1)

5. Safety glasses or chemical splash goggles*.

6. Hard hat.(1)

7. Escape mask.(1)

8. Face shield.(1)

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Footnote(1) Optional, as applicable.

Part B. The types of hazards for which levels A, B, C, and D protection are appropriate are described below:

I. Level A - Level A protection should be used when:

1. The hazardous substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on either the measured (or potential for) high concentration of atmospheric vapors, gases, or particulates; or the site operations and work functions involve a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials that are harmful to skin or capable of being absorbed through the skin;

2. Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible; or

3. Operations are being conducted in confined, poorly ventilated areas, and the absence of conditions requiring Level A have not yet been determined.

II. Level B - Level B protection should be used when:

1. The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection, but less skin protection;

2. The atmosphere contains less than 19.5 percent oxygen; or

3. The presence of incompletely identified vapors or gases is indicated by a direct-reading organic vapor detection instrument, but vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the skin.

Note: This involves atmospheres with IDLH concentrations of specific substances that present severe inhalation hazards and that do not represent a severe skin hazard; or that do not meet the criteria for use of air-purifying respirators.

III. Level C - Level C protection should be used when:

1. The atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect or be absorbed through any exposed skin;

2. The types of air contaminants have been identified, concentrations measured, and an air-purifying respirator is available that can remove the contaminants; and

3. All criteria for the use of air-purifying respirators are met.

IV. Level D - Level D protection should be used when:

1. The atmosphere contains no known hazard; and

2. Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

Note: As stated before, combinations of personal protective equipment other than those described for Levels A, B, C, and D protection may be more appropriate and may be used to provide the proper level of protection.

As an aid in selecting suitable chemical protective clothing, it should be noted that the National Fire Protection Association (NFPA) has developed standards on chemical protective clothing. The standards that have been adopted by include:

NFPA 1991 - Standard on Vapor-Protective Suits for Hazardous Chemical

Emergencies (EPA Level A Protective Clothing) NFPA 1992 - Standard on Liquid Splash-Protective Suits for Hazardous

Chemical Emergencies (EPA Level B Protective Clothing) NFPA 1993 - Standard on Liquid Splash-Protective Suits for Non-emergency,

Non-flammable Hazardous Chemical Situations (EPA Level B Protective

Clothing)

These standards apply documentation and performance requirements to the manufacture of chemical protective suits. Chemical protective suits meeting these requirements are labeled as compliant with the appropriate standard. It is recommended that chemical protective suits that meet these standards be used.

[58 FR 35144, June 30, 1993; 59 FR 43268, Aug. 22, 1994]

36. Forklift Safety

General

Allied Environmental Services is committed to providing a safe and healthy work environment and to protecting our employees from injury or death caused by uncontrolled hazards in the workplace. The Forklift Safety Program has been established to reduce the risk of physical injury or property damage in areas where powered forklifts and other powered material handling equipment is in operation.
Only those employees who have been trained and are qualified to operate the forklift are authorized to operate the equipment. All others must receive formal and practical training demonstrating competence in the safety and use of forklifts.
This Forklift Safety Program applies to all employees (permanent, temporary and contractors) who operate forklifts and other powered material handling equipment at Allied.

Responsibilities

Operations Manager and the Safety Manager are responsible for providing safe equipment and the resources necessary to implement this program, and for ensuring that this program is being followed by all Allied employees

Supervisors. Supervisors are responsible for:

- Ensuring that employees who are found to have insufficient skills or understanding of safe forklift
  operations receive retraining before continuing to operate any forklift
- Ensuring employees comply with all safe work practices described in this program
- Observing forklift operations in their department and correcting any unsafe practices
- Providing feedback of this program to the Operations Manager or Safety Manager

Forklift Operators. Operators are responsible for the following:

- Only operating the forklifts for which they have been specifically trained and authorized
- Operating all forklifts in a safe manner, consistent with the forklift safe work practices
- Conducting forklift inspections at the beginning of each work shift and documenting the inspection
  on the appropriate inspection forms
- Reporting all equipment malfunctions and/or maintenance needs to their supervisors immediately
- Wearing a seatbelt at all times while operating a forklift
- Notifying their supervisors if they begin taking a medication that affects their ability to

operate a
forklift

Qualification

All forklift operator candidates must meet the following basic requirements prior to starting initial or refresher training:

- No uncorrectable vision problems that would impair the safe operation of the forklifts
- No uncorrectable hearing loss that would impair the safe operation of the forklifts
- No physical limitations that would impair the safe operation of the forklifts
- No neurological disorders that affect balance or consciousness
- No use of medication that affects perception, vision or balance

Initial Training

Operator training occurs before an employee is permitted to operate any forklift or other powered material handling equipment in our facilities. All operational training will be conducted under close supervision. Training will consist of a combination of formal instruction (e.g., lecture, discussion, DVD), practical training (demonstrations performed by the trainer and exercises performed by the trainee), and an evaluation of the operator's performance in the workplace.

Only knowledgeable and experienced forklift operators that are authorized by Allied are permitted to conduct training and evaluations. The following are authorized to provide forklift training.

- Operations Manager
- Project Managers
- Safety Manager

All training and evaluations are documented and will include the name of the trainee, name of the trainer and the date of training. All training will be recorded using the form in **Appendix A**.

Training Program Content

Training for forklift operators is extensive, and covers both general forklift topics and workplace-specific topics, including:

General forklift topics:

- An overview of Allied's Written Forklift Safety Program
- Operating instructions, warnings and precautions for the types of forklifts the operator

will be
authorized to operate

- Differences between forklifts and automobiles
- Forklift controls and instrumentation
- Engine or motor operation
- Steering and maneuvering
- Visibility (including restrictions due to loading)
- Fork and attachment adaptation, operation and use limitations
- Vehicle capacity and stability
- Vehicle inspection and maintenance
- Refueling and/or charging of batteries
- Seatbelt use

Workplace-specific topics:

- Surface conditions where the vehicle will be operated
- Load stability, manipulation, stacking and unstacking
- Pedestrian traffic areas
- Narrow aisles and other restricted places
- Hazardous locations where the vehicle will be operated
- Ramps and other sloped surfaces that could affect the vehicle's stability
- Closed environments and other areas where a buildup of carbon monoxide or diesel exhaust could
  exist
- Any other unique or potentially hazardous environmental conditions in the workplace that could
  affect safe operation

Refresher Training

Refresher training will be conducted to ensure that all operators have the knowledge and skills needed to operate forklifts safely. Refresher training will be conducted for individual operators when:

- The operator has received an evaluation that reveals he/she is not operating the forklift safely
- The operator has been observed operating the vehicle in an unsafe manner
- The operator has been involved in an accident or near-miss incident
- The operator is assigned to drive a different type of forklift
- A condition in the workplace has changed which could affect the safe operation of the forklift

Refresher training will be evaluated by the Program Administrator to gauge the effectiveness of the training.

Operator Evaluation

Each forklift operator's performance is evaluated every three years. This evaluation includes a discussion with the operator regarding his/her experience with the forklift, an observation of the employee operating the forklift, and written documentation that the evaluation was performed. All evaluations will be documented on the form located in **Appendix B**. Individuals that do not pass the evaluation will be immediately removed from forklift operations until they successfully pass refresher training.

Forklift Safe Work Practices

The following procedures will be followed at all times.

Equipment Inspection.

- Each operator will either inspect their forklift daily before operation or ensure a documented inspection has been performed.. If any inspection item is determined to be damaged, broken or inoperable, the operator will notify their supervisor and authorized mechanic. If possible, the forklift will be immediately repaired. If immediate repair is not possible, a determination will be made as to whether the forklift can be used safely until repairs can be made.
- Employees may not operate an unsafe forklift at any time.
- Forklifts will be kept in clean condition, free of dirt, excess oil and grease.

Repairs and Maintenance.

- Only Allied's authorized mechanic will perform repairs and maintenance on forklifts and other powered material handling equipment.
- The authorized mechanic will complete a maintenance log that identifies repair needs and corrective actions taken for each forklift. This log is kept at the Shop Maintenance Office.
- If a forklift cannot be safely operated, it must be taken out of service until the repairs have been made. Forklifts that have been taken out of service will be visually marked with an out of service sign (see **Appendix D**) and the ignition keys will be secured in the Shop Maintenance Office.
- After repairs have been completed, the forklift must be given a performance test before being returned into service to ensure that the equipment is safe to operate.

LP Gas Cylinder Changing.

- Forklift LP cylinders will only be changed in the designated area located in the Maintenance Shop outside the overhead door.
- All full and empty cylinders will be kept in the appropriately labeled cylinder cage when not on a forklift.
- Smoking is prohibited in all cylinder changing areas.
- Eyewash equipment is available and maintained in all changing areas.
- Precautions are taken to prevent open flames, sparks and electric arcs in changing areas.
- Employees who change cylinders must wear appropriate PPE including:
    - Long sleeve shirt and full length pants
    - Face shield
    - Safety glasses or goggles
    - Gloves
- The following steps must be taken when changing all forklift LP cylinders.
    1. Set emergency brake and leave engine running
    2. Close tank valve and use up remaining fuel in the fuel lines
    3. Turn off ignition
    4. Disconnect the hose from the tank and remove the tank
    5. Inspect new tank for leaks and damage (Do not use if there is a leak or dents in the tank)
    6. Install the new tank and connect the hose
    7. Open the tank valve and restart the engine

General Safe Work Practices.

- Only authorized, trained personnel are permitted to operate forklifts.
- Horseplay is prohibited.
- Operators must drive with both hands on the steering wheel. Do not drive with wet or greasy hands.
- No person is permitted to ride as a passenger on a forklift or on the load being carried.
- A forklift may not be used to elevate a platform or pallet with persons on it, except work platforms specifically designed for this purpose. Work platforms must have standard guardrails, and must be securely fastened to the forks.
- No person is allowed to stand or walk under elevated forks.
- Operators should avoid making jerky starts, quick turns or sudden stops.
- Operators may not use reverse as a brake.
- Operators must slow down on wet and slippery surfaces and at cross aisles or locations where vision is obstructed.
- Operators entering a building or nearing a blind corner must make their approach at a reduced speed, sound their horn and proceed carefully.
- Operators must give pedestrians the right-of-way at all times.
- Operators may not drive toward any person who is in front of a fixed object or wall.

- Operators may not overtake and pass another forklift traveling in the same direction.
- Operators must not put their fingers, arms or legs between the uprights of the mast, or beyond the contour of the forklift.
- Forks should always be placed under the load as far as possible. Do not lift a load with one fork.
- No load should be moved unless it is absolutely safe and secure.
- Spotters must be used when handling long lengths of bar stock, pipe or other materials.
- Compressed gas cylinders may be moved only in special pallets designed for this purpose.
- When unloading trucks or trailers, the brakes on the vehicle must be set (locked) and the wheels chocked.
- Forklifts must be safely parked when not in use. The controls must be neutralized, power shut off, brakes set, key removed, and the forks must be in a down position, flat on the surface, and not obstructing any walkways or aisles.
- A forklift will not be left on an incline unless it is safely parked and the wheels chocked.
- Only stable and safely arranged loads may be handled.
- Only loads within the rated capacity of the forklift may be lifted or moved.

Traveling.

- Facility speed limits must be observed at all times.
- Three forklift lengths (or two seconds) must be maintained between forklifts in operation.
- The forklift must be kept under control at all times.
- When vision is obscured, the operator must slow down and sound the horn.
- If the load blocks the operator's view, the forklift must be driven in the direction that provides the best visibility.
- Forklifts must cross railroad tracks at a diagonal.
- Forklifts must be parked 8 feet or further from the center line of railroad tracks.
- The forklift must be driven with the load upgrade when driving on ascending or descending grades greater than 10%.
- Dock boards and bridge plates must be properly secured before they are driven over.
- When the forklift is not carrying a load, the operator must travel with the forks as low as possible (maximum of 3 inches on paved surfaces). When carrying a load, it should be carried as low as possible (consistent with safe operation, 2 to 6 inches above the surface.)
- The forks may not be operated while the forklift is traveling.

Periodic Program Review

The Forklift Safety Program and procedures are reviewed annually. The review is documented on the form located in **Appendix C**.

Appendix A – Forklift Operator Training Record

The following individuals received training on Allied Environmental Services Forklift Safety Program.

Print Name	Sign Name

The undersigned conducted training in accordance with Allied's Forklift Safety Program.

Print Instructor's Name	
Instructor's Signature	
Instructor's Title	
Date of Training	
Equipment Type	

Appendix B – Forklift Operator's Evaluation

Forklift Operator's Name _____ Forklift Model/# _____

Location _____ Date _____

Evaluator's Name _____

Pre-Starting	**Acceptable**	**Not Acceptable**
Conducts pre-shift inspections per operating manual and uses form/checklist		
Looks for damage and reports problems		
Elevators	**Acceptable**	**Not Acceptable**
Does not exceed elevator capacity - centers forklift - drives in load first - allows no other passengers.		
Elevating Personnel	**Acceptable**	**Not Acceptable**
Only elevates personnel using approved work platform		
Properly secures work platform to forklift		
Does not travel with personnel in platform - Checks raising and lowering of mast and platform before raising personnel		
Ensures that forklift has twice the capacity of the platform weight and load (Including personnel)		
Barricades area		
Stays at forklift controls while personnel are elevated		
Traveling	**Acceptable**	**Not Acceptable**
Wears safety belt or harness and required PPE		
Keeps body within operator compartment		
Operates forklift in accordance with operating manual instructions		
Looks in direction of travel before and while moving		
Uses forklift lighting in dark areas		
Carries forks/load 3" to 6" above ground		
Smooth starts, stops and direction changes		

Sounds horn at blind corners - slows or stops as necessary		
Turns wide to see down travel path		
Travels right of center allowing room for step out		
Uses extreme caution when meeting pedestrians		
Leaves three or more lengths for stopping when behind another vehicle		
Stays well away from drop-offs		
Load Handling	**Acceptable**	**Not Acceptable**
Never handles loads in excess of forklift capacity or load tiers above LBR height		
Uses attachments according to manufacturer's instructions		
Approaches load properly		
Does not raise or lower forks while traveling		
Does not turn with forks elevated		
Keeps mast vertical (load level) when high stacking		
Enters and exits pallets properly (forks level and properly spaced)		
Travels in reverse when load partially obstructs visibility		
Travels with loads 6" - 12" above the ground and tilted back to stabilize the load (if the load represents a hazard of sliding off the forks during forward braking, e.g., metal on metal, then additional back tilt may be necessary)		
Handles long loads with forks spread wide and uses spotters		
Aligns loads properly in racks or stacks		
Pedestrian Issues	**Acceptable**	**Not Acceptable**
Slows, honks and yields to pedestrians at corners and step outs		
Allows no pedestrians near operating forklift particularly in trailers or railcars		
Watches for pedestrians in tail swing area		
Honks before passing pedestrians		
Allows no pedestrians beneath load or to ride on forklift, forks or pallet		
Trailer and Railcar Loading	**Acceptable**	**Not Acceptable**
Trailer/railcar properly chocked - Jack stand used when needed		
Slides axles to rear		
Inspects floor		
Checks dockboard capacity - installs correctly		

Takes steps to prevent tractor-trailer pull-away		
Uses lighting aids		
Looks into trailer/railcar before entering with EACH load		
Ramps/Inclines	**Acceptable**	**Not Acceptable**
Travels with load upgrade and takes precautions for visibility		
Travels empty with counterweight upgrade		
NEVER turns on ramps or inclines		
Parking	**Acceptable**	**Not Acceptable**
Lowers forks, sets brake, neutralizes transmission controls, chocks wheels on slope and shuts off LPG when parking for extended periods of time		
Parks in location not blocking firefighting equipment, electrical panels, doorways, stairways, ladders, emergency exits or railroad tracks		
Shuts off engine if moving more than 25 feet from forklift or moving out of sight of forklift		
LPG/CNG	**Acceptable**	**Not Acceptable**
Turns off forklift		
Allows no open flames or ignition sources in refueling area		
Wears required PPE		
LPG: Removes tank and stands bottle vertically to refuel		
If authorized, fills in accordance with regulations		
Uses outage valve to determine fill level and does not overfill		
Seeks assistance replacing bottle on forklift and uses locator pin and hole to properly index bottle		
Cleans up spills		
Battery Charging	**Acceptable**	**Not Acceptable**
Turns off forklift		
Allows no open flames or ignition sources in refueling area		
Wears required PPE		
Opens battery lid - does not remove caps		
Does not plug running charger to battery		
Battery Changing	**Acceptable**	**Not Acceptable**

Turns off forklift		
Allows no open flames or ignition sources in refueling area		
Wears required PPE		
Locates forklift properly, uses changing device in accordance with manufacturer's instructions, and securely reinstalls battery and retention device		
Additional Observations and Comments		

Appendix C – Annual Evaluation Report

Date of Evaluation:	Evaluated By (list all present):
Written Program Reviewed: Yes No	
Comments on Written Program:	
The following specific procedures have been reviewed:	
The following specific procedures were modified:	
The following specific procedures were added:	
A review of the accident reports and injury and illness reports were made: Yes No	
The following additional expense(s) resulted from failure to properly operate a forklift or other powered material handling equipment:	
Comments:	

37. Allied Environmental Services Risk Assessment Process

37.1 Purpose

- To provide guidelines for identifying, assessing and controlling workplace hazards;
- To ensure the potential hazards of new processes and materials are identified before they are introduced into the workplace;
- To identify the jobs/tasks which require risk assessment.

37.2 Key Responsibilities

As specified within this program.
Allied Environmental Services (Allied) Project Managers and/or supervisors must assess a work site and identify existing or potential hazards before work begins at the work site or prior to the construction of a new work site

37.3 Hazard and Risk Identification

The hazard identification process is used for routine and non-routine activities as well as new processes, changes in operation, products or services if applicable.
The Division Manager, Supervisor, or Safety Manager shall conduct a baseline worksite hazard assessment which is a formal process in place to identify the various tasks that are to be performed identify potential hazards. The results are included in a report of the results of the hazard assessment and the methods used to control or eliminate the hazards identified. The hazard assessment report must be signed and have the date on it.
Inputs into the baseline hazard identification include, but are not limited to:

- Scope of work;
- Legal and other requirements;
- Previous incidents and non-conformances;
- Sources of energy, contaminants and other environmental conditions that can cause injury;
- Walk through of work environment;

Hazards identifications (as examples) are to include:

- Working Alone
- Thermal Exposure
- Isolation of Energy
- Hearing Protection

- Musculoskeletal Disorders
- Bloodborne Pathogens
- Confined Spaces
- Driving
- General Safety Precautions
- And any other established policy or procedure by Allied
- Any other site-specific work scope

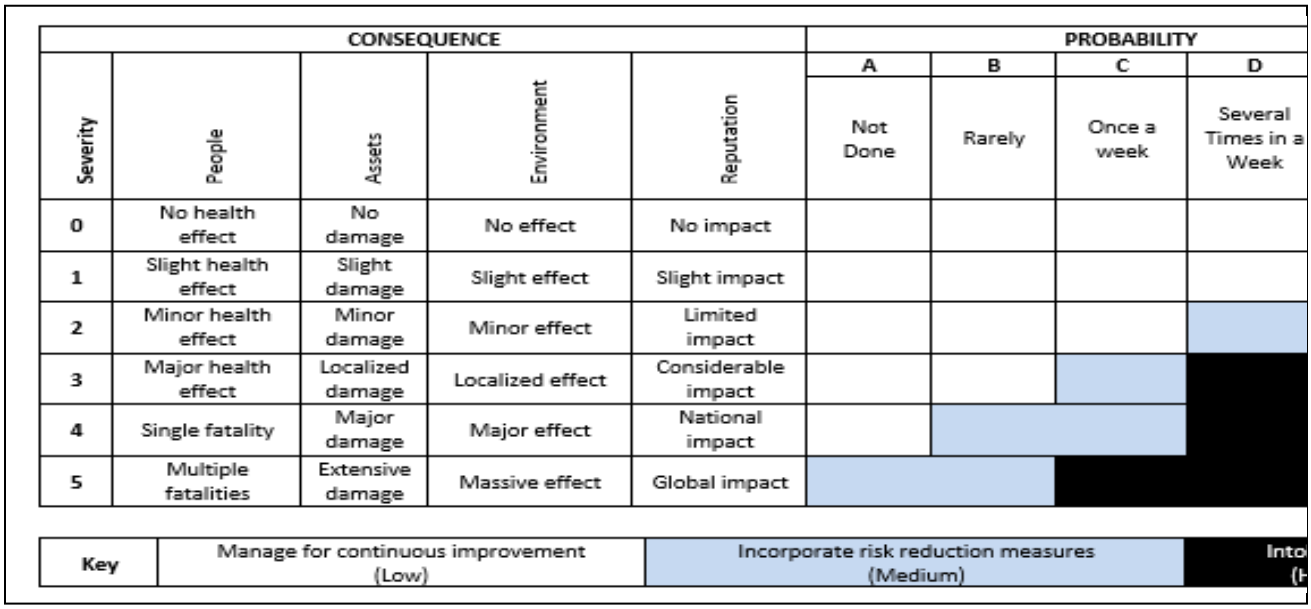
Allied has a formal process for identifying potential hazards. Processes are in place to identify potential hazards by the use of JSA's, JHA's, or Pre-Task Analysis.
All identified hazards are assessed for risk and risk controls are assigned within the worksite hazard assessment for that specific hazard.
Employees and/or sub-contractors are actively involved in the hazard identification process. The Allied program provides processes to ensure employees and/or sub-contractors are actively involved in the hazard identification process and hazards are reviewed with all employees concerned.
Allied's safety committee shall be involved in the identification and review process as well.
Employees shall be trained in the hazard identification process. Employees will be trained in the hazard identification process including the use and care of proper PPE. This is accomplished during new hire orientation as well as annually during Safety Day Training.
Unsafe hazards must be reported immediately and addressed by the supervisor. The supervisor discusses the worksite hazard assessment with employees at the respective work location during the employee's documented orientation.

37.4 Review of Hazard Assessment

Existing or potential worksite hazard identifications are formally reviewed annually or repeated at reasonably practicable intervals to prevent the development of unsafe and unhealthy working conditions and specifically updated when new tasks are to be performed that have not been risk assessed, when a work process or operation changes, before the construction of a new site or when significant additions or alterations to a job site are made.
The respective Supervisor or Project Manager advises the Safety Manager when additional hazards are introduced into the work place in order to revise planning and assessment needs.

37.5 Risk Assessment

Hazards are classified and ranked based on severity. The program identifies hazards are classified/prioritized and addressed based on the risk associated with the task. (See the risk analysis matrix outlining severity and probability).



CONSEQUENCE					PROBABILITY			
					A	B	C	D
Severity	People	Assets	Environment	Reputation	Not Done	Rarely	Once a week	Several Times in a Week
0	No health effect	No damage	No effect	No impact				
1	Slight health effect	Slight damage	Slight effect	Slight impact				
2	Minor health effect	Minor damage	Minor effect	Limited impact				
3	Major health effect	Localized damage	Localized effect	Considerable impact				
4	Single fatality	Major damage	Major effect	National impact				
5	Multiple fatalities	Extensive damage	Massive effect	Global impact				

Key	Manage for continuous improvement (Low)	Incorporate risk reduction measures (Medium)	Into (H

ALLIED ENVIRONMENTAL SERVICES INC RISK ASSESSMENT MATRIX

Key	Manage for continuous improvement (Low)	Incorporate risk reduction measures (Medium)	Intolerable (High)

37.6 Risk Controls/Methods to Ensure Identified Hazards Are Addressed and Mitigated

The following describes how identified hazards are addressed and mitigated:

- Risk assessed hazards are compiled with and addressed and mitigated through dedicated assignment, appropriate documentation of completion, and implemented controls methods including engineering or administrative controls and PPE required into the worksite hazard assessment of the site specific HSE plan. No work will begin before the worksite assessment is completed. Additionally, no risk assessed as High (Intolerable) shall be performed.

- If an existing or potential hazard to workers is identified during a hazard assessment Allied must take measures to eliminate the hazard, or if elimination is not reasonably practicable, control the hazard. If reasonably practicable, Allied must eliminate or control a hazard through the use of engineering controls. If a hazard cannot be adequately controlled using engineering controls Allied must use administrative controls that control the hazard to a level as low as reasonably achievable. If the hazard cannot be adequately controlled using engineering and/or administrative controls, Allied must ensure that the appropriate personal protective equipment (PPE) is used by workers affected by the hazard. Allied may use a combination of engineering controls, administrative controls, and personal protective equipment if there is a greater level of worker safety because a combination is used.

Emergency Control of Hazards

Only those employees competent in correcting emergency controls of hazards may be exposed to the hazard and only the minimum number of competent employees may be exposed during hazard emergency control. An example is a gas leak in a building. Only those personnel with training on fire safety, gas supply shut off and other related controls will attempt to resolve the emergency control of a hazard. Allied will make every possible effort to control the hazard while the condition is being corrected or under the supervision of client emergency response personnel in every emergency.

Certification of Hazard Assessment

The Safety Manager completes and signs the certification of hazard assessment for the worksite hazard assessment (also see PPE Program) and includes it within the site specific Safety Plan. Hazard assessments are reviewed annually and updated when new tasks are to be performed that have not been risk assessed.

Task Safety Analysis (TSA)

For those jobs with the highest injury or illness rates, jobs that are new to our operation, jobs that have undergone major changes in processes and procedures or jobs complex enough to require written instructions will have a Task Safety Analysis performed. Completed TSAs are available from the Safety Manager.

Site Specific HSE Plan (SSSP)

Each work location has a site specific HSE plan. Each employee reporting to a location shall receive a documented orientation from a Allied supervisor that includes the SSSP for that site. The SSSP contains the Allied Health and Safety Policy, site specific safety requirements as well as a PPE matrix and a signed site specific worksite hazard assessment for that location, which the Allied has a responsibility to provide.

37.7 Review Process

The hazard assessment program will be reviewed to ensure no new hazards derived from the corrective measures. The review shall include a management of change consideration as well.

ALLIED ENVIRONMENTAL WORKSITE HAZARD ASSESSMENT

TASKS	RISK LEVEL	HAZARDS	ENGINEERING OR ADMINISTRATIVE CONTROLS	PPE (Refer to PPE Matrix)
List individual task	*Use Risk Matrix*	*Identify hazards associated with task*	• *List procedures that apply* • *List appropriate engineering controls* • *List procedures or other administrative controls*	*List appropriate PPE*
Example: Washing Parts	MED	Chemical Exposure (Skin, Eyes, Body)	• PPE Procedure • No smoking;	Chemical gloves, splash proof goggles chemical apron
			•	
			•	
			•	
			•	
			•	
			•	

Notes:

1

ALLIED ENVIRONMENTAL SERVICES, INC.

Task Safety Analysis

Supevisor/Forman:

Date: **Job No**

2 List Tasks

(List all significant job tasks to be performed)

3 Employees At Risk

Employee Employee

4 **Identify Potential Hazard (√)**

- Chemical Burn
- Thermal Burn
- Particles in Eye
- Overexertion
- Elevated Load
- Falls Over 6'
- Overhead Work
- Sprains/Strains
- Dropping Materials / Tools to Lower Level
- Inhaling Hazardous Substance
- Trips/Slips/Falls
- Fire
- Spills
- Abrasions/Cuts
- Cave-In
- Loud Noises
- Heat/Cold Exposure
- Electric Shock
- Pinch Points
- Lead/Asbestos/Silica
- Moving Machinery
- Other_____

5 **Identify Hazard Elimination(√)**

- Get Proper Tools
- Be in Proper Position
- Faceshield, Goggles
- Keep Area Picked Up & Clean
- Personal Protective Equipment
- Leather Gloves
- Hearing Protection
- Respirator Needed?
- Safety Harness/Tie Off
- Erect Barricades
- Scaffold, Manlift, Ladder
- Proper Sloping, Shoring
- Review Potential for a Spill, Containment Needed?
- Fire Extinguishers Fire Watch, Contain Sparks
- Toe Boards, Barricades
- GFCI In Place?
- Inspect Tools/Rigging Equipment
- Get Help

6 **Job Preparation / Permits**

		Yes	No	N/A
1	Safety Orientation Complete?	☐	☐	
2	Job Scope Understood?	☐	☐	
3	Proper Safety Equipment on Job Site?	☐	☐	
4	Permit Issued? What Type?	☐	☐	☐
	Hot Work ☐ Excavation ☐			
	Confined Space ☐ Crane ☐			
	Electric Hot Work ☐ Scaffold ☐			
	_____ ☐ _____ ☐			
5	Oxygen/Flammability Checked?	☐	☐	☐
6	Confined Space Procedure Rescue Plan Reviewed	☐	☐	☐
7	Communicated Work With Others in Area?	☐	☐	☐
8	Proper Tools For Job?			
9	Reviewed The MSDS Of Any Hazardous Substance That Might Be Present?	☐	☐	☐
10	Rigging Plan Completed?	☐	☐	☐
11	Fire Extinguisher?	☐	☐	☐

7 **End Of Shift Review (By Foreman Initials)_____**

		Yes	No	N/A
1	Work Area Cleaned Up?	☐	☐	☐
2	All Tags Released and Signed Off?	☐	☐	☐
3	Permit Turned In?	☐	☐	☐
4	Job Status Communicated to Customer?	☐	☐	☐
5	Barricades Erected or Removed?	☐	☐	☐
6	Tools Secured?	☐	☐	☐

(When Complete, Return To Safety Department)