

CorTech LLC

Safety Program

SECTION III

SPECIFIC COMPLIANCE PROGRAMS

Control of Hazardous Energy - Lockout/Tagout

Fall Protection

Hazard Communication

Permit-Required Confined Space

Personal Protective Equipment

General

Respiratory Protection

Scaffold & Ladder

CorTech LLC

CONTROL OF HAZARDOUS ENERGY

Lockout/Tagout

CorTech LLC

Safety Program

SECTION III

CONTROL OF HAZARDOUS ENERGY - LOCKOUT/TAGOUT

INDEX

TOPIC	PAGE
OVERVIEW	1
DEFINITIONS	1
APPLICABILITY	3
PROCEDURES FOR CONTROL OF HAZARDOUS ENERGY	4
GENERAL PROCEDURES	4
PURPOSE AND SCOPE	4
PREPARATION FOR SHUTDOWN	4
MACHINE OR EQUIPMENT SHUTDOWN	5
LOCKOUT/TAGOUT DEVICE APPLICATION	5
RELEASE OF STORED ENERGY	5
VERIFICATION OF ISOLATION	5
RELEASE FROM LOCKOUT/TAGOUT	6
DEVICE SELECTION CRITERIA FOR NON-ELECTRICAL HAZARDOUS ENERGY ...	7
CONTROL OF ELECTRICAL HAZARDOUS ENERGY ON FIXED EQUIPMENT	8
DEVICE SELECTION CRITERIA FOR ELECTRICAL HAZARDOUS ENERGY	9
REENERGIZING ELECTRICAL EQUIPMENT	10
SPECIAL CONSIDERATIONS	11
GROUP LOCKOUT AND/OR TAGOUT PROCEDURES	11
SHIFT AND/OR PERSONNEL CHANGES	12
PERIODIC INSPECTIONS	13
TRAINING	13

OSHA Standards:

29 CFR 1910.147, *The Control of Hazardous Energy (Lockout/Tagout)*

29 CFR 1910.333, *Selection and Use of Work Practices*

Forms:

[Found immediately following this program]

Energy Source Evaluation

Control Procedures

Group Leader Documentation

Periodic Inspection

OVERVIEW

As a contractor, we would not be involved in normal production operations. We could, however, be involved in the constructing, installing, setting up, adjusting, inspecting, modifying, maintaining or servicing with the possibility of injury due to the unexpected energization, start up or release of stored energy. During these situations, we will comply with the provisions of 29 CFR 1910.147, *The Control of Hazardous Energy (Lockout/Tagout)* and 29 CFR 1910.333, *Selection and Use of Work Practices*, the standards on which this program is based.

Coordination will be established between the client and, if appropriate, subcontractors to clearly indicate who is responsible for what function of the program as well as the identifying characteristics of the lockout/tagout devices -- shape, color, color codes for locks and tags, if used.

Coordination is required because -- for example: our employee may complete lockout/tagout procedures and perform maintenance on a fixed piece of equipment while a client's employee is affected by that work.

All our employees affected by this program will be "authorized employees" by virtue of their work (see "Definitions" below.)

DEFINITIONS

There are a number of terms and phrases which must be understood by all employees to grasp the general thrust of this Program. For those employees directly involved with this Program or affected by it, there are specific requirements and procedures which would be meaningless without an understanding of the "language" of Control of Hazardous Energy.

AFFECTED EMPLOYEE: an employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

AUTHORIZED EMPLOYEE: a person who locks out or tags 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 service or maintenance covered under 29 CFR 1910.147, *The Control of Hazardous Energy (Lockout/Tagout)*.

[NOTE: An authorized employee is authorized to service only machines and equipment with which he/she is familiar by training and/or experience.]

CAPABLE OF BEING LOCKED OUT: an energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.

ENERGIZED: connected to an energy source or containing residual or stored energy.

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.

ENERGY SOURCE: any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

FIXED EQUIPMENT: equipment fastened in place or connected by permanent wiring methods.

HOT TAP: a procedure used in the repair, maintenance and service activities which involves welding on a piece of equipment (pipelines, vessels, or tanks) under pressure in order to install connections or appurtenances. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.

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

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

NORMAL PRODUCTION OPERATIONS: the utilization of a machine or equipment to perform its intended production function.

OTHER EMPLOYEES: those employees whose work operations are or may be in an area where energy control procedures may be utilized.

SERVICING AND/OR MAINTENANCE: workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment, and making adjustments or tool changes where the employee may be exposed to the unexpected energization or start up of equipment or release of hazardous energy.

SETTING UP: any work performed to prepare a machine or equipment to perform its normal production operation.

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

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

APPLICABILITY

The provisions of this program apply when there is a possibility of injury due to the unexpected energization, start up or release of stored energy while constructing, installing, setting up, adjusting, inspecting, modifying, maintaining or servicing fixed machinery. Stored energy in an electro/mechanical system can be found in rotating flywheels, weights and counter-weights, hydraulic and pneumatic pressure, thermal and chemical energy, springs and unbalanced loads.

This program does not apply to:

- a. work on cord and plug connected electric equipment for which exposure to the hazards of unexpected energization or start up of the equipment is controlled by unplugging the equipment from the energy source and by the plug being under the exclusive control of the employee performing the servicing or maintenance.
- b. hot tap operations provided:
 1. continuity of service is essential.
 2. shut down of the system is impractical.
 3. documented procedures are followed and special equipment is used which will provide proven effective protection for employees.

PROCEDURES FOR CONTROL OF HAZARDOUS ENERGY

The general procedures for lockout, tagout, or lockout and tagout are quite similar. Below are instructions which apply to all control of hazardous energy procedures. Exceptions and specific requirements for lockout without tagout; tagout without lockout; and lockout used in conjunction with tagout are noted in their own subchapters.

GENERAL PROCEDURES

[NOTE: Throughout this section, lockout/tagout refers to lockout without tagout; tagout without lockout; and lockout used in conjunction with tagout.]

PURPOSE AND SCOPE: 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. Further, effective hazardous energy control procedures will protect employees when working near or on exposed deenergized electrical conductors and parts of electrical equipment. Hazards being guarded against include, but are not limited to, being cut, struck, caught, crushed, thrown, mangled, and/or shocked by live electrical circuits caused by the unexpected release of hazardous energy. One (1) piece of machinery can have more than one (1) real or potential source of hazardous energy that must be guarded against.

These procedures for the control of hazardous energy will ensure that machines and equipment are isolated properly from hazardous or potentially hazardous energy sources during servicing and maintenance and properly protected from reenergization as required by 29 CFR 1910.147.

While any employee is exposed to contact with parts of fixed electrical equipment or circuits which have been deenergized, the circuits energizing the parts will be locked out and/or tagged in accordance with the requirements of 29 CFR 1910.333 (b)(2).

PREPARATION FOR SHUTDOWN: prior to lockout/tagout, all energy isolating devices must be located which apply to the specific machine in question. **There may be more than one energy source.** While electrical is most common, other sources could be: hydraulic, pneumatic, chemical, thermal, rotational, spring, etc.. All must be isolated. The Energy Source Evaluation Form and the Control Procedures Form must be completed prior to isolation. These forms must be completed by an authorized employee. Once completed, it is recommended that these evaluations remain on file for future use. Any changes in design or energy hazard will require an update of these forms. Not only the energy source hazard, but its magnitude must be recorded on the Energy Source Evaluation Form. Example: Energy Source: Pneumatic. Magnitude: 125 p.s.i..

Before an authorized or affected employee turns off the 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. Refer to the Control Procedures Form for specific energy control procedures.

MACHINE OR EQUIPMENT SHUTDOWN: before lockout/tagout controls are applied, all affected employees will be notified and given the reasons for the lockout/tagout.

If a machine or equipment is operating, it will be shut down by normal stopping procedures by either the affected or authorized employee.

LOCKOUT/TAGOUT DEVICE APPLICATION: authorized employees will lockout/tagout the energy isolating devices with assigned individual locks. Locks or other lockout/tagout devices will be color coded and shall be used for no other purpose. Lockout/tagout devices will indicate the identity of the authorized employee applying the device.

Lockout/tagout devices will be durable and capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected. They shall be standardized in color and be substantial enough to prevent their removal without the use of excessive force or unusual techniques such as bolt cutters or other metal cutting tools. Key or combination locks are acceptable. Tagout device attachments shall be non-reusable, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds. The tagout attachment will have the general design and basic characteristics of, at a minimum, a one-piece, all environmental tolerant nylon cable tie.

Lockout/tagout devices will be applied so that they will hold the energy isolating devices in a "Neutral" or "Off" position. Protective materials and hardware shall be provided for isolating, securing or blocking of machines or equipment from energy sources. These protective materials and hardware include, but are not limited to, locks, tag chains, wedges, key blocks, adapter pins, self-locking fasteners, etc..

RELEASE OF STORED ENERGY: all stored energy will be blocked or dissipated. Types of stored energy include flywheels, springs, hydraulic or pneumatic systems, etc.. Should there be a possibility of reaccumulation of stored energy, verification of isolation must be continued until servicing is complete.

VERIFICATION OF ISOLATION: prior to starting work on machines or equipment that have been locked out and after ensuring that no personnel are exposed to the release of hazardous energy, the authorized employee shall operate the normal operating controls to verify that the machine or equipment has been deenergized and that it will not operate.

After the above test, the operating controls will be returned to the "NEUTRAL" or "OFF" position.

At this point, the machine/equipment is now locked out. The work may proceed.

RELEASE FROM LOCKOUT/TAGOUT: Before the lockout/tagout devices are removed and energy is restored to the machine or equipment, the following procedures will be implemented to ensure the following:

- a. the work area will be inspected to ensure that nonessential items have been removed and to ensure that the machine or equipment components are operationally intact.
- b. the work area will be checked to ensure that all employees have been safely positioned or removed.

After the lockout/tagout devices have been removed and before the machine or equipment is started, affected employees will be notified that the lockout/tagout devices have been removed.

Each lockout/tagout device must be removed by the authorized employee who applied it.

NOTE: The one exception to the above is when the authorized employee who applied the lockout/tagout device is not available to remove it. That device may be removed under the direction of the competent person provided that the below specific procedures are followed:

- a. verification by the competent person that the authorized employee who applied the lockout/tagout device is not within the facility.
- b. all reasonable efforts will be made to contact the authorized employee to inform him/her that his/her lockout/tagout device has been removed.
- c. ensuring that the Authorized employee has been informed of the above before resuming work.

The person who removes the device must be an authorized employee.

Each type of control of hazardous energy procedure shall be documented using the Energy Source Evaluation Form and the Control Procedures Form **except** when all the below listed conditions exist:

- a. The machine or equipment has no potential for stored or residual energy or reaccumulation of stored energy after shut down which could endanger employees; and
- b. The machine or equipment has a single energy source which can be readily identified and isolated; and
- c. The isolation and locking out of that energy source will completely deenergize and deactivate the machine or equipment; and

- d. The machine or equipment is isolated from that energy source and locked out during servicing and maintenance; and
- e. A single lockout device is under the exclusive control of the authorized employee performing the servicing and maintenance; and
- f. The servicing and maintenance does not create hazards for other employees; and
- g. No accidents have occurred involving the unexpected activation or re-energization of the machine or equipment during servicing or maintenance.

The above exceptions apply to documentation only. Whether using lockout, tagout, or lockout and tagout, the general procedures are the same.

DEVICE SELECTION CRITERIA FOR NON-ELECTRICAL HAZARDOUS ENERGY

A lock, color coded with either paint or tape and identifiable with the name of the employee who applied it, shall be placed on each energy isolating device where feasible. Lockout is the primary means of non-electrical hazardous energy isolation and, where possible, will always be used in lieu of tagout. In the event a machine or piece of equipment will not accept a lock on its energy isolating device(s), it will be modified to do so whenever it is replaced, renovated, or undergoes a major repair.

There are occasions where lockout cannot be accomplished and in those instances, tagout alone may be used as long as it provides full employee protection as explained below:

- a. A tag may be used without a lock if a lock cannot be physically applied. This procedure must be supplemented with at least one additional safety measure providing a level of safety equivalent to that obtained by the use of a lock. Examples of additional safety measures include, but are not limited to the:
 - 1. removal of an isolating circuit element.
 - 2. blocking of a controlling switch.
 - 3. opening of an extra disconnecting device.

NOTE: A tag may be used without a lock if it can be demonstrated that tagging procedures will provide a level of safety equivalent to that obtained by the use of a lock. This demonstration must be documented. This is an allowable, but not preferred, option.

All affected persons must be fully aware of the fact that tags used in tagout procedures are essentially a warning device affixed to energy isolating devices. Unlike locks, tags do not physically restrain. Tags will:

- a. be capable of withstanding the environment to which they have been exposed for the maximum period of time that exposure is expected.
- b. be constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible.
- c. be standardized in at least one (1) of the following:
 1. color.
 2. shape.
 3. size.
- d. be standardized in print and format.
- e. in their method of attachment, be substantial enough to prevent inadvertent or accidental removal. Tagout device attachment methods and means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum strength of no less than 50 pounds and have the general design and basic characteristics of being at least equivalent to a one-piece, all-environment-tolerant nylon cable tie.
- f. indicate the identity of the employee applying the tag.
- g. warn against the hazardous conditions if the machine or equipment is energized and shall include a legend such as the following: *Do Not Start; Do Not Open; Do Not Close; Do Not Operate, etc..*

CONTROL OF ELECTRICAL HAZARDOUS ENERGY ON FIXED EQUIPMENT

Electrical hazards associated with fixed equipment present a special hazard class and, in each case, a determination must be made whether lockout, tagout, or lockout used in conjunction with tagout is to be utilized.

The guidelines for this determination are found in 29 CFR 1910.333. 29 CFR 1910.333 makes no mention of maintenance or servicing. Its provisions apply to any possible exposure to contact with fixed electrical equipment or circuits which have been deenergized. Live parts that operate at less than 50 volts to ground need not be deenergized if there will be no increased exposure to electrical burns or to explosion due to electric arcs. Fixed equipment is defined as: "equipment fastened in place or connected by permanent wiring methods."

Before circuits and/or equipment are deenergized, safe procedures will be determined before the fact. At a minimum:

- a. the circuits and equipment to be deenergized will be disconnected from all electric energy sources. Control circuit devices, such as push buttons, selector switches, and interlocks, may not be used as the sole means for deenergizing circuits or equipment. Interlocks for electric equipment may not be used as a substitute for lockout and tagging procedures.
- b. stored electric energy which might endanger personnel shall be released. Capacitors shall be discharged and high capacitance elements shall be short-circuited and grounded if the stored electric energy might endanger personnel. Be aware of the shock potential of capacitors and associated equipment. If they are handled in meeting this requirement (discharging), they shall be treated as energized until they have been totally discharged.
- c. stored non-electrical energy in devices that could reenergize electric circuit parts shall be blocked or relieved to the extent that the circuit parts could not be accidentally energized by the device.

DEVICE SELECTION CRITERIA FOR ELECTRICAL HAZARDOUS ENERGY

NOTE: When dealing with safety related work practices to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts, a Qualified Person is defined as one who: "is permitted to work on or near exposed energized parts" and who, at a minimum, has been trained in and is familiar with:

- a. the skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment, and
- b. the skills and techniques necessary to determine the nominal voltage of exposed live parts, and
- c. the clearance distances specified in §1910.333(c) and the corresponding voltages to which the qualified person will be exposed.

A lock and tag shall be placed on each disconnecting means used to de-energize circuits and equipment on which work is to be performed except:

- a. a tag may be used without a lock if it can demonstrate that tagging procedures will provide a level of safety equivalent to that obtained by the use of a lock. This demonstration must be documented. This is an allowable, but not preferred, option. A tag may also be used without a lock if a lock cannot be physically applied. Under either of the above two circumstances that a tag is used without a lock, the procedures must be supplemented with at least one additional safety

measure that provides a level of safety equivalent to that obtained by the use of a lock. Examples of additional safety measures include:

1. the removal of an isolating circuit element.
 2. the blocking of a controlling switch.
 3. the opening of an extra disconnecting device.
- b. A lock may be used without a tag if, and only if:
1. only one circuit or piece of equipment is being deenergized, and
 2. the lockout period does not extend beyond the work shift, and
 3. employees exposed to the hazards associated with reenergizing the circuit are familiar with this procedure -- utilizing a lock without a tag.

After electrical hazards are locked out, tagged out, or locked and tagged out, a Qualified Person must verify deenergization before work can proceed on deenergized equipment. Verification by the Qualified Person will include:

- a. operation of the equipment operating controls or otherwise verify that the equipment cannot be restarted.
- b. using test equipment to test the circuit elements and electrical parts of equipment to which employees will be exposed and verifying that the circuit elements and equipment parts are deenergized.
- c. using test equipment to determine if any energized condition exists as a result of inadvertently induced voltage or unrelated voltage backfeed even though specific parts of the circuit have been deenergized and presumed to be safe.

NOTE: If the circuit to be tested is over 600 volts, the test equipment shall be checked for proper operation immediately before and immediately after this test.

REENERGIZING ELECTRICAL EQUIPMENT

The process of reenergizing electrical equipment, even temporarily, must be accomplished as noted below in the order listed:

- a. A Qualified Person shall conduct tests and visual inspections, as necessary, to verify that all tools, electrical jumpers, shorts, grounds, and other such devices have been removed, so that the circuit and equipment can be safely energized.
- b. Employees exposed to the hazards associated with reenergizing the circuit or equipment shall be warned to stay clear of circuits and equipment.
- c. Each lock and tag will be removed by the authorized employee (who must also be a Qualified Person when dealing with electrical hazards).

- d. If the person who applied the lock or tag is absent from the workplace, the competent person may designate another Qualified Person to remove the lock and/or tag provided that:
 - 1. it is assured that the Authorized Person who applied the lock or tag is not available at the workplace, and
 - 2. it is assured that the Authorized Person who applied the lock and/or tag is aware that the lock and/or tag has been removed before he/she resumes work at the workplace.
- e. A visual determination shall be accomplished to ensure all employees are clear of the circuits energized.

SPECIAL CONSIDERATIONS

Whether using lockout, tagout, or lockout and tagout procedures, the below special considerations apply.

There may be special circumstances where, during a lockout procedure, a machine or equipment must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine or equipment or components thereof. The below procedures will be followed to accomplish this task:

- a. The machine or equipment will be cleared of tools and nonessential items and, if it is to be operated, all components will be operationally intact.
- b. The work area will be checked to ensure that all employees have been safely positioned or removed.
- c. The standard release from lockout procedures will be implemented.
- d. The machine or equipment will be energized and testing or positioning will proceed.
- e. After testing or positioning, deenergize all systems and reapply the energy control device following standard procedures.

GROUP LOCKOUT AND/OR TAGOUT PROCEDURES

In the event that servicing or maintenance is performed by more than one individual, the following shall be implemented:

- a. One person will be designated as Group Leader and that person will have overall responsibility for a set number of employees working under his/her control.
- b. The Group Leader will have exclusive control of a Master Group Lockout and/or Group Tagout device.

- c. The Group Leader will ascertain the exposure status of individual group members with regard to the lockout and/or tagout of the machine or equipment.
- d. Each authorized employee within the group shall affix his personal lockout/tagout device to a group lockout box or comparable device before beginning work and shall remove his/her personal lockout/tagout device upon completion of work.

If there is more than one group of personnel working a machine or piece of equipment, an employee shall be designated to coordinate and take responsibility for all the individual groups.

SHIFT AND/OR PERSONNEL CHANGES

In the event that Energy Control Procedures must extend into the next shift or if there are individual or group personnel changes, the procedures listed below will be implemented in the order listed:

- a. If the energy isolation device **will** accept two lockout/tagout devices:
 - 1. The authorized employee coming on duty will place his personalized lockout/tagout device in place, and
 - 2. After the above step has been completed, the employee going off duty will remove his lockout/tagout device.
- b. If the energy isolation device **will not** accept two lockout/tagout devices, both the incoming and outgoing authorized employees will:
 - 1. ensure that all affected employees are aware that a lockout/tagout change is about to take place, then
 - 2. ensure that the area is clear of tools and affected employees, then
 - 3. the outgoing authorized employee will remove his lockout/tagout devices and immediately the incoming authorized employee will install his lockout/tagout devices, and
 - 4. the incoming authorized employee will inform the affected employees that the change has been completed.

Following the above procedure will ensure the energy isolating device was never disturbed and that complete control of hazardous energy was maintained. The above procedure provides for continuing protection for both incoming and outgoing employees from the potential hazards of the unexpected release of hazardous energy and an orderly transfer of lockout/tagout responsibilities.

PERIODIC INSPECTIONS

The Safety Director will conduct periodic inspections of this Control of Hazardous Energy Program at least annually to ensure that the procedures and requirements of 29 CFR 1910.147 are being followed. The information gleaned from the periodic inspection will be used to correct any deviations or inadequacies identified. These inspections will be documented and certification will be prepared to identify the machine or equipment on which an energy control procedure was utilized, the date of the inspection, the employees included in the inspection, and the name of the person performing the inspection. It should be noted that all periodic inspections shall be conducted by a competent person designated by the Safety Director **other** than the person who actually used the energy control procedure being inspected.

TRAINING

Control of Hazardous Energy training will be documented giving the name of the trainer, the name of the trainee, and the date. Authorized employees must be familiar with this program and will be trained in the following areas: recognition of all applicable hazardous energy sources, types and magnitude of energy sources, methods and means necessary for energy isolation and control, and changes to our program.

Retraining will be conducted when a periodic inspection reveals inadequacy in an authorized employee's knowledge; there has been a deviation from established policy or procedure; or our procedures are changed.

All training will be interactive with applicable standards readily accessible.

Machine/Equipment Identification: _____

Date: _____

Location of Machine Equipment: _____

Authorized Person Name: _____

ENERGY SOURCE EVALUATION FORM

MACHINE OR EQUIPMENT NAME: _____ **LOCATION:** _____

MODEL: _____ **SERIAL NUMBER:** _____ **PROCEDURE NUMBER:** _____

ENERGY SOURCE	MAGNITUDE (Volts; Amps; Phase; HP; Lbs; RPM; Ft-Lbs; p.s.i.; °F/°C; Highly Reactive)	LOCATION OF ISOLATING DEVICE	MEANS OF ISOLATION	COMMENTS
CAPACITOR				
CHEMICAL				
COUNTER WEIGHT				
ELECTRICAL				
ENGINE				
FLYWHEEL				
HYDRAULIC				
PNEUMATIC				
SPRING				
THERMAL				
OTHER				
OTHER				

[NOTE: This form must be completed by an Authorized Employee.]

EVALUATION CONDUCTED BY:

NAME: _____

(MUST BE AN AUTHORIZED EMPLOYEE)

DATE: _____

Machine/Equipment Identification: _____

Date: _____

Location of Machine Equipment: _____

Authorized Person Name: _____

CONTROL PROCEDURES FORM

These Procedures must be accomplished in the order listed.

1. PREPARATION FOR SHUTDOWN: The Authorized Employee will be totally familiar with the first page of this form. The Affected Employees will be notified that the piece of equipment is about to be shutdown and locked out.

Specific Instructions: _____

2. SHUTDOWN: Affected Employees will be given the reason(s) for the lockout/tagout procedures. If the machine is running, it will be turned off using normal procedures. It may be shutdown by either the Authorized Employee or the Affected Employee.

Specific Instructions: _____

3. MACHINE ISOLATION: All real or potential hazardous energy listed on the first page of this form will be isolated from their source. The location of the isolation devices and the methods used are also found on the first page of the form.

Specific Instructions: _____

4. LOCKOUT/TAGOUT DEVICE APPLICATION: Authorized Employees will (circle appropriate procedure): [lockout] [tagout] [lockout and tagout] the energy isolating devices. Lock and tag devices will be color coded and they will contain the identity of the Authorized Employee actually performing this procedure. The lockout/tagout devices will be applied so that they hold the energy isolating device in a "Neutral" or "Off" position.

Specific Instructions: _____

4a. If a tag is used in lieu of a lock because the energy isolating device will not accept a lock, the following additional safety precautions will be taken [29 CFR 1910.147 c(3)(ii) & 29 CFR 1910.333(2)(b)(iii)((D))]:

Specific Instructions: _____

5. RELEASE OF STORED ENERGY: All stored energy will be blocked or dissipated. Reference page one (1) of this form to ensure real or potential stored energy in a system is identified and controlled.

Specific Instructions: _____

6. VERIFICATION OF ISOLATION: Prior to starting work on the piece of equipment and after ensuring that no personnel are exposed to the release of hazardous energy, the Authorized Employee shall operate the controls to verify that there has been deenergization and that the equipment will not operate. After this verification, the operating controls will be returned to the "Neutral" or "Off" position.

Specific Instructions: _____

7. RELEASE FROM LOCKOUT/TAGOUT: The Authorized Employee shall 1.) ensure that all Employees have been safely positioned or removed and the work area will be cleared of non-essential items, 2.) ensure the equipment or equipment components are operationally intact; 3.) ensure machine guards have been replaced; 4.) inform the Affected Employees that lockout and or tagout devices are going to be removed; 5.) remove the lockout and or tagout devices including all energy restraints such as blocks; and 6.) inform the Affected Employees that the equipment is ready for operation.

Specific Instructions: _____

CorTech LLC

GROUP LEADER DOCUMENTATION

One (1) person shall be designated as Group Leader. The Group Leader will have overall responsibility for a set number of employees.

The Group Leader shall have exclusive control of a Master (Group) Lockout and/or Group Tagout device.

The Group Leader will ascertain the exposure status of individual group members with regard to the lockout and/or tagout of the machine or equipment.

Each individual authorized employee within the group shall affix his personal lockout/tagout device to a group lockout box or comparable device before beginning work and shall remove his/her personal lockout/tagout device upon completion of work.

If there is more than one group of personnel working on a machine or piece of equipment, an employee shall be designated to coordinate and take responsibility for all the individual groups.

NAME OF DESIGNATED GROUP LEADER: _____

EQUIPMENT REQUIRING CONTROL OF HAZARDOUS ENERGY

NAME: _____ SERIAL NUMBER: _____

DATE: _____ MODEL NUMBER: _____

AUTHORIZED (QUALIFIED) EMPLOYEES OF THE GROUP

(Name) (Signature)

(Name) (Signature)

(Name) (Signature)

(Name) (Signature)

Program Administrator

SIGNATURE OF GROUP LEADER: _____

CorTech LLC

PERIODIC INSPECTION DOCUMENTATION

EQUIPMENT ON WHICH CONTROL OF HAZARDOUS ENERGY PROCEDURES WERE UTILIZED

NAME: _____ SERIAL NUMBER: _____

DATE: _____ MODEL NUMBER: _____

WERE ALL THE CORRECT PROCEDURES CORRECTLY APPLIED? YES NO

[If yes, sign the form and return to the Safety Director.]

[If no, complete the below section, sign the form and return to the Safety Director.]

EMPLOYEES PERFORMING THE PROCEDURE

_____ (Name)	_____ (Signature)
-----------------	----------------------

_____ (Name)	_____ (Signature)
-----------------	----------------------

_____ (Name)	_____ (Signature)
-----------------	----------------------

_____ (Name)	_____ (Signature)
-----------------	----------------------

_____ (Name)	_____ (Signature)
-----------------	----------------------

_____ (Name)	_____ (Signature)
-----------------	----------------------

IMPROPER PROCEDURES NOTED

_____ (SIGNATURE OF INSPECTOR)	_____ (Date)
-----------------------------------	-----------------

[NOTE: If improper procedures are noted, the above employees must have retraining or the Program must be modified.]

CorTech LLC

FALL PROTECTION

CorTech LLC

Safety Program

SECTION III

FALL PROTECTION

INDEX

TOPIC	PAGE
OVERVIEW	1
DUTIES OF THE PROGRAM ADMINISTRATOR	1
PRE-PROJECT PLANNING	2
DEFINITIONS	3
WHERE FALL PROTECTION IS REQUIRED	7
PRE-CONSTRUCTION SURVEY	11
FALL PROTECTION SYSTEMS	11
FALL PROTECTION PLAN	17
ACCIDENTS AND NEAR ACCIDENTS	19
TRAINING /RETRAINING	19
FALL PROTECTION AT THE JOB SITE	20
RESIDENTIAL CONSTRUCTION	21

OSHA Standards:

29 CFR 1926.500 *Scope, Application, and Definitions Applicable to This Subpart*

29 CFR 1926.501 *Duty to Have Fall Protection*

29 CFR 1926.502 *Fall Protection Systems Criteria and Practices*

29 CFR 1926.503 *Training Requirements*

29 CFR 1926 Subpart M, *App A Determining Roof Widths*

29 CFR 1926 Subpart M, *App B Guardrail Systems*

29 CFR 1926 Subpart M, *App C Personal Fall Arrest Systems*

29 CFR 1926 Subpart M, *App D Positioning Device Systems*

Forms:

[Found immediately following this program]

Fall Protection Plan (w/Changes)

Safety Net Installation Certification

OVERVIEW

One of the most serious hazards faced by our employees is falls from heights. Our Fall Protection Program has been developed to prevent injury from falls of six (6) feet or more from a walking/working surface to a lower level, to prevent objects falling from above and striking persons below, and to prevent job site persons from falling into holes.

Within the context of this program, the term “fall hazard” does not refer to tripping and falling which is addressed in our general safety & health program, nor does it apply to falling off a ladder or scaffold. Scaffold and ladder safety is addressed within its own program.

A copy of our Fall Protection **Program** can be found readily accessible to our employees on appropriate job sites.

A copy of our Fall Protection **Plan** will be found on every applicable job site.

On all job sites where fall hazards exist, there will be at least one competent person who has the training and ability to identify fall hazards and the authority to ensure that proper fall protection systems are properly implemented.

The following areas of concern are addressed by this Program:

- a. the need to know where fall protection is required.
- b. selection of fall protection systems which are appropriate for given situations.
- c. construction and installation of safety systems.
- d. supervision of employees.
- e. implementation of safe work procedures.
- f. training in selection, use, and maintenance of fall protection systems.

Our Fall Protection Program may be reviewed at any time by our employees. Should a question arise concerning this Program, personnel are encouraged to consult with their supervisor or our Fall Protection Program Administrator.

DUTIES OF THE PROGRAM ADMINISTRATOR

The Fall Protection Program Administrator's duties include:

- a. training of personnel.
- b. maintenance of training records.
- c. random, unannounced job site inspections to assure compliance with both OSHA standards and company safety policies.

- d. resolution of specific problems that may present themselves regarding a particular job site situation.
- e. designating a competent (by training or experience) person at each applicable job site who will ensure:
 - 1. a copy of our fall protection program/plan is readily accessible on appropriate job sites.
 - 2. subcontractors with whom we work are appropriately trained in fall protection.
 - 3. a written certification record has been prepared documenting that employees who have potential exposure to fall hazards at the job site have received the required training in protection.
 - 4. the fall protection system(s) utilized at the job site are appropriate for the hazard(s) present.
 - 5. that, before any work is initiated, the walking/working surfaces at the job site are capable of supporting both our personnel and equipment.

The Fall Protection Program Administrator will be familiar with all applicable standards and will keep abreast of developments in the field of fall protection.

PRE-PROJECT PLANNING

Fall protection requires a joint effort by our personnel and the specialty subcontractors who may be working with us to identify work situations in which fall hazards exist, determine the most appropriate fall protection system to be utilized, and to ensure that all persons understand the proper methods of utilizing the selected fall protection systems. A pre-construction survey by a competent person will often provide the information needed to make these determinations.

Fall protection system requirements may change during a project and the competent person on site will ensure that fall protection is maintained at all times. Care will be taken to assure that load limits are not exceeded on walking/working surfaces and attachment points and hardware is capable of withstanding (with the appropriate safety factor) the potential forces that may be generated during an actual fall incident.

Fall protection hardware and equipment owned, rented, or leased will be NIOSH/ANSI approved and it is assumed that the manufacturer's technical specifications and capabilities are accurate.

From the very inception of a potential project (pre-bid) to completion, fall protection needs and costs will be factored in.

DEFINITIONS

There are a number of terms and phrases, not common in everyday life, which must be understood to grasp the thrust of this Program. For those employees directly involved with this Program or affected by it, there are specific requirements and procedures which would be meaningless without an understanding of the "language" of our Fall Protection Program. Words used within the definitions which are themselves defined are printed in bold italic.

ANCHORAGE: a secure point of attachment for *lifelines*, *lanyards* or *deceleration devices*.

BODY HARNESS: straps which may be secured about the employee in a manner that will distribute the fall arrest over at least the thighs, pelvis, waist, chest, and shoulders with means for attaching it to other components of a *personal fall arrest system*.

BUCKLE: any device for holding the *body harness* closed around the employee's body.

CARABINER: an oval metal ring with a snap link used to fasten a rope to the piton [a spike (attachment) with an eye to which a rope can be secured.]

CFR: Code of Federal Regulations.

COMPETENT PERSON: one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees; and who has authorization to take prompt corrective measures to eliminate them.

CONNECTOR: a device which is used to couple (connect) parts of the *personal fall arrest system* and *positioning device systems* together. It may be an independent component of the system, such as a *carabiner*, or it may be an integral component of part of the system (such as a *buckle* or dee-ring sewn into a self-retracting *lanyard*).

CONTROLLED ACCESS ZONE (CAZ): an area in which certain work (e.g., *overhand bricklaying*) may take place without the use of *guardrail systems*, *personal fall arrest systems*, or safety net systems; access to the zone is controlled.

DANGEROUS EQUIPMENT: equipment (such as pickling or galvanizing tanks, degreasing units, machinery, electrical equipment, and other units) which, as a result of form or function, may be hazardous to employees who fall onto or into such equipment.

DECELERATION DEVICE: any mechanism, such as a **rope grab**, rip-stitch **lanyard**, specially-woven **lanyard**, tearing or deforming **lanyards**, automatic self-retracting **lifelines/lanyards**, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.

DECELERATION DISTANCE: the additional vertical distance a falling employee travels from the point at which the **deceleration device** begins to operate before stopping, excluding **lifeline** elongation and **free fall distance**. It is measured as the distance between the location of an employee's **body harness** attachment point at the moment of activation (at the onset of fall arrest forces) of the **deceleration device** during a fall, and the location of that attachment point after the employee comes to a full stop.

EQUIVALENT: alternative designs, materials, or methods to protect against a hazard which the employer can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials or designs specified in the standard.

FAILURE: load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.

FREE FALL: the act of falling before a **personal fall arrest system** begins to apply force to arrest the fall.

FREE FALL DISTANCE: the vertical displacement of the fall arrest attachment point on the employee's **body harness** between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes **deceleration distance**, and **lifeline/lanyard** elongation, but includes any **deceleration device** slide distance of **self-retracting lifeline/lanyard** extension before they operate and fall arrest forces occur.

GUARDRAIL SYSTEM: a barrier erected to prevent employees from falling to **lower levels**.

HOLE: a gap or void 2 inches (5.1 cm) or more in its least dimension, in a floor, **roof**, or other **walking/working surface**.

INFEASIBLE: it is impossible to perform the construction work using a conventional fall protection system (i.e., **guardrail system**, safety net system, or **personal fall arrest system**) or that it is technologically impossible to use any one of these systems to provide fall protection.

LANYARD: a flexible line of rope, wire rope, or strap which generally has a **connector** at each end for connecting the **body harness** to a **deceleration device**, **lifeline**, or **anchorage**.

LEADING EDGE: the edge of a floor, **roof**, or formwork for a floor or other **walking/working surface** (such as the deck) which changes location as additional floor, **roof**, decking, or formwork sections are placed, formed, or constructed. A leading edge is considered to be an "unprotected side and edge" during periods when it is not actively and continuously under construction.

LIFELINE: a component consisting of a flexible line for connection to an **anchorage** at one end to hang vertically (vertical lifeline), or for connection to **anchorages** at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of **personal fall arrest system** to the **anchorage**.

LOW-SLOPE ROOF: a **roof** having a slope less than or equal to 4 in 12 (vertical to horizontal).

LOWER-LEVELS: those areas or surfaces to which an employee can fall. Such areas or surfaces include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits, tanks, material, water, equipment, structures, or portions thereof.

MECHANICAL EQUIPMENT: all motor or human propelled wheeled equipment used for **roofing work**, except wheelbarrows and mopcars.

OPENING: a gap or void 30 inches or more high and 18 inches or more wide, in a wall or partition through which employees can fall to a **lower level**.

OVERHAND BRICKLAYING AND RELATED WORK: the process of laying bricks and masonry units such that the surface of the wall to be jointed is on the opposite side of the wall from the mason, requiring the mason to lean over the wall to complete the work. Related work includes mason tending and electrical installation incorporated into the brick wall during the overhand bricklaying process.

PERSONAL FALL ARREST SYSTEM: a system used to arrest an employee in a fall from a working level. It consists of an **anchorage**, **connectors**, a **body harness** and may include a **lanyard**, **deceleration device**, **lifeline**, or suitable combination of these. **The use of body belts for fall arrest is prohibited.**

POSITIONING DEVICE SYSTEM: a **body belt** or **body harness** system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

QUALIFIED PERSON: one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

ROPE GRAB: a **deceleration device** which travels on a **lifeline** and automatically, by friction, engages the **lifeline** and locks so as to arrest the fall of an employee. A rope grab usually employs the principle of inertial locking, cam/level locking, or both.

ROOF: the exterior surface on the top of a building. This does not include floors or formworks which, because a building has not been completed, temporarily become the top surface of a building.

ROOFING WORK: the hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work, but not including the construction of the **roof** deck.

SAFETY-MONITORING SYSTEM: a safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

SELF-RETRACTING LIFELINE/LANYARD: a **deceleration device** containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

SNAPHOOK: a **connector** comprised of a hook-shaped member with a normally closed keeper of similar arrangement which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object. Snaphooks are generally one of two types:

- (1) the locking type with a self-closing, self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection; or
- (2) the non-locking type with a self-closing keeper which remains closed until pressed open for connection or disconnection. The use of a non-locking snaphook as part of **personal fall arrest systems** and **positioning device systems** is prohibited.

STEEP ROOF: a **roof** having a slope greater than 4 in 12 (vertical to horizontal).

TOEBOARDS: a low protective barrier that will prevent the fall of material and equipment to **lower levels** and provide protection from falls for personnel.

UNPROTECTED SIDES AND EDGES: any side or edge (except at entrances to points of access) of a **walking/working surface**, e.g., floor, **roof**, ramp, or runway where there is no wall or **guardrail system** at least 39 inches high.

WALKING/WORKING SURFACE: any surface, whether horizontal or vertical, on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runway, formwork and concrete reinforcing steel; not including ladders, vehicles, or trailers on which employees must be located in order to perform their job duties.

WARNING LINE SYSTEM: a barrier erected on a **roof** to warn employees that they are approaching an unprotected **roof** side or edge, and which designates an area in which **roofing work** may take place **without** the use of guardrail, **body belt**, or safety net systems to protect employees in the area.

WORK AREA: that portion of a **walking/working surface** where job duties are being performed.

WHERE FALL PROTECTION IS REQUIRED

The "key" distance is six (6) feet. All employees must be aware that if there is a possibility of falling six (6) feet or more at least one (1) fall protection system will be implemented. Further, protection from being struck by falling objects from above will be provided on all job sites.

All areas identified by OSHA are included because, over time, most of these areas will present themselves on job sites even if the exposures are the result of another contractor's work.

Below listed are specific situations where fall protection systems will be utilized.

UNPROTECTED SIDES AND EDGES:

Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is 6 feet or more above a lower level shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems.

LEADING EDGES:

Each employee who is constructing a leading edge 6 feet or more above lower levels shall be protected from falling by guardrail systems, safety net systems, or personal fall arrest systems.

HOIST AREAS:

Each employee in a hoist area shall be protected from falling 6 feet or more to lower levels by guardrail systems or personal fall arrest systems.

If a guardrail system is utilized in a hoist area and portions of the system are removed to facilitate the hoisting operation, and an employee must lean through the access opening or out over the edge of the access opening, that employee must be protected by a fall arrest system.

HOLES:

Each employee on walking/working surfaces shall be protected from falling through holes (including skylights) more than 6 feet above lower levels by personal fall arrest systems, covers, or guardrail systems.

- a. Each employee on a walking/working surface shall be protected from tripping in or stepping into or through holes (including skylights) **(regardless of height)** by covers.
- b. Each employee on a walking/working surface shall be protected from objects falling through holes **(regardless of height)** by covers.

FORMWORK and REINFORCING STEEL:

Each employee on the face of formwork or reinforcing steel shall be protected from falling 6 feet or more to lower levels by personal fall arrest systems, safety net systems, or positioning device systems.

RAMPS, RUNWAYS, and OTHER WALKWAYS:

Each employee on ramps, runways, and other walkways shall be protected from falling 6 feet or more to lower levels by guardrail systems.

EXCAVATIONS:

Each employee at the edge of an excavation 6 feet or more in depth shall be protected from falling by guardrail systems, fences, or barricades when the excavations are not readily seen because of plant growth or other visual barriers.

Further, each employee at the edge of a well, pit, shaft, and similar excavation 6 feet or more in depth shall be protected from falling by guardrail systems, fences, barricades, or covers.

DANGEROUS EQUIPMENT:

Each employee **less than 6 feet** above dangerous equipment shall be protected from falling into or onto the dangerous equipment by guardrail systems or by equipment guards.

Each employee **6 feet or more** above dangerous equipment shall be protected from fall hazards by guardrail systems, personal fall arrest systems, or safety net systems.

OVERHAND BRICKLAYING AND RELATED WORK:

Each employee performing overhand bricklaying and related work 6 feet or more above lower levels shall be protected from falling by guardrail systems, safety net systems, personal fall arrest systems, or shall work in a controlled access zone.

Each employee performing overhand bricklaying and related work who is required to reach more than 10 inches below the level of the walking/working surface on which he/she is working shall be protected from falling by a guardrail system, safety net system, or personal fall arrest system.

ROOFING WORK ON LOW-SLOPED ROOFS:

Each employee engaged in roofing activities on low-sloped roofs with unprotected sides and edges 6 feet or more above lower levels shall be protected from falling by guardrail systems, safety net systems, personal fall arrest systems or a combination of a warning line system and a safety net system or a warning line system and a safety monitoring system.

NOTE: On roofs 50 feet or less in width, the use of a safety monitoring system alone (without the warning line system) is permitted.

STEEP ROOFS:

Each employee on a steep roof with unprotected sides and edges 6 feet or more above lower levels shall be protected from falling by guardrail systems with toeboards, safety net systems, or personal fall arrest systems.

PRECAST CONCRETE ERECTION:

Each employee, engaged in the erection of precast concrete members (including, but not limited to the erection of wall panels, columns, beams, and floor and roof "tee") and related operations such as grouting of precast concrete members, who is 6 feet or more above lower levels shall be protected from falling by guardrail systems, safety net systems, or personal fall arrest systems.

RESIDENTIAL CONSTRUCTION:

Each employee engaged in residential construction activities 6 feet or more above lower levels shall be protected by guardrail systems, safety net systems, or personal fall arrest systems.

WALL OPENINGS:

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

WALKING/WORKING SURFACES NOT OTHERWISE ADDRESSED:

Each employee on a walking/working surface 6 feet or more above a lower level that is not addressed in the preceding fourteen (14) categories shall be protected from falling by a guardrail system, a safety net system, or a personal fall arrest system except when:

- a. working on scaffolds fall protection requirements are covered by subpart L of 29 CFR 1926.
- b. working on certain cranes and derricks fall protection requirements are covered by subpart N of 29 CFR 1926.
- c. performing steel erection work in buildings fall protection requirements are covered by subpart R of 29 CFR 1926.
- d. working on certain types of equipment used in tunneling operations fall protection requirements are covered by subpart S of 29 CFR 1926.
- e. engaged in the construction of electric transmission and distribution lines, equipment fall protection requirements are covered by subpart V of 29 CFR 1926.
- f. working on stairways and ladders fall protection requirements are covered by subpart X of 29 CFR 1926.

NOTE: On multi-employer work sites, employees of all contractors and subcontractors must understand the fall protection hazards that exist and be aware of the various methods of fall protection even if they are NOT directly exposed to fall hazards in their particular work area. For example, a contractor may have a controlled access zone in place and all persons on the job site, regardless of their employer, must understand the importance of remaining outside that CAZ.

PRE-CONSTRUCTION SURVEY

Prior to the initiation of any construction project, the job site will be surveyed by a competent/qualified person to determine:

- a. if fall protection systems will be required.
- b. if fall hazards exist, the types of conventional fall protection systems to be utilized.
 - 1. particular attention will be given to anchorage points, location of warning lines, etc..
- c. rescue procedures to be used if a fall actually occurs.
- d. the load-carrying capabilities of the walking/working surface.
- e. assuring that all personnel utilizing a fall protection system have training in that system.

This survey may be made without the use of fall protection because no work will be accomplished during this survey and installing fall protection systems would create a greater hazard.

If it is determined that certain areas within the overall worksite have fall hazards that cannot be addressed with conventional fall protection systems (those areas being limited to leading edge work, residential construction work, and precast concrete work), **then** a Fall Protection Plan must be prepared to specifically protect employees from these hazards.

FALL PROTECTION SYSTEMS

GUARDRAIL SYSTEM:

A guardrail system is a physical barrier erected to prevent employees from falling to lower levels.

Specific guardrail systems criteria are found in 29 CFR 1926.502(b) and we will erect guardrail systems that comply with the cited criteria.

The main advantage of a guardrail system is that it is a “passive” system which, once installed, requires no employee involvement in its function. A guardrail will stop an employee who inadvertently walks into it.

A guardrail system is an acceptable fall protection system in each of the fifteen (15) OSHA designated work areas save one (1) - “Formwork and Reinforcing Steel.”

GUARDRAIL SYSTEMS AT HOISTING AREAS:

When guardrail systems are used at hoisting areas, a chain, gate or removable guardrail section shall be placed across the access opening between the guardrail sections when hoisting operations are not taking place.

NOTE: If a portion of the guardrail system is removed at a hoisting area to facilitate the hoisting operations **and** an employee must lean out over the opening, then that employee must be protected by a personal fall arrest system. In this instance it is important to remember that the personal fall arrest system may not be attached to the guardrail system.

GUARDRAIL SYSTEMS AT HOLES:

Guardrail systems used at holes shall be erected on all unprotected sides of the edges of the hole.

When the hole is to be used for the passage of materials, the hole shall not have more than two sides provided with removable guardrail sections to allow the passage of materials. When the hole is not in use, it shall be closed over with a cover **or** protected with a guardrail system on all unprotected sides or edges.

NOTE: Guardrails need not be erected around holes while employees are working at the hole, passing materials through the hole, etc.. When work is completed around the hole, the hole must be protected by guardrails on all sides of the hole or by covers.

Guardrail systems used around holes which are used as points of access (such as ladderways) will be provided with a gate or be offset so that a person cannot walk directly into the hole.

GUARDRAIL SYSTEMS ON RAMPS AND RUNWAYS:

Guardrail systems used on ramps and runways shall be erected along each unprotected side or edge. Ramps, runways, and other walkways on which employees need protection from falling 6 feet or more to a lower level must be protected by a guardrail system and only a guardrail system.

PERSONAL FALL ARREST SYSTEM:

A personal fall arrest system is, as the name implies, a means of safety decelerating a falling body before a lower level is hit. The three (3) main components of a personal fall arrest system are the:

- a. anchorage point.
- b. lanyard.
- c. body harness.

NOTE: Body belts **will not** be used in a personal fall arrest system.

Specific personal fall arrest systems criteria are found in 29 CFR 1926.502(d) and we will use personal fall arrest systems that comply with the cited criteria.

The tie-off attachment point must be at or above the connection point on the harness to prevent additional free fall distance.

As are guardrails, personal fall arrest systems are “passive” and require no employee involvement once they are properly rigged.

For all practical purposes, dee-rings and locking type snaphooks shall have a minimum tensile strength of 5,000 pounds and lanyards and vertical lifelines shall have a minimum breaking strength of 5,000 pounds. Anchorages must be capable of supporting 5,000 per employee. Anchorages used in personal fall arrest systems must be independent of any anchorage being used to support or suspend platforms.

NOTE: Knots in a rope lanyard or lifeline can reduce its strength by as much as 50% and having a lanyard go over or around sharp edges can completely destroy its effectiveness.

With the exception that harnesses and components may be used as positioning device systems, personal fall arrest system components may not be used for purposes other than that for which they were designed.

Positioning device system components shall be inspected prior to each use for wear, damage, and other deterioration and defective components shall be removed from service.

Personnel should be aware that should a fall occur and self rescue is not possible, equipment and personnel will be available for rescue.

Should a personal fall arrest system actually be used to stop a fall, it will be removed from service and not used again until inspected and determined to be undamaged and suitable for reuse by a competent person.

SAFETY NET SYSTEM:

Specific safety net systems criteria are found in 29 CFR 1926.502(c).

Safety nets will be installed as close as practicable under the walking/working surface on which employees are working and in no case shall they be more than 30 feet below such level.

Safety nets shall be inspected at least once per week and after an occurrence which could affect the integrity of the system. Defective nets will not be used.

All items that have fallen in a safety net will be removed as soon as possible and at least before the next work shift.

Safety nets will be drop-tested at the job site after initial installation and before being used as a fall protection system; whenever relocated; after major repair; and at six-month intervals if left in one place.

NOTE: If it is demonstrably unreasonable to perform a drop-test, a designated competent person shall prepare a certification in accordance with 29 CFR 1926.502(c)(4)ii.

WARNING LINE SYSTEM:

A warning line system is a barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and which designates an area in which roofing work may take place without the use of guardrail, body belt, or safety net systems to protect employees in the area.

A warning line system is to be used only during roofing work on low-sloped roofs over 50-feet in width with unprotected sides and edges 6-feet or more above lower levels (on a simple rectangular roof, width is the lesser of the two primary overall dimensions. This is also the case with roofs which are sloped toward or away from the roof center). Most importantly, warning line systems must be used in conjunction with either a guardrail system; a safety net system; a personal fall arrest system; or a safety monitoring system.

NOTE: In the above scenario, either a guardrail system, a safety net system, or a personal fall arrest system alone provides adequate fall protection.

Specific warning line systems criteria are found in 29 CFR 1926.502(f) and we will use warning line systems that comply with the cited criteria.

As a general rule, warning line systems will be used in conjunction with a safety monitoring system.

A warning line, made of ropes, wires, chains and supporting stanchions will be flagged at no more than 6-feet intervals with high-visibility material. As the name implies, this line will only “warn” employees that they are approaching an unprotected side or edge. The horizontal resisting force of a warning line is 16 pounds versus 200 pounds for a guardrail system.

No personnel are allowed in the area between a roof edge and a warning line unless they are performing roofing work in that area.

Mechanical equipment on roofs shall only be used in areas that are protected by either a warning line system, a guardrail system, or a personal fall arrest system.

The warning line shall be erected around all sides of the roof work area not less than 6-feet from the roof edge unless mechanical equipment is being used. In that case, the warning line shall be erected not less than 6-feet

from the roof edge which parallels the mechanical operation and not less than 10 feet from the roof edge which is perpendicular to the direction of the mechanical operation.

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. When the aforementioned areas are not in use, the warning line will be adjusted to completely seal off the work area so that a person cannot inadvertently enter the area.

SAFETY MONITORING SYSTEM:

Specific safety monitoring systems criteria are found in 29 CFR 1926.502(h) and we will use safety monitoring systems that comply with the cited criteria.

A safety monitoring system used in conjunction with a warning line system is not considered a “passive system” because it takes active employee involvement and, as such, both the Safety Monitor and the employee(s) being monitored must be alert for fall hazards.

A competent person will perform the duties of Safety Monitor. These duties include:

- a. recognizing fall hazards,
- b. warning the employee when it appears the employee is unaware of a fall hazard or is acting in an unsafe manner,
- c. remaining on the same walking/working surface and within visual sighting of the employee being monitored, and
- d. remaining close enough to communicate orally with the employee being monitored.

The Safety Monitor shall have no other responsibilities which could take the monitor's attention from the monitoring function.

Only the employee engaged in roofing work on low-sloped roofs or an employee covered by a fall protection plan [29 CFR 1926.502(k)] is allowed in the area being protected by the Safety Monitor.

When a safety monitoring system is being used, mechanical equipment will not be used or stored in that controlled zone.

Of course, the employee being monitored is required to comply promptly with the fall hazard warnings from the Safety Monitor.

POSITIONING DEVICE SYSTEM:

A positioning device system consists of a body belt or body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning. It is used during formwork and steel reinforcing.

Specific positioning device systems criteria are found in 29 CFR 1926.502(e) and we will use positioning device systems that comply with the cited criteria.

Positioning device systems must be inspected prior to each use for wear, damage, and other deterioration. Defective components must be removed from service. Components of positioning device systems must never be used for purposes other than that for which they were designed -- specifically fall protection and/or positioning on a vertical surface.

CONTROLLED ACCESS ZONE (CAZ):

A controlled access zone is an area in which certain work activity may take place without the use of guardrail systems, personal fall arrest systems, or safety net systems and access to the zone is controlled.

Specific controlled access zone criteria are found in 29 CFR 1926.502(g). A controlled access zone will be created when appropriate.

Controlled access zones will only be used as part of a fall protection plan (reference 29 CFR 1926.502(k) and *Fall Protection Plan*, below) or when an employee is performing overhand bricklaying and related work.

Persons performing overhand bricklaying or related work that requires reaching more than 10 inches below the walking/working surface may not be afforded fall protection by working in a controlled access zone.

Controlled access zones are work areas that have limited access to only authorized personnel by means of control lines or other means that restrict access.

COVERS:

Covers can prevent an employee from stepping into a hole, tripping over a hole, falling through a hole, or being injured by objects falling through a hole.

NOTE: When work is completed around a hole, the hole must be protected by guardrails on all sides of the hole or by covers.

Specific cover criteria are found in 29 CFR 1926.502(i) and we will use covers that comply with the cited criteria.

Covers must be capable of supporting, without failure, twice the weight of the employees, equipment, and/or materials that may be imposed upon them.

Covers, when used, must be secured to prevent accidental displacement by wind, equipment, or employees.

All covers must be color coded or marked with the word: "HOLE" or "COVER" to identify the hazard.

NOTE: The above does not apply to cast iron manhole covers or roadway steel grates.

Covers, and only covers, will be used on walking/working surfaces to protect employees from tripping or stepping into or through a hole (including skylights). This provision is **regardless of the height** of the hole above a lower surface.

Covers, and only covers, will be used to protect employees from objects falling through holes (including skylights). This provision is **regardless of the height** of the hole above a lower surface.

PROTECTION FROM FALLING OBJECTS:

Specific protection from falling objects criteria are found in 29 CFR 1926.502(j) and we will use that criteria to protect our employees from falling objects.

Covers are to be used to protect employees from objects falling through holes (including skylights) from upper surfaces regardless of heights.

Toeboards, used to prevent objects from falling on employees on a lower level must be at least 3½ inches high with not more than a ¼ inch clearance between the toeboard and the walking/working surface. When tools, materials, or equipment are piled higher than the top edge of the toeboard, paneling or screening will be erected from the top of the toeboard to the appropriate mid or top rail of the guardrail system to provide adequate protection to employees below.

FALL PROTECTION PLAN

The foregoing Fall Protection Program is not a Fall Protection Plan per se. However, implementing the preceding guidelines for conventional fall protection systems coupled with certified formal and hands-on training will provide appropriate fall protection for our employees.

There may be occasions where conventional fall protection systems just will not work. OSHA has determined that these occasions will be limited to:

- a. leading edge work.

NOTE: Leading edge work involves construction which moves the location of the edge forward (backward). Working at the edge of a walking/working surface (such as a roof) is not leading edge work - it is (roofing) work at an unprotected side or edge.

- b. precast concrete construction work.
- c. residential construction work.

The criteria for determination that conventional fall protection systems are infeasible are: 1) it is impossible to perform construction work using conventional fall protection systems, or 2) it is technologically impossible to use conventional fall protection systems. Inconvenience and cost are not acceptable considerations.

Specific Fall Protection Plan criteria are found in 29 CFR 1926.502(k) and, if necessary, a Fall Protection Plan will be completed that complies with the cited criteria.

Fall Protection Plans must be prepared by a qualified person and developed specifically for the site where the work is to be performed. All changes to the Plan must be approved by a qualified person.

NOTE: A qualified person is one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project. OSHA has indicated that an employer may use the services of more than one qualified person to comply with these requirements as long as (1) those persons, collectively, are qualified to prepare the fall protection plan and approve any changes; and (2) the resulting plan complies with the applicable requirements of the standards.

Fall Protection Plans must be maintained at the job site and be up to date.

The implementation of the fall protection plan must be under the supervision of a competent person.

A Fall Protection Plan must document reasons why conventional fall protection systems are infeasible and/or offer a detailed explanation why conventional fall protection systems create a greater hazard in their use than non-use.

All measures taken to reduce or eliminate fall hazards (in lieu of conventional fall protection systems) such as the use of ladders or scaffolds shall be discussed.

In each area where a conventional fall protection system cannot be used, a safety monitoring system must be utilized that conforms with the requirements of 29 CFR 1926(h).

Either the names of the employees or some other means of employee identification (such as armbands or color coded hard hats) will be used to control access to the controlled access zone.

In the event an employee falls or a serious incident occurs, the circumstances will be investigated and changes to the Fall Protection Plan will be made to prevent a reoccurrence of a similar incident.

After completion of all work and after all fall protection systems have been removed, a competent/qualified person may survey the work areas for inspection purposes without the use of fall protection systems. Care will be taken to assure solid footing and focused attention to potential fall hazards.

There are only two (2) instances where employees may be exposed to fall hazards without the use of fall protection systems. Those times are: pre-construction activities (inspecting, investigating, or assessing the workplace) and post-construction activities. During these times, no actual construction work may take place.

ACCIDENTS AND NEAR ACCIDENTS

Accidents and near accidents involving fall hazards will be investigated by the Fall Protection Program Administrator to determine the cause of the incident and a method of preventing a reoccurrence. Questions to be considered are:

- a. Was the fall protection system selected appropriate for the hazard?
- b. Was the system properly installed?
- c. Was the person involved in the accident following proper procedures?
- d. Were there contributing factors such as ice, wind, debris, etc.?
- e. Is retraining or a change of the Fall Protection Plan required?

TRAINING/RETRAINING

Training, which must be certified, will include the following topics:

- a. the nature of fall hazards in the work area.
- b. the correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection to be used.
- c. the use and operation of guardrail systems; personal fall arrest systems; safety net systems' warning line systems; safety monitoring systems' controlled access zones; and other protection to be used.
- d. the role of the Safety Monitor and the role of the employee when a safety monitoring system is used.
- e. the limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs.
- f. the correct procedures for handling and storage of equipment and materials and the erection of overhead protection.
- g. the role of employees in fall protection plans.

Training will be conducted by competent person(s) using the below listed items as resource materials:

- a. this Fall Protection Program.
- b. the manufacturer's instruction manuals that come with fall protection equipment.
- c. OSHA standards pertaining to fall protection which include 29 CFR 1926.500, 501, 502, and 503.
- d. the competent person's work experiences.

Should the competent person, a supervisor, or the Program Administrator suspect that an employee lacks the skills needed for proper fall protection, that employee will be retrained.

Changes in the workplace, types of fall protection systems and equipment will also necessitate retraining.

Only the latest Training Certificate will be kept on file.

FALL PROTECTION AT THE JOB SITE

A quick glance through this Fall Protection Program may leave the reader with the impression that fall protection requires an inordinate amount of attention to small details which, in practice, would render the fall protection provisions of subpart M, 29 CFR 1926 unworkable in real work situations.

The opposite is true. OSHA has gone to great lengths to make subpart M user friendly by incorporating performance-oriented criteria (as opposed to specification-oriented criteria) into their standards. Following a hazard assessment, we will select the most advantageous fall protection system that is compatible with our task needs and our protection requirements.

Lastly, while time, equipment, training, and money are devoted to fall protection systems which either physically prevent persons from falling from height, control the rate of deceleration during an actual fall, prevent objects from falling onto persons below, or warn personnel of restricted areas, we must never forget that it is important not to fall in the first place.

Accidents are more likely to occur as we become "adjusted" to working at height. Most slips, trips and falls are preventable. Proper footwear, wearing hard hats when there is a possibility of falling objects, cleaning up of debris, and paying attention to footing, hand holds, and edges is as important as the fall protection systems themselves.

RESIDENTIAL CONSTRUCTION

OSHA Instruction STD 3-01A

NOTE: OSHA Instruction STD 3.01A is a Fall Protection Compliance Guideline for residential construction. The procedures contained in this instruction will remain in effect until further notice or until completion of a new formal rule making effort addressing these concerns, whichever is earlier.

Reference paragraph (b)(13), 29 CFR 1926.501, Residential Construction, printed below:

Each employee engaged in residential construction activities 6 feet (1.8 m) or more above lower levels shall be protected by guardrail systems, safety net system, or personal fall arrest system unless another provision in paragraph (b) of this section provides for an alternative fall protection measure. Exception: When the employer can demonstrate that it is infeasible or creates a greater hazard to use these systems, the employer shall develop and implement a fall protection plan which meets the requirements of paragraph (k) of 1926.502.

Note: There is a presumption that it is feasible and will not create a greater hazard to implement at least one of the above-listed fall protection systems. Accordingly, the employer has the burden of establishing that it is appropriate to implement a fall protection plan which complies with 1926.502(k) for a particular workplace situation, in lieu of implementing any of those systems.

OSHA interprets “residential construction”, for the purposes of STD 3-01A, to apply to structures where the working environment and the construction material, methods, and procedures employed are essentially the same as those used for typical house (single-family dwelling) and townhouse construction. Discrete parts of a large commercial structure may come within the scope of this directive (for example, a shingled entranceway to a mall), but such coverage does not mean that the entire structure thereby comes within the terms of this directive.

OSHA STANDARD 3-0.1A:

From time to time, OSHA publishes a Directive which provides guidance for compliance for certain activities.

Standard 3-0.1A provides interim guidance for alternate fall protection when dealing with the specific activities residential construction listed below:

- a. Installation of floor joists, floor sheathing, and roof sheathing; erecting exterior walls; setting and bracing roof trusses and rafters.
- b. Working on concrete and block foundation walls and related formwork.

- c. This group consists of the following activities when performed in attics and on roofs: installing drywall, insulation, HVAC systems, electrical systems (including alarms, telephone lines, and cable TV), plumbing and carpentry.
- d. Roofing work (removal, repair, or installation of weatherproofing roofing materials such as shingles, tile and tar paper).

Because the whole concept of Standard 3.01A is, as its title suggests, plain language compliance guidelines, it is printed in its entirety and it is self explanatory.

Click on the below:

[STD 3-0.1A - Plain Language Revision of OSHA Instruction STD 3.1, Interim Fall Protection Compliance Guidelines for Residential Construction](#)

CorTech LLC

FALL PROTECTION PLAN

(Required when standard fall protection systems are not feasible)

With changes: _____
(If no changes, enter "None")

This Fall Protection Plan is specific for the following project:

Project Name: _____

Location of Job: _____

Date Plan Prepared: _____ by: _____
(Must be a Qualified Person)

Date Plan Modified: _____ by: _____
(Must be a Qualified Person)

Date Plan Modified: _____ by: _____
(Must be a Qualified Person)

Plan Approved by: _____

Plan Supervised by: _____

POLICY STATEMENT

Our Fall Protection Program has been developed to protect our employees from the easily identifiable danger associated with working at height: falling. While the general concept of Fall Protection is straight forward, those employees to whom this Program applies must have specific training applicable to their individual jobs. It is recognized that the nature of fall hazards may vary from project to project and even change during a specific project. Training will be on-going to reflect the various existing work situations.

A copy of our Fall Protection Program can be found in the main office at:

50 Glenlake Parkway Suite 340
Atlanta, GA 30328

A copy of our Fall Protection Plan will be found on every applicable Job Site.

FALL PROTECTION SYSTEMS TO BE USED ON THIS JOB

All employees on this job/project will be protected from fall hazards by the use of one or more conventional fall protection systems. These systems include guardrail systems; safety net systems; personal fall arrest systems; positioning device systems; warning line systems; controlled access zones; safety monitoring systems; covers; and protection from falling objects.

Further, the conventional fall protection system used in each required circumstance will be in compliance with 29 CFR 1926.502 which addresses which systems are appropriate (allowed) for specific types of work.

TRAINING

All our personnel working on this job/project have received training in the our Fall Protection Program and are able to recognize fall hazards and understand procedures to minimize these hazards. Further, they have been trained, as necessary, by a competent person qualified in the following areas using both formal and hands on training:

- a. The nature of fall hazards in the work area.
- b. The procedures for erecting, maintaining, disassembling, and inspecting the fall protections to be used.
- c. The use and operation of guardrail systems; personal fall arrest systems; safety net systems' warning line systems; safety monitoring systems' controlled access zones; and other protection to be used.
- d. Their role in the safety monitoring system when this system is used.
- e. The limitations on the use of mechanical equipment during the performance of roofing work on low sloped roofs.
- f. The procedures for handling and storage of equipment and materials and the erection of overhead protection.
- g. The roll of employees in fall protection plans.

ENFORCEMENT

Awareness of and respect for fall hazards, and compliance with all safety rules are of great importance. Appropriate disciplinary action will be taken should an employee disregard our safety guidelines.

ACCIDENT INVESTIGATION

All accidents that result in injury to employees, regardless of their nature, will be investigated and reported. It is important that documentation of accidents take place as soon as possible so that the cause may be determined and steps may be taken to prevent a reoccurrence.

CHANGES TO THIS PLAN

Changes to this plan, specifically a deviation from conventional fall protection systems, will be documented by a qualified person whose name appears on the front of this fall protection plan.

Changes will be limited to:

- a. leading edge work.

NOTE: Leading edge work involves construction which moves the location of the edge forward (backward). Working at the edge of a walking/working surface (such as a roof) is not leading edge work - it is (roofing) work at an unprotected side or edge.

- b. precast concrete construction work.
- c. residential construction work.

The criteria for determination that a conventional fall protection is infeasible is that it is impossible to perform construction work with a conventional fall protection system or it is technologically impossible to use a conventional fall protection system. Inconvenience and cost are not acceptable considerations.

Specific Fall Protection Plan criteria are found in 29 CFR 1926.502(k) and we will, if necessary, create a Fall Protection Plans that comply with the cited criteria.

A separate change will be made for each situation where conventional fall systems cannot be used.

CHANGE TO FALL PROTECTION PLAN

CHANGE NUMBER: _____

This change to the Fall Protection Plan for the below listed project will be attached to the original Fall Protection Plan and a copy will be available at the job site.

Project Name: _____

Location of Job: _____

Date Change Prepared: _____ by: _____
(Must be a Qualified Person)

Date Change Modified: _____ by: _____
(Must be a Qualified Person)

Change Approved by: _____

Change Supervised by: _____

Reference the above.

Changes to this Fall Protection Plan for this specific project are required for the following reason(s):

Specific work that requires fall protection other than conventional fall protection:

Specific work areas where the above work will take place:

Before any non-conventional fall protections are used as part of the work plan, a controlled access zone (CAZ) shall be clearly defined by the competent person _____ as an

(Name(s) of Competent Person)

area where a recognized hazard exists. The demarcation of the CAZ will be communicated by the competent person in a recognized manner such as:

Circle one or more of the below:

- a. signs
- b. wires
- c. tapes
- d. ropes
- e. chains
- f. other: _____

All access to the CAZ will be restricted to authorized entrants. Those entrants will be identified by _____

(Color hard hats; arm bands, etc.)

and are listed below:

The competent person will ensure the protective elements of the CAZ are implemented prior to the beginning of work.

Specific reasons why conventional fall protection is either infeasible or creates a greater hazard:

Specific measures to be taken to reduce or eliminate fall hazards for personnel who cannot be provided conventional fall protection:

In the above CAZ, a safety monitoring system will be implemented in conformance with 29 CFR 1926.502(h).

SAFETY NET INSTALLATION CERTIFICATION

This is to certify that the Safety Net identified below was installed with sufficient clearance under it to prevent contact with the surface or structures below when subjected to an impact force equip to the drop test specified in 29 CFR 1926.502(c)(4)(i).

SAFETY NET MAKE: _____

SAFETY NET MODEL: _____

SAFETY NET LOCATION: _____

It was found to be unreasonable to perform the below listed drop test for the following reasons:

Drop Test (Circle appropriate drop test to which the certification applies):

- a. After initial installation and before using drop test.
- b. After relocation drop test.
- c. After major repair drop test.
- d. After remaining in the same location for 6 months drop test.

(Competent Person)

(Date)

CorTech LLC

HAZARD COMMUNICATION

CorTech LLC

Safety Program

SECTION III

HAZARD COMMUNICATION

INDEX

TOPIC	PAGE
OVERVIEW	1
DEFINITIONS	1
CHEMICAL TYPES AS THEY RELATE TO HEALTH	3
HAZARD DETERMINATION	4
LABELS	5
MATERIAL SAFETY DATA SHEETS (MSDS)	6
LIST OF HAZARDOUS CHEMICAL PRODUCTS	8
TRAINING AND DOCUMENTATION	8
NON-ROUTINE TASKS	9
CHEMICALS IN UNLABELED PIPES	9
SHARING OF INFORMATION	9

OSHA Standards:

29 CFR 1926.59, Hazard Communication

29 CFR 1910.1200, Hazard Communication

29 CFR 1910.1200 Appendix A, Health Hazard Definitions (Mandatory)

29 CFR 1910.1200 Appendix B, Hazard Determination (Mandatory)

29 CFR 1910.1200 Appendix C, Information Sources (Advisory)

Note: The Federal Register of March 7, 1996,
removed 1926.59 Appendix C., [61 FR 9227, March 7, 1996]

29 CFR 1910.1200 Appendix D, Definition of Trade Secret (Mandatory)

29 CFR 1910.1200 Appendix E, Guidelines for Employer Compliance

Forms:

[Found immediately following this program]

List of Hazardous Chemicals

OVERVIEW

Petroleum products, adhesives, sealants -- even saw dust from treated wood! What do these typical job site products have in common? They are all chemicals and their properties may cause harm to an employee if inhaled, ingested, or absorbed into the skin. A common error is thinking that a hazard communication plan is not needed because there are no "hazardous" chemicals such as nitroglycerin or sulfuric acid on the job site. Hazard communication addresses the health and physical hazards associated with essentially all the chemical and chemical products found on the job site.

There may be a tendency to think of common everyday products such as hand cleaners as just that -- hand cleaners. However, even these items are job site chemicals and, if misused, have a health hazard. What possible hazard could be associated with hand cleaner? Quick! Some gritty hand cleaner gets in your eye! What do you do?

This hazard communication plan is designed to make all employees aware that most, if not all, job site chemicals have a downside if improperly used, spilled, transferred or stored. The hazard may be a physical hazard such as an explosion or a health hazard such as cancer.

DEFINITIONS

Article:	a manufactured item which is formed to a specific shape or design during manufacture; has end use function(s) dependent in whole or in part upon its shape or design during end use; and does not release, or otherwise result in exposure to a hazardous chemical under normal conditions of use.
[Note: Articles are exempt from the Hazard Communication standard]	
Hazardous Chemical:	any chemical which is a physical or a health hazard.
Physical Hazard:	a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric (will ignite spontaneously in air at a temperature of 130°F or below), unstable (reactive) or water-reactive.
Health Hazard:	a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principals that acute or chronic health effects may occur in exposed employees.

To clarify the difference between acute and chronic, acute effects occur rapidly as a result of short term exposure and are of short duration. Chronic effects occur as a result of long term exposure and are of a long duration. These terms can overlap. For example, a mild heart attack, with no pain severity, would be termed acute within the first two hours, yet if there were long term effects, it would be termed chronic.

Exempt from hazard communication are “articles”. Note that a manufactured item that has a downstream use is not an article. The below example from 29 CFR 1926.59(f)(2) illustrates this point:

For a solid metal (such as a steel beam or a metal casting) that is not exempted as an article due to its downstream use, the required label may be transmitted to the customer at the time of the initial shipment, and not be included with subsequent shipments to the same employer unless the information on the label changes. The label may be transmitted with the initial shipment itself, or with the material safety data sheet that is to be provided prior to or at the time of first shipment. This exception to requiring labels on every container of hazardous chemicals is only for the solid metal itself and does not apply to hazardous chemicals used in conjunction with, or known to be present with the metal and to which employees handling the metal may be exposed (for example, cutting fluids or lubricants).

Almost all chemicals are considered hazardous -- a steel beam or metal casting does not immediately come to mind as a hazardous chemical. Without a material safety data sheet (MSDS) and/or a label, one cannot assume a chemical is safe.

Even filters for your equipment will have an MSDS. This is because, until it is placed in your equipment, it still has a down stream use and therefore until it is used it is not an article by definition.

Also exempt from the hazard communication standard are chemicals which are regulated by other government agencies such as hazardous waste, food, tobacco products, and normal consumer products that are used in the workplace in the same manner, frequency and duration as normal consumer use and produces the same or less exposure as normal consumer use.

CHEMICAL TYPES AS THEY RELATE TO HEALTH

Below is a list of categories of hazardous chemical types as they relate to health:

- a. Carcinogen or potential carcinogen as determined by the International Agency for Research on Cancer (IARC) or a carcinogen or potential carcinogen as listed in the Annual Report on Carcinogens published by the National Toxicology Program (NTP), latest edition, or as regulated by OSHA as a carcinogen.
- b. Corrosive: A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact. This is not to be confused with, and does not refer to, action on inanimate surfaces.
- c. Highly Toxic: A chemical which is lethal to test animals under specific doses and time limits. Some tests require ingestion, some inhalation, some skin exposure, and some implantation.
- d. Irritant: A chemical which is not a corrosive, but which causes a reversible inflammatory effect on living tissue by chemical action at the site of contact.
- e. Sensitizer: A chemical that causes a substantial proportion of exposed people or animals to develop an allergic reaction in normal tissue after repeated exposure.
- f. Toxic: A chemical which is lethal to test animals under specific doses and time limits. A toxic chemical has a greater dose per weight than a Highly Toxic chemical.

g. Target Organ Effects:

Hepatotoxins: Chemicals which produce liver damage

Signs & Symptoms: Jaundice; liver enlargement

Chemicals: Carbon tetrachloride; nitrosamines

Nephrotoxins: Chemicals which produce kidney damage

Signs & Symptoms: Edema; proteinuria

Chemicals: Halogenated hydrocarbons; uranium

Neurotoxins: Chemicals which produce their primary toxic effects on the nervous system

Signs & Symptoms: Narcosis; behavioral changes; decreased motor function

Chemicals: Mercury; carbon disulfide

Agents which act on the blood or hemotopoietic system: decrease hemoglobin function; deprive the body tissue of oxygen

Signs & Symptoms: Cyanosis; loss of consciousness

Chemicals: Carbon monoxide; cyanides

Agents which damage the lungs: chemicals which irritate or damage the pulmonary tissue

Signs & Symptoms: Cough; tightness in the chest; shortness of breath

Chemicals: Silica; asbestos

Reproductive toxins: Chemicals which affect the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis)

Signs & Symptoms: Birth defects; sterility

Chemicals: Lead; DBCP

Cutaneous hazards: Chemicals which affect the dermal (skin) layer of the body

Signs & symptoms: Defatting of the skin; rashes; irritation

Chemicals: Ketones; chlorinated compounds

Eye hazards: Chemicals which affect the eye or visual capacity

Signs & Symptoms: Conjunctivitis; corneal damage

Chemicals: Organic solvents; acids

The above is to illustrate the broad scope of health hazards.

HAZARD DETERMINATION

The determination of chemical hazards is primarily the responsibility of the manufacturer and/or importer. It is performance-oriented and, surprisingly, there is no specific method required to determine if a chemical or chemical mixture is hazardous. Personal judgment of the evaluator is relied upon and it takes but one scientifically acceptable study to force a chemical onto the hazardous chemical list.

According to OSHA regulations, thousands of studies could indicate complete safety and one study indicate a hazard and the chemical will be deemed a hazard. We will rely on the evaluations of the chemical product's manufacturers or importers. Should hazard information be received from a source other than the manufacturer, it shall be placed in this Hazard Communication Plan.

LABELS

A label is any written, printed, or graphic material displayed on or affixed to containers of hazardous chemicals.

All chemicals used in or on the job site will be properly labeled using the manufacturer's labeling system. Labels will not be removed or defaced. If a chemical is not labeled, it will not be used with the following exception which is quite common with contractors:

portable containers into which hazardous chemicals are transferred from labeled containers need not be labeled if they are for immediate use of the employee who makes the transfer.

To simplify the above, one may take a hazardous chemical (*example*: paint) out of a labeled container and put it into a smaller, unlabeled container (*example*: paint tray), for immediate use. OSHA defines "immediate use" as being under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.

The label must clearly state:

- a. the identity of the hazardous chemical(s).
- b. the appropriate hazard warning.
- c. the name and address of the manufacturer.

Appropriate hazard warnings would contain:

- a. instruction for proper and safe use. This would include obvious information such as, "do not ingest" or "do not spray in eyes" as well as less obvious information such as, "caustic, wear rubber gloves"
- b. first aid instructions
- c. fire containment instructions
- d. storage
- e. disposal instructions

Treat empty containers of hazardous materials as if they were full. Proper disposal is a must!

MATERIAL SAFETY DATA SHEETS (MSDS)

It is required that material safety data sheets (MSDS) be maintained for all hazardous chemicals in our inventory. The information contained on MSDS must be readily accessible to the individual(s) using the products and we will share that information with whom we may work.

Chemicals come in all forms of matter: liquid, solid, and gas; they can be found as sludge, vapor, mist, dust, etc..

How would one know what a chemical smelled or looked like? How would one be able to administer first aid quickly? Where would you find the proper procedure for cleaning up a spill? Where would you find a listing of symptoms caused by inadvertent exposure to a chemical or chemical mixture? Where would you find fire fighting procedures? These questions and many others are answered on Material Safety Data Sheets (MSDS).

The Safety Director will be notified immediately if a chemical is in inventory without an MSDS. Should that event occur, the Safety Director will submit a letter to the manufacturer or distributor requesting an MSDS.

Personnel utilizing a new chemical product will review the MSDS before initial use. New chemical products will be added to our List of Hazardous Chemicals.

While there is no specific format, the following information will be found on an MSDS:

- a. identity (chemical or common name) which will be the same as on the label and on the required list of hazardous chemicals.
- b. hazardous chemical ingredients -- both the chemical and common name(s).
- c. physical and chemical characteristics such as boiling point, flash point, solubility in water, etc.. Two of the most important items to be found in this category are appearance and odor. It is important to be able to identify chemicals rapidly and appearance and odor are of great value in initial determination.
- d. physical hazards which would include the potential for explosion, fire, and reactivity. Also included in this section are the flash point and auto ignition temperature. Special fire fighting procedures are also noted and should be carefully studied by potential users.

- e. health hazards which include first aid procedures, signs and symptoms of exposure, medical dangers, exposure limits, routes of entry, precautions for safe handling, potential carcinogen information, and whether professional medical response is required after a mishap.
- f. chemical reactivity which includes stability, incompatibility with other chemicals, hazardous decomposition products and hazardous polymerization. Special conditions to avoid may also be included.
- g. spill and/or leak procedures which include approved waste disposal methods.
- h. special handling information which includes appropriate hygienic practices, protective equipment requirements, and needed ventilation.
- i. special precautions which would include applicable control measures known to the manufacturer and/or importer. Should it be determined there are special advisories that pertain to our company, the advisories will be placed in this section of the MSDS.
- j. the name, address and telephone number as well as the date of preparation or revision must be included.

Of course, you are not required to memorize nor are you expected to know all the information contained therein; however, you are expected to know where to find information when it is needed and you are expected to ask any questions to clear up any uncertainties that you may have concerning chemicals in the workplace.

Particular attention should be paid to:

- a. Identification/detection of a hazardous chemical. This would include odor and color as well as container labeling.
- b. Physical hazards of the hazardous chemical. This information would include the potential for fire, explosion, and reactivity. Reactivity, in chemistry, is defined as "the reciprocal action of chemical agents upon each other; chemical change." The MSDS will indicate proper procedures for fire extinguishing, including special precautions, if needed.
- c. The health hazards of the chemical. Routes of entry are noted. A chemical may enter the body through ingestion, inhalation, absorption, or injection. Signs and symptoms are indicated such as irritation of the skin, redness of the eyes, nausea, etc.. Health hazards are defined as acute, chronic or both. Carcinogenicity is

indicated. First Aid procedures are explained as well as notes to a treating physician, if appropriate.

Methods to lessen or prevent exposure are explained. The need for protective equipment such as rubber gloves, disposable suits, respirators, goggles, etc. is explained. Hygienic work practices are re-enforced such as keeping the product away from food and washing hands after use.

The MSDS has a wealth of information which is to be made available to all employees and to anyone who wants to review them. There is nothing secret about an MSDS; its whole purpose is the dissemination of information. It provides awareness.

Should an employee not be able to read English, the information contained on MSDS and labels (and any other warning sign) will be given orally or written in that employee's language. The actual labels, MSDS, and all warning signs must be written in English.

LIST OF HAZARDOUS CHEMICAL PRODUCTS

A list will be maintained of all hazardous chemical products in our inventory. This list will be arranged alphabetically by trade or common name and be readily available to our employees. This will also be the order in which our MSDS are filed.

TRAINING AND DOCUMENTATION

The Safety Director is responsible for employee training and will ensure that all new employees attend training on our Hazard Communication Plan prior to initial work assignment. Training shall include:

- a. Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area. The primary method to detect the presence of a release is sight and smell. As mentioned above, the appearance and odor of a hazardous chemical can be found on the MSDS for that chemical.
- b. Physical and health hazards of the chemicals in the workplace. Again, this information is found on the appropriate MSDS.
- c. Measures to take to protect the employee from chemical hazards. This Hazard Communication Program, the specific MSDS, as well as oral and hands on training and instruction provide the basis for measures to protect one's self. Where required protective equipment will be provided. Never minimize the value of protective safety equipment. For example, the use of relatively inexpensive eye protection could easily save your eyesight.

Each employee will sign a form indicating that they have attended training and understand the above.

Annually, all employees will receive refresher training to ensure that awareness is maintained. Furthermore, with the introduction of each new hazard, not necessarily each new chemical, training will be given with specific emphasis on emergency procedures as noted on the MSDS. This training will include procedures for handling leaks and spills, personal protection equipment if required, decontamination procedures, etc..

NON-ROUTINE TASKS

Prior to performing a non-routine task, an employee will be given information by a competent person or supervisor concerning the hazardous chemicals to which he may be exposed. This information will include:

- a. Specific chemical hazards
- b. Protective/safety measures the employee may take.
- c. Measures taken to lessen the hazards including ventilation, respirators, presence of another employee and emergency procedures.

CHEMICALS IN UNLABELED PIPES

Should work activities be performed in areas where chemicals are transferred through unlabeled pipes, the employee shall be informed by the competent person or supervisor of:

- a. The chemical in the pipes.
- b. Potential Hazards.
- c. Safety precautions to be taken.

SHARING OF INFORMATION

The competent person on the job site will inform those with whom we work of any hazardous chemical products we are using and will provide them with the appropriate MSDS for their review. MSDS for all chemical products used on the job site will be readily available.

Should we introduce a new chemical product to the job site that contains a physical or health safety hazard, the product's MSDS will accompany that product and, before use, employees will be given instruction on the products hazards. This information will be shared with other contractors with whom we may be working. Employees are to be kept informed of the chemical products being used by other contractors if they pose a safety hazard.

CorTech LLC

LIST OF HAZARDOUS CHEMICALS

The Material Safety Data Sheets for the below listed Hazardous Chemicals following this list. The Material Safety Data Sheets are arranged in the order listed below:

[illegible]

CorTech LLC

PERMIT-REQUIRED CONFINED SPACE PROGRAM

CorTech LLC

Safety Program

SECTION III

PERMIT-REQUIRED CONFINED SPACE

INDEX

TOPIC	PAGE
OVERVIEW	1
CONFINED SPACES	1
DEFINITIONS	2
JOB SITE EVALUATION	6
STANDARD PROCEDURES FOR PERMIT-REQUIRED CONFINED SPACE ENTRY..	7
CONFINED SPACE ENTRY USING FORCED AIR VENTILATION FOR	12
CONTROL OF HAZARDOUS ATMOSPHERE	
TRAINING	14
REVIEW OF PROGRAM	18
RE-DESIGNATION OF CONFINED SPACES	18
SUMMARY	19

OSHA Standards:

29 CFR 1910.1046, Permit-Required Confined Spaces

29 CFR 1910.1000, Air Contaminants

Table Z-1, Limits for Air Contaminants

Table Z-2, No Title

Table Z-3, Mineral Dusts

Forms:

[Found immediately following this program]

Emergency Phone Numbers

Permit-Space Information & Attendant Designation

Entry Roster

Entry Permit & Pre-Entry Checklist

Pre-Entry Checklist for Confined Space Entry Using Forced Air
Ventilation for Control of Hazardous Atmosphere - Parts 1 & 2

OVERVIEW

As a contractor, we are subject to 29 CFR 1926 standards. According to 29 CFR 1926.21(b)(6)(i), Safety Training and Education, all employees required to enter into confined or enclosed spaces shall be instructed as to the nature of the hazards involved, the necessary precautions to be taken, and in the use of protective and emergency equipment required. We are to comply with any specific regulations applying to this potentially dangerous situation.

29 CFR 1910.146, Permit-Required Confined Spaces, applies to confined space entry.

CONFINED SPACES

Confined spaces are dangerous because of their configuration, their actual or potential atmosphere, and other hazards that may present themselves such as engulfment.

This Program is designed to:

- a. identify and evaluate permit space hazards before entry.
- b. provide a system of testing conditions before entry and monitoring conditions during entry.
- c. provide a system of preventing unauthorized entry.
- d. provide a method of eliminating or controlling hazards for safe permit-space entry operations.
- e. provide a method of ensuring at least one (1) Attendant is stationed outside the permit space for the duration of the entry operations.
- f. provide a method of coordinating and monitoring entry operations when employees of more than one employer are to be working in the permit space.
- g. provide appropriate procedures for emergency rescue.
- h. establish a written procedure for preparation, issuance, use, and cancellation of entry permits.
- i. provide a system for review and revision of our Program.
- j. provide a complete understanding of OSHA Standard 29 CFR 1910.146 for all workers affected by the provisions.

After all is said and done, the bottom line is this:

a. A confined space is a space that:

is large enough and so configured that an employee can bodily enter and perform assigned work; and

has limited or restricted means for entry or exit. On the job site, these spaces may include: ventilation or exhaust ducts, bins and tanks, boilers, sewers, tunnels and open top spaces more than 4 feet in depth such as pits, tubs, and vessels; and

is not designed for continuous employee occupancy.

b. A Permit-Required Confined Space is:

a confined space that contains any recognized serious safety or health hazards.

DEFINITIONS

The Permit-Required Confined Space standard contains terms which must be understood by all those involved with entry to confined space, permit-required or not. These terms should be known to avoid miscommunication:

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

ATTENDANT: an individual stationed outside one or more permit spaces who monitors the Authorized Entrants and who performs all Attendant's duties identified and assigned in our permit-required confined space program.

AUTHORIZED ENTRANT: denotes an employee who is authorized to enter a permit space.

BLANKING OR BLINDING: the absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore, and is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

DOUBLE BLOCK AND BLEED: the closure of a line, duct, or pipe by closing and locking or tagging two in-line valves, and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

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

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

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

ENTRY PERMIT (*PERMIT*): the document that is prepared to allow and control entry into a permit space and that contains the below listed information:

- a. the permit space to be entered.
- b. the purpose of the entry.
- c. the date and authorized duration of the entry permit.
- d. the authorized entrants listed in a manner that will allow the attendant to determine, for the duration of the permit, quickly and accurately which entrants are inside the confined space.
- e. the names of personnel currently serving as attendants.
- f. the name of the individual serving as entry supervisor, with a space for the signature or initials of the entry supervisor who originally authorized entry.
- g. the hazards of the permit space to be entered.
- h. the measures used to isolate the permit space and to eliminate or control permit space hazards before entry, i.e., lockout or tagging of equipment, as well as procedures for purging, inerting, ventilating, and flushing permit spaces.
- i. the acceptable conditions.
- j. The results of initial and periodic tests accompanied by the names or initials of the testers and by an indication of when the tests were performed. Permit space conditions will be evaluated as follows:
 1. testing of conditions in the permit space to determine if acceptable entry conditions exist before entry is authorized to begin. If isolation of the space is not feasible because the space is large or is part of a continuous system (such as a sewer), pre-entry testing

shall be performed to the extent feasible before entry is authorized. If entry is authorized, entry conditions shall be continuously monitored in the areas where Authorized Entrants are working.

2. testing and/or monitoring the permit space as necessary to determine if acceptable entry conditions are being maintained during the course of entry operations.
3. testing for atmospheric conditions will be conducted in this order: 1) oxygen; 2) combustible gases and vapors; and 3) toxic gases and vapors.

ENTRY SUPERVISOR: the person responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required.

HAZARDOUS ATMOSPHERE: an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (i.e., escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

- a. flammable gas, vapor, or mist in excess of 10% of its lower flammable limit.
- b. airborne combustible dust at a concentration that meets or exceeds its lower flammable limit.
- c. atmosphere oxygen concentration below 19.5% or above 23.5%.
- d. atmospheric concentration of any substance for which a dose or permissible exposure limit is published in Subpart G, *Occupational Health and Environmental Control*, or Subpart Z, *Toxic and Hazardous Substances*, (29 CFR 1910), and which could result in employee exposure in excess of its dose or permissible exposure limit.
- e. any other atmospheric condition that is immediately dangerous to life or health.

HOT WORK PERMIT: the written authorization to perform operations capable of providing a source of ignition, i.e., riveting, welding, cutting, burning, and heating.

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH): any condition that poses an immediate or delayed threat to life, causes irreversible adverse health effects, or interferes with an individual's ability to escape unaided from a permit space.

INERTING: The displacement of the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible.

[NOTE: This procedure produces an IDLH oxygen-deficient atmosphere.]

ISOLATION: the process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as: blanking or blinding; misaligning or removing sections of line, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources or energy; or blocking or disconnecting all mechanical linkages.

LFL: lower flammable limit.

LINE BREAKING: the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

NON-PERMIT CONFINED SPACE: a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

OXYGEN DEFICIENT ATMOSPHERE: an atmosphere containing less than 19.5 percent oxygen by volume.

OXYGEN ENRICHED ATMOSPHERE: an atmosphere containing more than 23.5 percent oxygen by volume.

PEL: Permissible Exposure Limit.

PERMIT-REQUIRED CONFINED SPACE: a confined space that has one or more of the following characteristics:

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

PERMIT SYSTEM: our written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

PROHIBITED CONDITION: any conditions in a permit space that is not allowed by the permit during the period when entry is authorized.

RESCUE SERVICE: the personnel designated to rescue employees from permit spaces.

RETRIEVAL SYSTEM: the equipment (including a retrieval line, chest or full body harness, wristlets if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

STRATIFIED ATMOSPHERE: layered atmosphere.

TESTING: the process by which the hazards confronting entrants of a permit space are identified and evaluated. Testing includes specifying the tests to be performed in the permit space.

JOB SITE EVALUATION

The Entry Supervisor will evaluate the job site to determine if any spaces are permit-required spaces. Should a permit-required confined space(s) be identified, all exposed employees will be informed of the location and danger by posting a sign that reads:

**DANGER--PERMIT-REQUIRED CONFINED SPACE
DO NOT ENTER**

Personnel are not allowed in the Permit-Required Confined Space except under the provisions of this Program. The above sign shall remain in place unless the space is reevaluated and re-designated a non-permit confined space. By the same token, non-permit confined space(s) shall be reevaluated as configurations, uses, and changes in hazards are identified, and, if necessary, re-classified as a permit-required confined space.

In the absence of other guidelines, this Program will be used for all Permit-Space Entry by our employees. When working with a client that has permit spaces, we will:

- a. inform the client that the workplace contains permit spaces and that permit space entry is allowed only through compliance with a permit-required confined space program meeting the requirements of 29 CFR 1910.146.
- b. inform the client of reasons that make the confined space a permit-required confined space.
- c. seek information from the client concerning their experience with the space in question and the hazards associated with it.
- d. seek any information from the client concerning any precautions or procedures they have implemented for the protection of employees in or near permit spaces where our employees will be working.

- e. should our employees and a client's employees be working near or in the same permit-required confined space, one person will be designated Senior Attendant and have authority over the other Attendants. This authority will be in writing.

A decision flow chart will be used to identify permit-required confined spaces.

As a general policy, no employee shall enter any confined space, permit-required or not, unless entry is dictated by work assignment. Entry of permit-required confined spaces will be made under the provisions of this Program.

STANDARD PROCEDURES FOR PERMIT-REQUIRED CONFINED SPACE ENTRY

MEASURES TO PREVENT UNAUTHORIZED ENTRY

Unauthorized entry will be prevented by:

- a. posting of the below sign:

**DANGER--PERMIT-REQUIRED CONFINED SPACE
DO NOT ENTER**

- b. posting of Attendants outside the permit-required confined space to ensure that unauthorized personnel are not allowed in.
- c. ensuring that the Entry Supervisor is aware of his authority, under 29 CFR 1910.146(j)(5), to remove unauthorized individuals who enter or attempt to enter the permit space during entry operations.
- d. ensuring the Authorized Entrants are aware of the provisions of 29 CFR 1910.146(h)(5)(iii) which requires an immediate evacuation in the event of the detection of a prohibited condition. An unauthorized entrant is a prohibited condition.

A roster system which allows the Attendant to keep track of the Authorized Entrants within the permit space will be used. The times in and out are recorded. This system accomplishes two major safety goals and one time management goal:

- a. identifies who is actually in the permit-required space.
- b. records the time of exposure to the hazardous condition(s).
- c. documents the time required for accomplishing the assigned task.

ATMOSPHERIC TESTING

Atmospheric testing is required for two (2) distinct purposes: evaluation of the hazards of the permit space and verification that acceptable conditions exist for entry into that space.

- a. Evaluation testing.** The atmosphere of a confined space should be analyzed using equipment of sufficient sensitivity and specificity to identify and evaluate any hazardous atmospheres existing or arising so that appropriate permit entry procedures can be developed and acceptable entry conditions stipulated for that space. Evaluation and interpretation of these data and development of the entry procedure should be reviewed by a technically qualified professional (e.g., OSHA consultation service, certified industrial hygienist, registered safety engineer, or certified safety professional) based on evaluation of all serious hazards.
- b. Verification testing.** The atmosphere of a permit space which may contain a hazardous atmosphere should be tested for residues of all contaminants identified by evaluation testing using permit specified equipment to determine that residual concentration at the time of testing and entry are within the range of acceptable entry conditions. Testing order should be oxygen, flammables, then toxics. Results of testing (i.e., actual concentration) should be recorded on the permit in the space provided adjacent to the stipulated acceptable entry condition.

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

Testing stratified (layered) atmospheres. When monitoring for entries involving a descent into atmospheres which may be stratified, the atmospheric envelope should be tested at a distance of approximately four (4) feet in the direction of travel and to each side. If a sampling probe is used, the entrant's rate of progress should be slowed to accommodate the sampling speed and detector response.

Periodic re-testing will verify the atmosphere remains within acceptable entry conditions.

PROCEDURES AND PRACTICES FOR PERMIT SPACE ENTRY

The confined space will be evaluated to determine if, in fact, it is a Permit-Required Confined Space. The decision process will be aided by using the Permit-Required Confined Space Decision Flow Chart. The Entry Supervisor will make this determination.

Questions to be answered in the decision making process include:

- a. Does the atmosphere have an oxygen content of between 19.5% and 23.0% by volume?
- b. Does the atmosphere contain or have a potential to contain a hazardous atmosphere?
- c. Does the confined space contain a material with a potential for engulfing the entrant?
- d. Does the confined space have an internal configuration capable of entrapping or asphyxiating the entrant?
- e. Does the confined space contain any other recognized hazards?

Once it has been determined that the procedures for Permit-Required Confined Space operations will be implemented, the following actions will be taken:

- a. the space will be secured and isolated to prevent non-authorized entry. Barriers, or some other protection as dictated by circumstance, will be erected or installed to protect entrants from external hazards such as pedestrians, vehicles, falling objects, etc..
- b. the Pre-Entry Check List will be prepared.
- c. a check will be made of the records of all personnel involved with the operations to insure they have had appropriate training for the hazards involved. Material Safety Data Sheets will be made available.
- d. before entry, a comprehensive rescue plan will be written and a check of the rescue team's qualifications will be made.
- e. all feasible engineering controls will be implemented. The atmosphere will be purged, ventilated, inerted, and/or flushed to control or eliminate the hazardous atmosphere.
- f. before entry, all personnel involved will review the Pre-Entry Check List and have a completed understanding of what the operations are to accomplish, the safety measures available, and the rescue plan.
- g. all available data will be sought from our client concerning the space including its history, its hazards, their experience with the space and, if applicable, problems encountered. At the completion of the project, all information pertinent to the confined space operation will be provided to the client. Coordination of work and the assignment of one (1) Senior Attendant will be made.

Throughout the duration of an authorized entry into a permit confined space, conditions will be continually verified for acceptability.

After all measures listed above: training; testing; identification of hazards; evaluation; specifying acceptable entry conditions; controlling the atmospheric hazards and other identified hazards through engineering controls, such as forced air ventilation, isolation, and control of hazardous energy (lockout/tagout); preparing a rescue plan; barricading; equipping the appropriate employees with personal protective gear and notifying them of all hazards involved with the entry, etc., the Entry Permit will be issued and signed by the Entry Supervisor.

The duration of the Entry Permit may not exceed the time required to complete the assigned task identified on the permit and will be terminated:

- a. when the assigned task is completed.
- b. when a condition that is not allowed under the entry permit arises in or near the permit space.

During Permit-Required Confined Space entry, employees will be provided, at no cost, the following:

- a. testing and monitoring equipment to test conditions in the permit space to determine if acceptable entry conditions exist before entry is authorized to begin and, if acceptable conditions exist, to continually monitor conditions during the entry process to ensure that acceptable conditions are maintained.
- b. ventilating equipment, if required, to maintain acceptable atmospheric conditions.
- c. communications equipment, or a method of communicating, between the entrant(s) and the Attendant.
- d. personal protective equipment should feasible engineering controls not adequately protect the entrants.
- e. adequate lighting to provide safe working conditions and enhance the ability of entrants to safely and quickly evacuate the permit-required confined space in an emergency.
- f. required equipment, such as ladders, for safe entry and exit for the Authorized Entrants.
- g. rescue equipment, such as wristlets, life lines, and harnesses to extricate entrants in the event of an emergency. The Emergency Rescue Plan will be implemented so that rescue personnel are either on call or on station with adequate medical resources.

RESCUE AND EMERGENCY SERVICES PLAN

One of the most important elements of any Permit-Required Confined Space Program is the Rescue and Emergency Services Plan. There shall be, as a matter of policy, at least one Attendant for each applicable confined space. Regardless of the emergency, if only one Attendant is on duty, he shall not enter a Permit-Required Confined Space to attempt a rescue until replaced by a second Attendant as required by 29 CFR 1910.146 (i)(4).

Should an employee be assigned to be a member of a Rescue Team, that employee must have had documented training in:

- a. proper use of personal protective equipment and rescue equipment.
- b. the same training as required of the entrant.
- c. a simulated rescue within at least twelve (12) months in the same type of confined space (i.e., representative space of the same general dimensions, opening size, hazard type, and accessibility.)

At least one member of the Rescue Team must be trained and certified in basic first aid and cardiopulmonary resuscitation (CPR) and that documentation will be on file. This person must also have training in bloodborne pathogens and exposure control.

As a general procedure, we will notify the local Emergency Rescue Department before permit-required confined space entry is made to coordinate a possible rescue before the fact. The local Emergency Department will be informed of the exact location of the project, the hazards involved, the number of entrants, the types of protective equipment worn by the entrants, and, if needed, a practice rescue will be accomplished.

Non-entry rescue will be used by retrieval systems, where possible, in lieu of actual entry unless the retrieval system would contribute to the overall risk of the entrant.

Retrieval systems to be considered include:

- a. a chest or full body harness with a retrieval line attached at the center of the entrant's back near shoulder level.
- b. wristlets if they create a lesser danger to the entrant than the above.
- c. a retrieval line attached to a mechanical lifting (pulling) device fixed to an anchorage outside the permit space.

Should a potential rescue be required to retrieve an entrant from a five (5) foot vertical drop, a mechanical retrieval device will be employed.

The Attendant will have on site the MSDS for all chemical substances to which the entrant will be exposed. The emergency responders as well as the treating hospital will be provided this information.

The rescue procedure to be used will be noted on the Entry Permit before entry.

**CONFINED SPACE ENTRY USING FORCED AIR VENTILATION
FOR CONTROL OF HAZARDOUS ATMOSPHERE
(NO OTHER HAZARDS ARE IDENTIFIED)**

IF it can be demonstrated that the only hazard posed by the permit space is an actual or potential hazardous atmosphere; and

IF it can be demonstrated that continuous forced air ventilation alone is sufficient to maintain that permit space safe for entry; and

IF monitoring and inspection data supports the above; and

IF the initial entry of the permit space is necessary to obtain the above data, it is carried out by the complete Permit-Required Confined Space Program; and

IF the determinations and supporting data for the above are documented and made available to each employee who enter the permit space; then

ENTRY may be made provided:

THAT any conditions making it unsafe to remove an entrance cover have been eliminated before the cover is removed; and

THAT when the entrance covers are removed, the openings shall be promptly guarded by a railing, temporary cover, or other temporary barrier preventing an accidental fall through the opening, and protecting each employee working in the space from foreign objects entering the space; and

THAT before entering the space, the internal atmosphere shall be tested, with a calibrated direct-reading instrument, for the following conditions in the order given:

- a. Oxygen content.
- b. Flammable gasses and vapors.
- c. Potential toxic air contaminants; and

THAT there be no hazardous atmosphere within the space whenever any employee is inside the space; and

THAT continuous forced air ventilation shall be used, as follows:

- a. no employee may enter the space until the forced air ventilation has eliminated any hazardous atmosphere; and
- b. the forced air ventilation will be so directed as to ventilate the immediate areas where an employee is or will be present within the space and shall continue until all employees have left the space; and
- c. the air supply for the forced air ventilation shall be from a clean source and may not increase the hazards in the space; and

THAT the atmosphere within the space shall be periodically tested as necessary to ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere; and

THAT if a hazardous atmosphere is detected during entry:

- a. each employee shall leave the space immediately; and
- b. the space will be evaluated to determine how the hazardous atmosphere developed; and
- c. measures will be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place; and

THAT all the above is verified with a written certification that contains the date, location of the space, and the signature of the person providing the certification before entry and made available to each employee entering the space.

THEN, per 29 CFR 1910.146(c)(5)(i) & (c)(5)(ii), we may use an alternate procedure for Confined Space Entry which does not require compliance with the following provisions of 29 CFR 1910.146:

- a. Permit-Required Confined Space Program.
- b. Permit System.
- c. Entry Permit.
- d. Duties of Authorized Entrants.
- e. Duties of Attendants.
- f. Duties of Entry Supervisors.
- g. Rescue and Emergency Services.

In spite of the above, this type of confined space is still a Permit-Required Confined Space. We are only talking about authorized entry here. Remember, when the forced air ventilation has been removed, the hazardous atmosphere will return.

At first glance, this may seem like a way to avoid much of the paperwork and compliance requirements. To a small degree, it is. However, the confined space which falls under these provisions of the OSHA standard do require documented evaluation, training of employees, barricading of the area, a plan for emergency contingencies, and record keeping. Adherence to all applicable safety standards and practices must be maintained.

This is an alternate set of procedures which may or may not be used. If they are used, all employees should be aware that their safety is first and foremost and that provisions of 29 CFR 1910 (5)(c)(i) & (5)(c)(ii) will be adhered to. Specifically, what we are dealing with is a space with only one hazardous condition (atmosphere) before any action (i.e., forced air ventilation) is taken. Before entry is made the hazardous atmosphere is made acceptable through continuous forced air ventilation and the safety of the atmosphere is periodically checked to ensure that the atmosphere remains safe whenever an employee is within the space in question.

TRAINING

Training will be given to all employees whose work is regulated by this plan. Training will ensure that these persons have the knowledge and skills necessary for the safe accomplishment of their assigned jobs with a confined space. Training will include the duties and responsibilities of each Permit-Required Confined Space position: Authorized Entrant, Attendant, Entry Supervisor, and Rescue Team Member.

Training will be certified with the trainee's name and signature; the trainer's name and signature; and the date of the training. This will be available for inspection by the employees and their authorized representatives.

Training will be accomplished before any assignment involving permit-required confined space operations and when there is a change in assigned duties. Further training will be given at the introduction of a new hazard for which the employee has not been trained.

Should actual job experience indicate a lack of knowledge or proficiency, training will be re-accomplished.

Training for the various Permit-Required Confined Space job positions is noted below.

AUTHORIZED ENTRANTS:

Authorized Entrants will be trained in:

- a. an awareness of the hazards that may be encountered during entry, including: information on the mode, signs or symptoms, and consequences of the exposure.
- b. proper use of monitoring equipment, ventilation equipment, communications equipment, personal protective equipment, lighting equipment, rescue equipment, entry and egress equipment, barriers to protect entrants from external hazards, and other equipment necessary for safe entry into and rescue from permit spaces.
- c. the skills necessary to communicate with the Attendant should a reason for evacuation be present.
- d. the requirement to alert the Attendant whenever:
 1. the entrant notices a warning sign or symptom of exposure to a dangerous situation. An example of this may be a tingling of the skin, dizziness, or a headache. Consult the Material Safety Data Sheets for information on specific chemical hazards.
 2. a prohibited condition is detected.
- e. exit procedures which include the need to exit the permit space as quickly as possible whenever:
 1. an order to evacuate is given by the attendant or the Entry Supervisor.
 2. the entrant recognizes any warning sign or symptom of exposure to a dangerous situation.
 3. a prohibited condition is recognized.
 4. an evacuation alarm is activated.

ATTENDANTS:

Attendants will be trained in:

- a. an awareness of the hazards that may be encountered during entry, including the mode, signs or symptoms, and consequences of the exposure.
- b. an awareness of possible behavioral effects of hazard exposure in Authorized Entrants.

- c. the method used to continuously maintain an accurate count of Authorized Entrants in the permit space and the use of a roster on the entry permit to readily identify who is in the permit space.
- d. the requirement that, while an external rescue attempt may be attempted (such as the use of an external retrieval system), they may not attempt to enter a permit-required confined space to attempt a rescue under any circumstances unless:
 - 1. they are relieved by a second Attendant.
 - 2. they are thoroughly trained and certified in appropriate rescue techniques as required by the Rescue and Emergency Services Plan of this Program.
- e. communication procedures, as necessary, with Authorized Entrants to monitor entrant status and alert entrants of the need to evacuate if one of the following conditions presents itself:
 - 1. a prohibited condition is detected by the Attendant.
 - 2. the Attendant detects the behavioral effects of hazard exposure in an Authorized Entrant.
 - 3. the Attendant detects a situation outside the space that could endanger the Authorized Entrants.
 - 4. the Attendant realizes that he/she cannot perform all the required duties of this Plan.
- f. the procedures to summon rescue and other emergency services as soon as the Attendant determines that Authorized Entrants need assistance to escape from permit space hazards.
- g. taking the following steps when unauthorized persons approach or enter a permit space while entry is underway:
 - 1. warn the unauthorized persons that they must stay away from the permit space.
 - 2. advise the unauthorized persons they must exit immediately if they have entered the permit space.
 - 3. inform the Authorized Entrants and the Entry Supervisor if unauthorized persons have entered the permit space.
- h. the procedures for safe non-entry rescues as specified by our rescue procedure.

- i. an awareness that no duties may be performed which might interfere with the Attendant's primary duty to monitor and protect the Authorized Entrants. The Attendant must remain outside the Permit Space during entry operations until relieved by another Attendant.

ENTRY SUPERVISOR:

The Entry Supervisor will be trained in:

- a. an awareness of the hazards that may be encountered during entry including information of the mode, signs, symptoms, and consequences of the hazard exposure.
- b. verification procedures, especially checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted, and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin.
- c. termination procedures. Operations will terminate when:
 - 1. the entry operations covered by the entry permit have been completed, or
 - 2. a condition arises in or near the permit space that is not allowed.
- d. verifying that rescue services are available and that means for summoning them are operational.
- e. an awareness that unauthorized personnel who enter or attempt to enter the permit space must be removed.
- f. maintaining entry operations consistent with the terms of the entry permit. Whenever responsibility for a permit space entry operation is transferred, and at intervals dictated by the hazards and operations performed within the space, the entry operations must remain consistent with the terms of the entry permit and acceptable entry conditions must be maintained.

RESCUE AND EMERGENCY SERVICES:

Rescue and Emergency Services (Teams and/or Personnel) will be trained and knowledgeable in all areas applicable to Authorized Entrants as well as:

- a. the use of personal protective equipment and rescue equipment.
- b. rescue duties consistent with the permit space involved and the identified hazards or potential hazards.
- c. first aid -- at least one (1) member of a rescue team will be certified in basic first aid and CPR.

Assigned rescue personnel must complete permit space simulated rescues at least once every twelve (12) months from representative permit spaces similar to the permit space in question with regard to size, configuration, hazards involved, accessibility, and opening size.

REVIEW OF PROGRAM

Canceled entry permits will be retained for at least one (1) year to facilitate the review of the permit-required confined space program. Any problems encountered during an entry operation will be noted on the appropriate permit so this program may be revised to correct deficiencies before subsequent entries are authorized.

This Permit-Required Confined Space Program will be reviewed and altered, if appropriate, at the following times:

- a. when there is reason to believe the measures taken under this program may not protect employees such as: unauthorized entry; detection of a permit space hazard not covered by the permit; occurrence of an injury or near injury; change in the use or configuration of a permit space; or employee complaints about the effectiveness of this Program.
- b. within one year of each entry to ensure employees participating in entry operations are protected from permit space hazards.

NOTE: A single review may be conducted covering all entries during a twelve (12) month period.

RE-DESIGNATION OF CONFINED SPACES

Confined spaces will be reevaluated and re-designated as appropriate. If all hazards, both atmospheric and non-atmospheric, are eliminated from a confined space, it shall be re-classified as a Non-Permit Confined Space. This will be accomplished provided that actual and potential hazards are eliminated.

By the same token, should a space that is classified a Non-Permit Confined Space be found to have a hazard, it shall be reclassified as a Permit-Required Confined Space.

Should a Non-Permit Confined Space, by virtue of altered configuration, use, addition, or identification of hazards become a Permit-Required Confined Space, its designation will change accordingly.

A confined space is one of the following:

- a. a non-permit confined space not falling under the Confined Space standards.
- b. a confined space whose one and only hazard is atmospheric and can be controlled by forced air ventilation. The Pre-Entry Check List provides this information.
- c. a permit-required confined space; all hazards must be identified. The Pre-Entry Check List and Entry Permit provide this information.

Controlling and eliminating hazards are two distinct concepts. Controlling an atmosphere to make it acceptable (i.e., forced air ventilation) does not eliminate the hazard. Stop the forced air ventilation, and the hazard returns.

SUMMARY

All employees who, by virtue of their work assignments, fall under the provisions of this standard should have a comprehensive understanding of confined spaces and the potential dangers involved when working in them. Certain items can not be overemphasized; safety is so important. Most accidents are sudden and unexpected. It is much wiser to plan ahead for possible courses of action in response to potential danger than wait until an accident happens and find, for example, there is no external retrieval system or method of summoning qualified medical response.

Some of the provisions of this program may, on first review, seem unnecessary and/or harsh. One item is the requirement forbidding the Attendant trained in rescue, CPR and First Aid and having the proper safety equipment on site to enter a Permit-Required Confined Space to rescue a fellow worker until he/she is replaced by another Attendant. Another item is the requirement to evacuate the Permit-Required Confined Space immediately at the first sign of a problem.

An explanation of these two items might help to clarify the importance of the whole program.

In the first case, the worker has succumbed to a hazard in a Permit-Required Confined Space. The following information is assumed: the Authorized Entrant entered the space in question after the Pre-Entry Check List and Permit were issued; he/she is aware of the dangers and trained and qualified for entry; he/she has all the required personal protective gear and it is properly worn and functioning. The worker is down! The Attendant would, at the time of the emergency, have no additional information. Therefore whatever hazard fell the first worker would certainly fall the Attendant if the Attendant were to enter the space. No one would

know there are now two people to rescue. Even if they did, by the time the Emergency Response Team arrived, they would now be dealing with two people instead of one. The time lost could be critical to the survival of the Authorized Entrant and to the unwitting Attendant who, while trying to save his friend, actually put his life at greater risk.

Let's analyze the second case concerning immediate evacuation. Suppose you are in a smoke-free environment such as an office, a house, or room and someone lights a cigarette. Even a smoker can detect the odor in a few moments. This gives an indication of how fast the gases in an atmosphere mix even at room temperature (it would be faster at higher temperatures). Immediate evacuation means just that -- immediate. If an Authorized Entrant has just a few seconds to complete a work assignment in a permit-required confined space and is told by the Attendant to evacuate; a warning sign or symptom of exposure is noticed; a prohibited condition is observed; or an evacuation alarm is activated, the entrant must stop work at once and evacuate. Time is of the essence -- hazardous atmospheres may spread quickly. Other hazards (such as engulfment) can happen instantly with little or no warning. It is much easier to re-assess a situation and re-group from outside the permit-required confined space.

CorTech LLC

EMERGENCY PHONE NUMBERS

(To be accessible to attendant)

[illegible]

FIRE 911 [_____] (If no 911 Service Available)

POLICE 911 [_____] (If no 911 Service Available)

EMERGENCY RESCUE SERVICE NAME: _____
 PHONE: _____

HOSPITAL NAME: _____
PHONE: _____

MAIN OFFICE 770-671-0444

Safety Director Work: _____
Pager: _____

OTHER:

(Name/Title)

(Name/Title)

(Name/Title)

(Name/Title)

Work: _____

Pager: _____

Work: _____

Pager: _____

Work: _____

Pager: _____

Work:

Pager: _____

When calling for EMERGENCY RESPONSE, this location is:

CorTech LLC

PERMIT-SPACE INFORMATION & ATTENDANT DESIGNATION

CONFINED SPACE

DATE: _____

SPACE IDENTIFICATION: _____

SPACE LOCATION: _____

CLIENT: _____

1. Reasons the above confined space is designated a Permit-Required Confined Space:

2. Special precautions taken to protect personnel in or around the above space:

3. Specific hazards and experience with the above confined space:

CLIENT UNDERSTANDING

I, _____, have been provided the above
(Client Representative)
information and understand that permit space entry is allowed only through compliance with a Permit Space Program meeting the requirements of 29 CFR 1910.146.

In the event our employees and your company employees are working near or in the same Permit-Required Confined Space, the below listed person is designated as the one and only Senior Attendant. The person, listed below, will have authority over other Attendants.

(Designated Senior Attendant)

(Client Representative Signature/Title)

(Date)

Safety Director

(Date)

[A copy of this form will be kept at the job site during all operations.]

CorTech LLC

ENTRY ROSTER

CONFINED SPACE

DATE: _____

SPACE IDENTIFICATION

SPACE LOCATION:

AUTHORIZED ENTRANT	TIME <u>IN</u>	TIME <u>OUT</u>	TIME <u>IN</u>	TIME <u>OUT</u>	TIME <u>IN</u>	TIME <u>OUT</u>	TIME <u>IN</u>	TIME <u>OUT</u>
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

CorTech LLC

PERMIT-REQUIRED CONFINED SPACE ENTRY PERMIT

Note: This Entry Permit must be used with the attached **Pre-Entry Checklist**.
Additional pages may be added as necessary.

PERMIT VALID FOR _____ HOURS

CONFINED SPACE-HAZARDOUS AREA: _____

CONFINED SPACE IDENTIFICATION: _____ START
DATE: _____

SPACE LOCATION: _____ TIME: _____

PURPOSE OF ENTRY: _____

SUPERVISOR(S) in charge of crew:

AUTHORIZED ATTENDANTS:

ATMOSPHERE (GAS) TESTER'S SIGNATURE & INITIALS: _____

ATMOSPHERE TESTING EQUIPMENT USED:

(Type) (Model and/or Serial Number) (Calibration date)

(Type) (Model and/or Serial Number) (Calibration date)

(Type) (Model and/or Serial Number) (Calibration date)

(Signature of Entry Supervisor/Date)

(Signature of Program Administrator/Date)

REVIEWED BY: (Confined Space Operations Personnel)

NOTE: The below listed persons, or their representative, have had the opportunity to observe
the pre-entry atmospheric testing as well as any periodic testing that may be deemed
necessary for employee safety.

(Print Name) (Signature) (Print Name) (Signature)

(Print Name) (Signature) (Print Name) (Signature)

(Print Name) (Signature) (Print Name) (Signature)

(Print Name) (Signature) (Print Name) (Signature)

PRE-ENTRY CHECKLIST

This checklist is an integral part of our Permit System and **MUST** be maintained with the Entry Permit.

All items on this Pre-Entry Checklist must be completed before entry.

For items that do not apply, enter N/A.

INITIAL ATMOSPHERIC CHECK (BEFORE VENTILATION): TIME: _____

	<u>Acceptable Parameters</u>	<u>Tester's Initials</u>
Oxygen: _____ % _____ %	> 19.5 % < 23.5 %	_____
Flammable gases and vapors:		
_____: _____ % LEL	< 10.0 %	_____
(NAME)		
_____: _____ % LEL	< 10.0 %	_____
(NAME)		
_____: _____ % LEL	< 10.0 %	_____
(NAME)		

		<u>Tester's Initials</u>
Potential toxic air contaminants:		
_____: _____ PPM	< _____ PPM	_____
(NAME)		
_____: _____ PPM	< _____ PPM	_____
(NAME)		
_____: _____ PPM	< _____ PPM	_____
(NAME)		

[NOTE: mg/m³ may be substituted for PPM. See Table Z-1 to Z-3, Subpart Z 29 CFR 1910. Further, reference Subpart G, 29 CFR 1910.]

METHOD OF ISOLATION (Atmospheric Conditions): _____

MEANS OF VENTILATION (To control Atmospheric Conditions): _____

ATMOSPHERIC CHECK (AFTER VENTILATION & ISOLATION AND IMMEDIATELY PRIOR TO INITIAL ENTRY): TIME: _____

	<u>Acceptable Parameters</u>	<u>Tester's Initials</u>
Oxygen: _____ % _____ %	> 19.5 % < 23.5 %	_____
Flammable gases and vapors:		
_____: _____ % LEL	< 10.0 %	_____
(NAME)		
_____: _____ % LEL	< 10.0 %	_____
(NAME)		
_____: _____ % LEL	< 10.0 %	_____
(NAME)		
Potential toxic air contaminants:		
_____: _____ PPM	< _____ PPM	_____
(NAME)		
_____: _____ PPM	< _____ PPM	_____
(NAME)		
_____: _____ PPM	< _____ PPM	_____
(NAME)		

[NOTE: mg/m³ may be substituted for PPM. See Table Z-1 to Z-3, Subpart Z 29 CFR 1910. Further, reference Subpart G, 29 CFR 1910.]

OTHER HAZARDS:

(Type, i.e., configuration, engulfment,
unacceptable atmosphere, any recognized
serious safety or health hazard)

(Engineering controls to control or eliminate the hazard to the extent feasible.)

(Type, i.e., configuration, engulfment,
unacceptable atmosphere, any recognized
serious safety or health hazard)

(Engineering controls to control or eliminate the hazard to the extent feasible.)

(Type, i.e., configuration, engulfment,
unacceptable atmosphere, any recognized
serious safety or health hazard)

(Engineering controls to control or eliminate the hazard to the extent feasible.)

(Type, i.e., configuration, engulfment,
unacceptable atmosphere, any recognized
serious safety or health hazard)

(Engineering controls to control or eliminate the hazard to the extent feasible.)

(Type, i.e., configuration, engulfment,
unacceptable atmosphere, any recognized
serious safety or health hazard)

(Engineering controls to control or eliminate the hazard to the extent feasible.)

HAZARDS NOT COMPLETELY ELIMINATED BY ENGINEERING CONTROLS AND SAFETY GEAR REQUIRED (i.e., respirators (specific type), special boots, gloves, suits, eye protection, etc.):

(HAZARD)

(SAFETY GEAR)

(HAZARD)

(SAFETY GEAR)

(HAZARD)

(SAFETY GEAR)

COMMUNICATIONS PROCEDURES:

[NOTE: Acceptable, non-electrical, suggestions include, but are not limited to, predetermined rapping
sounds, tugs on a rope or line, air horn signals, voice communications]

BELOW LISTED ITEMS MUST BE COMPLETED AND REVIEWED PRIOR TO ENTRY:**NOTE: For items that do not apply, enter N/A.**

<u>REQUIREMENT COMPLETED</u>	<u>DATE</u>	<u>TIME</u>	<u>REQUIREMENT COMPLETED</u>	<u>DATE</u>	<u>TIME</u>
Lock Out/De-energize/Try Out	_____	_____	Full Body Harness w/"D" ring	_____	_____
Lines Broken/Capped/blanked	_____	_____	Emergency Escape Retrieval	_____	_____
Purge-Flush & Vent	_____	_____	Equipment	_____	_____
Ventilation	_____	_____	Lifelines	_____	_____
Secure Area (Post & Flag)	_____	_____	Fire Extinguishers	_____	_____
Breathing Apparatus	_____	_____	Lighting (Explosion Proof)	_____	_____
Resuscitator-Inhalator	_____	_____	Protective Clothing	_____	_____
Standby Safety Personnel	_____	_____	Respirator(s) (Air Purifying)	_____	_____
Hoisting Equipment	_____	_____	Direct reading gas monitor	_____	_____
All electric equipment listed	_____	_____	tested	_____	_____
Class I, Division I, Group D	_____	_____	Non-Sparking Tools	_____	_____
SCBA's for entry & standby	_____	_____	Powered Communications	_____	_____
Other: _____	_____	_____	Burning & Welding Permit	_____	_____
Other: _____	_____	_____	Other: _____	_____	_____

EMERGENCY AND RESCUE PROCEDURES

	YES	NO	N/A
Rescue Procedures will be implemented by Company Employees.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Company Rescue Personnel have had training in:			
a. Use of Personal Protective Equipment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Use of Rescue Equipment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Practiced simulated permit space rescue within the past 12 months for a space representative of the space for which this permit is issued.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Each member of the Rescue Team has had training in basic First Aid and cardiopulmonary resuscitation (CPR) and at least one (1) member is currently certified.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NAME OF CERTIFIED PERSON (CPR): _____			
NAME OF CERTIFIED PERSON (1st AID): _____			
Appropriate Material Safety Data Sheets are at the job site.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The retrieval line is affixed to the entrants and a fixed point outside the space or a mechanical device should the space be a vertical type more than five (5) feet deep.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All entrants will wear a chest or full body harness with a retrieval line attached at the center of the entrant's back neat shoulder level, or above the entrant's head.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Entrants will wear wristlets, in lieu of the above, should they create a lesser danger to the entrants.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RECORD OF CONTINUOUS MONITORING

[The results of continuous monitoring, if applicable, are to be recorded below every two (2) hours.]

[illegible]

***8 Hour Time Weighted Average: Employee can work in area 8 hours (longer with appropriate protection).**

****Short term exposure limit: Employee can work in area up to 15 minutes.**

[illegible]

***8 Hour Time Weighted Average: Employee can work in area 8 hours (longer with appropriate protection).**

****Short term exposure limit: Employee can work in area up to 15 minutes.**

This six (6) page Entry Permit and Pre-Entry Checklist as been prepared by the Entry Supervisor and reviewed by all personnel involved in this Permit-Required Confined Space Entry Operation.

ENTRY SUPERVISOR: _____
(Name) (Signature) (Date)

(Page 6 of 6)

CorTech LLC

PRE-ENTRY CHECK LIST
and
CERTIFICATION OF COMPLIANCE WITH 29 CFR 1910.146(c)(5)(ii)
for
CONFINED SPACE ENTRY USING FORCED AIR VENTILATION
FOR CONTROL OF HAZARDOUS ATMOSPHERE
(NO OTHER HAZARDS ARE IDENTIFIED)

PART 1

I certify that the below listed confined space falls under the Permit-Required Confined Space Standard, 29 CFR 1910.146(c)(5)(i) & entry will be performed under the provisions of 29 CFR 1910.146(c)(5)(ii).

CONFINED SPACE IDENTIFICATION: _____ DATE: _____

SPACE LOCATION: _____ TIME: _____

WORK TO BE ACCOMPLISHED IN CONFINED SPACE: _____

PRE ENTRY CHECKLIST

INITIAL ATMOSPHERIC CHECK (BEFORE VENTILATION): TIME: _____

Acceptable Parameters

Oxygen: _____ % _____ % **> 19.5 % < 23.5 %**

Flammable gases and vapors:

_____ : _____ % LEL **< 10.0 %**
(NAME)

_____ : _____ % LEL **< 10.0 %**
(NAME)

_____ : _____ % LEL **< 10.0 %**
(NAME)

Potential toxic air contaminants:

_____ : _____ PPM **< _____ PPM**
(NAME)

_____ : _____ PPM **< _____ PPM**
(NAME)

_____ : _____ PPM **< _____ PPM**
(NAME)

NOTE: mg/m³ may be substituted for PPM. See Table Z-1 to Z-3, Subpart Z 29 CFR 1910. Reference Subpart G, 29 CFR 1910.

METHOD OF ISOLATION: _____

MEANS OF VENTILATION: _____

ATMOSPHERIC CHECK (AFTER VENTILATION & ISOLATION): TIME: _____

Acceptable Parameters

Oxygen: _____ % _____ % > 19.5 % < 23.5 %

Flammable gases and vapors:

_____ : _____ % LEL < 10.0 %
(NAME)

_____ : _____ % LEL < 10.0 %
(NAME)

_____ : _____ % LEL < 10.0 %
(NAME)

Potential toxic air contaminants:

_____ : _____ PPM < _____ PPM
(NAME)

_____ : _____ PPM < _____ PPM
(NAME)

_____ : _____ PPM < _____ PPM
(NAME)

NOTE: mg/m³ may be substituted for PPM. See Table Z-1 to Z-3, Subpart Z 29 CFR 1910. Reference Subpart G, 29 CFR 1910.

PERMIT AND CHECK
LIST PREPARED BY: _____

(Entry Supervisor/Date)

APPROVED BY: _____

(Program Administrator/Date)

REVIEWED BY: (Confined Space Operations Personnel)

NOTE: The below listed persons, or their representative, have had the opportunity to observe the pre-entry atmospheric testing as well as any periodic testing that may be deemed necessary for employee safety.

_____ (Print Name)	_____ (Signature)	_____ (Print Name)	_____ (Signature)
_____ (Print Name)	_____ (Signature)	_____ (Print Name)	_____ (Signature)
_____ (Print Name)	_____ (Signature)	_____ (Print Name)	_____ (Signature)

THE ATMOSPHERE WITHIN THE SPACE SHALL BE PERIODICALLY TESTED AS NECESSARY TO ENSURE THAT THE CONTINUOUS FORCED AIR VENTILATION IS PREVENTING THE ACCUMULATION OF A HAZARDOUS ATMOSPHERE.

IF CONDITIONS ARE IN COMPLIANCE WITH THE ABOVE REQUIREMENTS AND THERE IS NO REASON TO BELIEVE CONDITIONS MAY CHANGE ADVERSELY, THEN PROCEED TO THE PERMIT SPACE PRE-ENTRY CHECK LIST. COMPLETE AND POST WITH THIS FORM. MAINTAIN THIS FORM AND SUPPORTING DOCUMENTATION FOR A PERIOD OF ONE (1) YEAR.

THIS PERMIT AND SUPPORTING DOCUMENTATION SHALL BE KEPT AT THE JOB SITE. AT COMPLETION OF THE JOB, THIS COPY WILL BE FORWARDED TO THE PROGRAM ADMINISTRATOR.

CorTech LLC

PRE-ENTRY CHECK LIST For CONFINED SPACE ENTRY USING FORCED AIR VENTILATION FOR CONTROL OF HAZARDOUS ATMOSPHERE (NO OTHER HAZARDS ARE IDENTIFIED)

PART 2

I certify that the below listed confined space falls under the Permit-Required Confined Space Standard, 29 CFR 1910.146(c)(5)(i) & (c)(5)(ii):

CONFINED SPACE PRE-ENTRY CHECK LIST

A confined space either is entered through an opening other than a door (such as a manhole or side port) or requires the use of a ladder or rungs to reach the working level. Test results must be satisfactory. This check list must be filled out whenever the job site meets this criteria.

	YES	NO
1. Did your survey of the surrounding area show it to be free of hazards such as drifting vapors from any source?	<input type="checkbox"/>	<input type="checkbox"/>
2. Does your knowledge of industrial or other discharges indicate this area is likely to remain free of dangerous air contaminants while occupied?	<input type="checkbox"/>	<input type="checkbox"/>
3. Are you certified in the operation of the gas monitor to be used?	<input type="checkbox"/>	<input type="checkbox"/>
4. Has a gas monitor functional test (Bump Test) been performed this shift on the gas monitor to be used?	<input type="checkbox"/>	<input type="checkbox"/>
5. Did you test the atmosphere of the confined space prior to entry?	<input type="checkbox"/>	<input type="checkbox"/>
6. Did the atmosphere check as acceptable (no alarms given)?	<input type="checkbox"/>	<input type="checkbox"/>
7. Will the atmosphere be continuously monitored while the space is occupied?	<input type="checkbox"/>	<input type="checkbox"/>

NOTE: If any of the above questions are answered "NO", DO NOT ENTER. Contact your immediate supervisor.

JOB LOCATION: _____ DATE: _____

COMPETENT PERSON NAME: _____ SHIFT: _____

COMPETENT PERSON SIGNATURE/DATE: _____

EMERGENCY PHONE NUMBERS:

LOCAL FIRE DEPARTMENT (RESCUE): _____

LOCAL FIRE DEPARTMENT (FIRE): _____

ON-SITE EMERGENCY PHONE NUMBER: _____

POLICE: _____

CorTech LLC

PERSONAL PROTECTIVE EQUIPMENT (PPE)

[General]

CorTech LLC

TOPIC	PAGE
OVERVIEW	1
DUTIES OF THE PPE PROGRAM ADMINISTRATOR	1
HAZARD ASSESSMENT AND PPE SELECTION	1
DISSEMINATION OF PPE SELECTION INFORMATION	2
ANSI STANDARDS AND PPE	2
SIZING AND FITTING	3
CARE AND MAINTENANCE OF PPE	4
TRAINING	4
EYE AND FACE PROTECTION	5
HEAD PROTECTION	6
HEARING PROTECTION	7
FOOT PROTECTION	9
HAND PROTECTION	9
MISCELLANEOUS PERSONAL PROTECTION	10
RESPIRATORY PROTECTION	10
SUMMARY	10

OSHA Standards:

- 29 CFR 1910.136, **Occupational Foot Protection**
29 CFR 1910.138, **Hand Protection**
29 CFR 1926.28, **Personal Protective Equipment**
(w/29 CFR 1910.132, **General Requirements**)
29 CFR 1926.95, **Criteria for Personal Protective Equipment**
29 CFR 1926.100, **Head Protection** (w/29 CFR 1910.135, **Head Protection**)
29 CFR 1926.101, **Hearing Protection** (w/ 29 CFR 1926.52, **Occupational Noise Exposure**)
29 CFR 1926.102, **Eye and Face Protection** (w/29 CFR 1910.133, **Eye and Face Protection**)
29 CFR 1926.107, **Definitions Applicable to this Subpart**

Forms:

[Found immediately following this program]

Certificate of Workplace Hazard Assessment

OVERVIEW

This Personal Protective Equipment (PPE) Program has been prepared to inform our employees of potential hazards in the workplace and to identify the proper PPE to be used to reduce or eliminate these hazards. This Program relies on a cooperative effort by all personnel to understand the reasons for PPE and to protect themselves from harm.

The use of PPE does not lessen an employee's obligation to use safe work practices and procedures. Employees are expected to be aware of the hazards within their area of responsibility and properly use prescribed PPE.

Our operations, work methods and individual job sites present specific hazards which must be identified, analyzed, and matched with the appropriate PPE through a continuing hazard assessment process.

A Certificate of Hazard Assessment will be kept on the job site for inspection purposes.

DUTIES OF THE PPE PROGRAM ADMINISTRATOR

The primary duties of the Program Administrator include: hazard assessment; PPE selection; PPE training; and monitoring of our PPE Program. Certain types of PPE may require hands-on training before on the job use (primarily for sizing and fitting) and this training may be further delegated to competent persons.

HAZARD ASSESSMENT AND PPE SELECTION

A careful, systematic personal protective equipment selection process is used to identify what, if any, protection is required to reduce or eliminate the possibility of eye, hand, foot, limb, or head injury.

Hazard assessment, performed by the PPE Program Administrator or a designated competent person, starts with a thorough knowledge of our job sites, work procedures and methods of operation as well as the hazards that may be created by other contractors working in the vicinity of our employees. The basic hazard categories are: impact; penetration; compression; chemical; heat; harmful dust; and light radiation.

Identifying the source of the above hazards allows for consideration of administrative or engineering controls to eliminate the hazard as opposed to providing protection against it. Examples would include: redirecting traffic flow, ventilation, temporary weather barriers, non-slip surfaces, etc..

Because administrative and engineering controls are passive -- no employee involvement is required -- they are preferable to PPE.

A PPE selection is made by analyzing the above information and evaluating the type of risk, the level of risk, the potential for injury and the possible seriousness of that injury. PPE, which is compatible with the above risks and work situation, is considered. Actual selection involves all the above factors plus an attempt to provide a level of protection greater than the minimum required.

In all situations where it has been determined that a particular type of PPE is to be used, it will be used. There will be no exceptions by virtue of position or rank to this policy. Within an area on a job site where the possibility of falling objects exists, hard hats will be worn. It follows that once an item of PPE (hard hat, in this case) is selected, it must be used by all persons in the identified area regardless of job title or function.

Having the PPE Program Administrator or designated competent person on a job site determine the PPE requirements allows for knowledgeable selection and consistency, and eliminates chaos that would result if each individual were to decide when, where, and if PPE should be used.

29 CFR 1910 Subpart I, Appendix B, Non-mandatory Compliance Guidelines for Hazard Assessment and Personal Protective Equipment Selection, provides excellent selection guidelines for eye and face protection; head protection; foot protection; and hand protection.

DISSEMINATION OF PPE SELECTION INFORMATION

Employees must understand when PPE is necessary and what type(s) of PPE are necessary.

All persons for whom PPE will provide a measure of safety will be given appropriate training on that item of PPE as well as an explanation of the importance of its use.

ANSI STANDARDS AND PPE

Most items of PPE are manufactured in accordance with a specific American National Standards Institute (ANSI) standard. For example, protective eye and face devices purchased after 07/05/94 must comply with ANSI standard ANSI Z87.1-1989, *American National Standard Practice for Occupational and Educational Eye and Face Protection*; protective helmets purchased after 07/05/94 must comply with ANSI standard ANSI Z89.1-1986, *American National Standard for Personnel Protection-Protective Headwear for Industrial Employees-Requirements*.

PPE safety products are tested to ensure they meet ANSI standards. Because products are tested in the manner in which they are designed to be used, ANSI certification is valid only if the user follows the manufacturer's instructions for proper sizing, fitting, wearing, and adjusting. A review of

OSHA citations reveals that fines can be levied because employees were improperly using PPE. For example, a hard hat worn with the bill toward the rear may provide adequate protection from impact, however, because it is tested with the bill toward the front, this improper use is cause for a safety violation.

Prior to purchase, items of selected PPE will be checked to ensure they were manufactured in accordance with the proper ANSI standard.

The importance of hazard assessment takes on added significance when judgments are made matching the hazard to the protection desired in cases where ANSI certification is not available. What matters most is: does the selected PPE do what it is intended to do?

Employee owned PPE must be approved for use by the PPE Program Administrator. Further, such equipment must be properly maintained and cleaned in accordance with the manufacturer's instructions.

SIZING AND FITTING

The word "personal" in the phrase "personal protective equipment" correctly implies that the equipment is for a specific person. As such, sizing and fitting are important for a variety of reasons.

- a. Function: an improperly fitted piece of PPE may not do its job. For example, eye protection against dust must have an excellent face seal.
- b. Comfort: the likelihood of continued use is increased if the PPE selected is comfortably fitted. Example: gloves that fit poorly and, over time, make a person's hands hot and clammy are likely to be removed exposing that person to the hazard for which the gloves were required in the first place.
- c. Safety: ill-fitting PPE may actually cause an accident. Example: loose hard hat may slip and block one's vision.

Most PPE come in a variety of sizes and within those size groups, adjustments may be made to affect a perfect fit. It is important to understand the procedures for donning, adjusting, using, and removing PPE. Each person who is required to use any type of PPE will be taught, before initial issue, the specific procedures for properly donning, adjusting, using, and removing the specific PPE. This instruction will generally be given by the employee's Supervisor. When available, the manufacturer's instructions will be issued with the PPE.

CARE AND MAINTENANCE OF PPE

PPE will be visually inspected before each use and if defects are noticed, it will not be used. Some types of PPE are expendable (cotton gloves) and have a limited life span after which they are discarded and new PPE is reissued. Plastic safety glasses become scratched and they too must be exchanged for new ones when vision is impaired. Other types of safety equipment consist of both non-expendable and expendable components. A hard hat is non-expendable, yet the head band does wear out and becomes expendable. PPE will be maintained in accordance with the manufacturer's instructions and, where appropriate, kept in a sanitary condition.

Cleanliness takes on an added importance when dealing with PPE designed to protect the eyes and face. Dirty or fogged lenses can impair vision and, rather than offer protection from a hazard, actually becomes a contributory factor in causing an accident.

Lastly, should PPE become contaminated with a chemical substance and decontamination is impossible, the PPE will be properly disposed of following the disposal instructions on the Material Safety Data Sheet for that substance.

TRAINING

Affected employees will be given an understanding of:

- a. when PPE is necessary;
- b. what PPE is necessary;
- c. how to properly put on, take off, adjust, and wear PPE;
- d. the limitations of the PPE; and,
- e. the proper care, maintenance, useful life and disposal of the PPE.

Retraining will be given in situations when changes in PPE requirements render the previous training obsolete or it is noticed that an employee is not following our PPE policies -- specifically, not properly wearing the selected PPE in identified locations or work situations.

As a contractor, we are not required to have a PPE Program, per se, nor is the hazard assessment a specific requirement. In fact, there is no hand

protection standard. Construction standards are short and to the point. The complete standard for head protection is printed below:

Standard Number: 1926.100

Title: Head protection.

Applicable 1910 Standards 1910.135

- (a) Employees working in areas where there is a possible danger of head injury from impact, or from falling or flying objects, or from electrical shock and burns, shall be protected by protective helmets.
- (b) Helmets for the protection of employees against impact and penetration of falling and flying objects shall meet the specifications contained in American National Standards Institute, Z89.1-1969, Safety Requirements for Industrial Head Protection.
- (c) Helmets for the head protection of employees exposed to high voltage electrical shock and burns shall meet the specifications contained in American National Standards Institute, Z89.2-1971.

Most PPE requirements are obvious and PPE wear is so simple that training is almost unnecessary.

What is important -- vitally important -- is actually using the proper PPE when it is required.

To ensure employee compliance with PPE requirements, we have opted to treat all employees as intelligent, responsible persons who, when reminded of what PPE actually protects, will enthusiastically endorse PPE use.

EYE AND FACE PROTECTION

Your eyes are a marvel of engineering. Most of us take them for granted as we do all our senses until an accident, injury, or disease forces us to realize the miracle we lost or almost lost. Can you imagine a system that can take (absorb) light and convert it to electrical signals (by way of the 120 million rods and 6 million cones on the retina) and transfer these signals through an optic nerve which has about one million fibers directly into the brain?

Most of us see the world in living color and with depth perception. The body itself does much to protect the eyes. Bony eye sockets in the skull protect the eye from many mechanical injuries. Orbital fluids and tissues cushion direct blows. Eyelids close reflexly from visual or mechanical stimuli. Eyes reflexly rotate upward with the lid closing to protect the cornea. Tears can flush away chemicals and foreign bodies. We all come with these safeguards. Sometimes, they are not enough.

Eye protection is required when there is a possibility of eye injury. Eye injury is not confined to flying objects. Eye injury can be caused by bright light, dust, chemicals, heat, and, literally, anything that can reach them. Different hazards require different types of protection.

Eye (and face) protection is required when one is exposed to flying particles, chemicals, or injurious light radiation. Types of eye protection include: impact resistant safety glasses; safety glasses with side shields; goggles; goggles with a face seal; face masks; and shaded goggles with varying degrees of darkness.

Affected employees who wear prescription lenses will wear eye protection over the prescription lenses without disturbing the proper positioning of the prescription lenses, or will wear eye protection that incorporates their prescription into the design.

All prescription glasses should be made with impact-resistant lenses. Hardened lenses, through a tempering process, are extremely hard and resistant to impact and breakage. Safety lenses are similar to hardened lenses but are 1 mm thicker. Safety lenses are used in goggles where there is a danger of flying glass or chips of metal.

All employees who wear contact lenses must also wear appropriate eye and face protection in hazardous environments.

Welding helmets and faceshields, if required, should be worn over primary eye protection (spectacles or goggles).

An inexpensive pair of safety glasses can save your priceless eyesight.

HEAD PROTECTION

Talking about head protection is really talking about brain protection. Your brain, either through divine providence, evolution, or quirk of nature, is you. The brain, that soft mass of gray and white convoluted matter, is what you are all about. Destroy your brain and you no longer exist.

Your brain is naturally protected by a cranium. Your skull actually has many bones which protect your brain and support your face. Obviously, there are other parts to your head which need protecting such as your eyes, ears, nose, tongue, skin, etc., but your brain is the most important.

Head protection is required when there is a possibility of injury to the head from falling objects and when working near exposed electrical conductors which could contact the head.

Brain injury is the second most common cause of major neurologic deficits and causes more deaths than injury to any other organ.

When the skull receives an impact, it actually can indent and deform. A fracture may occur and the fracture may be distant from the point of impact.

A direct blow to the head can cause the brain to actually move within the skull. Surprisingly, there is often a reverse correlation between skull damage and brain damage. Just because there is no external visible injury to the skull does not preclude the possibility of brain injury.

Wearing head protection (a hard hat) accomplishes two major objectives: it reduces the rate of energy transfer and spreads out the area of energy transfer. Just as your head should be checked out at a hospital after a head impact, so should your hard hat. A hard hat can absorb energy by destructing and this destruction may be unnoticeable.

A head injury may occur after a blow to the head and the following symptoms may be present: unconsciousness or disorientation, confusion, nausea, vomiting, and/or double vision. Get medical help immediately. Cover open wounds lightly with sterile dressing. Keep victim still, warm, and reassured. DO NOT move the victim unless he/she would be in greater danger if you did not. DO NOT apply pressure to a head wound. DO NOT try to stop blood or clear fluid coming from ears, nose, or mouth.

HEARING PROTECTION

Wherever it is not feasible to reduce the noise levels or duration of exposures to those specified in Table D-2, below, ear protective devices shall be provided and used.

Ear protective devices inserted in the ear shall be fitted or determined individually by competent persons.

Plain cotton is not an acceptable protective device.

TABLE D-2 - PERMISSIBLE NOISE EXPOSURES	
<u>Sound level</u> <u>Duration per day, hours</u>	<u>dBA slow response</u>
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110
1/4 or less	115

Hearing damage is caused by noise level and duration of exposure to the noise. If, after using the formula below, the equivalent noise exposure exceeds unity (1), then a Hearing Conservation Program will be initiated.

$F(e) = (T(1) \text{ divided by } L(1)) + (T(2) \text{ divided by } L(2)) + \dots + (T(n) \text{ divided by } L(n))$ where:

$F(e)$ = The equivalent noise exposure factor.

T = The period of noise exposure at any essentially constant level.

L = The duration of the permissible noise exposure at the constant level (from Table D-2).

If the value of $F(e)$ exceeds unity (1) the exposure exceeds permissible levels.

A sample computation showing an application of the formula in paragraph (d)(2)(ii) of this section is as follows. An employee is exposed at these levels for these periods:

110 db A 1/4 hour.

100 db A 1/2 hour.

90 db A 1 1/2 hours.

$F(e) = (1/4 \text{ divided by } 1/2) + (1/2 \text{ divided by } 2) + (1 \text{ 1/2 divided by } 8)$

$F(e) = 0.500 + 0.25 + 0.188$

$F(e) = 0.938$

Since the value of $F(e)$ does not exceed unity, the exposure is within permissible limits.

Understanding some interesting facts about your hearing will emphasize the need for hearing protection.

Your outer ears on the side of your head are the least important part of your hearing system. Should you lose your ear, you would not necessarily lose your hearing. Your outer ear, made of cartilage, includes the external auditory canal which leads to the eardrum which is only 2/5" in diameter. The eardrum separates the outer ear from the middle ear. Within the middle ear are three (3) bones commonly called the hammer, anvil, and stirrup. The stirrup (stapes) is the smallest bone in your body -- thinner than a grain of rice. Also in the middle ear is the Eustachian tube which connects the middle ear to the back of the throat to maintain equal air pressure on both sides of the ear drum.

The inner ear, where sound waves are converted to electrical impulses, actually has a function unrelated to hearing. It contains the semicircular canals which completely control your balance. Also in the inner ear is the cochlea, a small spiral coil in which you would find the basilar membrane which has over 15,000 hair cells. These hair cells are the end of the auditory nerve which goes directly to the temporal lobe of the brain.

The hardest bone in your whole body is the temporal bone which protects two thirds of the auditory canal and all of the middle and inner ear. Nature, itself, seems to have placed a high priority on your hearing.

Protect your hearing. If you are issued hearing protection, use it!

FOOT PROTECTION

When purchasing new protective footwear, ensure that it complies with ANSI Z41-1991, "American National Standard for Personal Protection-Protective Footwear".

Specific hazards require specific types of protective footwear. Certain types of footwear can offer traction, crush protection, penetration protection, electrical protection, chemical resistance, heat and/or fire resistance, dryness, cushion, or ankle-protection. Further, certain activities may require a combination of these features.

Your foot is a remarkable piece of engineering which is composed of 26 bones, muscles, fatty tissue, nerves, tendons, skin and joints. The foot itself can absorb a tremendous amount of punishment without damage. But there are limits and it would be a shame to lose a foot, or part of a foot, because of failure to wear the prescribed protective footwear.

HAND PROTECTION

Your hand is composed of 20 muscles, 3 major nerves, 27 bones (14 of which are in your fingers) plus skin, fatty tissue, tendons, and joints. There are 15 muscles in your forearm which provide power to your hand. Your hand is your gateway to the world. It lets you do what you think. Its function is feeling and grasping.

Try to pick up something while holding your thumb still. It is very difficult. If the nerve to the small muscles of the thumb is severed, 80% of the total hand function is lost.

There are numerous types of hand protection (gloves) available -- each with a specific purpose. The most common are general purpose cotton work gloves which provide protection from minor skin abrasions and cold. However, there are many other types of gloves. Hands need protection from chemicals, abrasions, cuts and lacerations, temperature extremes, germs, radiation, impact, punctures, electricity, and other hazards in the workplace. Specific job requirements determine the type of hand protection needed. Proper hand protection must do more than protect your hand; it must allow you to accomplish your job assignment with efficiency as well as safety.

Wearing hand protection could prevent your hand and/or fingers from being severed, burned, crushed, punctured, lacerated, cut, or generally abused.

MISCELLANEOUS PERSONAL PROTECTION

PPE immediately brings to mind eye, head, hand, and foot protective equipment. However, there may be other types of protective equipment which are readily available and which have the capability of protecting employees from identified hazards in the workplace. Some of these items may not fall under a specific OSHA standard or may not be ANSI approved or disapproved, however, in the judgment of our PPE Program Administrator, they may be appropriate for use in our operations.

RESPIRATORY PROTECTION

Employees who, by nature of their work, are exposed to harmful aerosols, vapors, gases, contaminated air, or non-breathable air will be provided air purifying or air supplying respirators after training, medical evaluation, and fit testing per our Respiratory Protection Program. The one exception is dust masks worn solely for comfort and not for respiratory protection.

SUMMARY

The true beneficiary of PPE utilization is the user. The whole thrust of this Program is to protect our employees from injury. This is accomplished by, among other things, explaining the process of hazard assessment; the reasons for PPE use; and the necessity of using the PPE selected.

What possible justification could there be for maiming, losing, or even slightly injuring a body part because available (and required) PPE was not used? "I forgot"; "I was in a hurry"; "I misplaced my PPE"; "I felt silly wearing PPE"; or "I really didn't believe PPE was necessary" will not undo what could be a lifetime of regret.

CorTech LLC

CERTIFICATE OF WORKPLACE HAZARD ASSESSMENT

I certify, this date, that I have performed a hazard assessment of our job sites and our methods of operations.

This hazard assessment was accomplished to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE).

Identified hazards which cannot be eliminated through engineering controls or changes in procedures will be addressed by the use of selected PPE.

All affected employees will be informed of the required PPE for specific work locations or specific types of work to be performed and will receive initial training or retraining, if necessary, before being allowed to perform work requiring PPE.

If conditions or procedures change, a reassessment will be made.

Personal Protective Equipment
Program Administrator

(Date)

CorTech LLC

PERSONAL PROTECTIVE EQUIPMENT (PPE)

[Respiratory Protection Program]

CorTech LLC

Safety Program

SECTION III

PERSONAL PROTECTIVE EQUIPMENT (PPE)

[Respiratory Protection]

INDEX

TOPIC	PAGE
OVERVIEW	1
DUTIES OF THE PROGRAM ADMINISTRATOR	2
DEFINITIONS	2
RESPIRATOR SELECTION	5
PARTICULATE RESPIRATOR SELECTION	7
SERVICE LIFE OF FILTERS	8
MEDICAL APPROVAL FOR RESPIRATOR USE	8
RESPIRATOR FIT TEST	10
USER SEAL CHECK	11
HAZARD COMMUNICATION AND EMERGENCY PROCEDURES	11
WORK AREA SURVEILLANCE	12
AIR QUALITY	12
CLEANING; INSPECTION; AND MAINTENANCE	13
MAINTENANCE OF EMERGENCY/UNASSIGNED RESPIRATORS	13
STORAGE OF RESPIRATORS	14
PROGRAM EVALUATION	14
TRAINING	14
DUST MASKS - USE OF RESPIRATORS WHEN NOT REQUIRED	15

OSHA Standards:

29 CFR 1910.134, Respiratory Protection

Forms:

[Found immediately following this program]

Evaluation Form

Report of Medical Examination

Medical Opinion for Respirator Wear

Respirator Fit Test Summary

Record of Inspection: Emergency/Unassigned Respirators

Respirator Medical Evaluation Questionnaire

OVERVIEW

The best respiratory protection one can have is clean, breathable air. Engineering controls are our first line of defense against contaminated or oxygen deficient air. These controls include, but are not limited to, using measures such as enclosure or confinement to keep atmospheric hazards away from employees, general or local ventilation to exhaust hazardous atmospheres, and/or substitution of less toxic materials to avoid hazardous atmospheres in the first place. When effective engineering controls are not feasible, or during the time frame they are being instituted, appropriate respirators will be used.

The concept of respiratory protection is quite simple. Certain types of atmospheric hazards are merely particles that can be filtered out of the air through the use of an air-purifying respirator. Air-purifying respirators force the harmful particles into a filter specifically designed for the hazard(s) where they are trapped or absorbed. The air reaching the employee's lungs is essentially free of the hazard.

- a. If the action of inhalation causes the ambient air to be sucked through the filter, the respirator is considered a negative pressure respirator.
- b. If the ambient air is forced through the respirator filter (with a blower, for example), the respirator is considered a positive pressure respirator.

A respirator that removes harmful contaminants is of no value in an oxygen deficient (less than 19.5% oxygen) or oxygen enriched (more than 23.5 % oxygen) atmosphere.

An atmosphere-supplying respirator will be used in oxygen deficient atmospheres or in atmospheres where a filter cannot reduce the particulate hazard to an acceptable level. This type of respirator provides clean, breathable air from a source independent of the ambient atmosphere.

Different types of respirators provide different levels of protection. **Never** may an air-purifying respirator be substituted for a required atmosphere-supplying respirator.

Unfortunately, respiratory protection is more complicated than it first appears. Because of the variety and severity of respiratory hazards, the types of respirators and their limitations, the methods for fitting and testing, and, most importantly, the detrimental ramifications of respirator misuse, this respiratory protection program is required.

Proper respirator selection and use can prevent occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays and vapors. In atmospheres that are immediately dangerous to life or health, proper respirator selection and use will save your life.

When required, employees will be supplied appropriate respirators and all incidental costs associated with respirator use (fit testing, repair parts, filters, medical examinations, cleaning supplies, etc.) will be borne by the company.

DUTIES OF THE PROGRAM ADMINISTRATOR

The Respiratory Protection Program Administrator will keep abreast of developments in the respiratory protection field and ensure that our personnel are provided safe respiratory working conditions.

Additionally, the Program Administrator will:

- a. measure, estimate, or review data on the concentration of airborne contaminants in the work area prior to respirator selection.
- b. select the appropriate type of respirator that will provide adequate protection from the airborne contaminants or provide clean, breathable air.
- c. maintain applicable records including:
 1. fit test records.
 2. medical records.
 3. inspection records.
 4. evaluation records.
 5. training records.

DEFINITIONS

There are a number of terms and phrases, not used in ordinary everyday life, which must be understood by affected employees.

Air-purifying respirator: a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

Atmosphere-supplying respirator: a respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

Canister or cartridge: a container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

Demand respirator: an atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

Emergency situation: any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

Employee exposure: exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.

End-of-service-life indicator (ESLI): a system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

Escape-only respirator: a respirator intended to be used only for emergency exit.

Filter or air-purifying element: a component used in respirators to remove solid or liquid aerosols from the inspired air.

Filtering facepiece (dust mask): a negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.

Fit factor: a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

Fit test: the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual.

Helmet: a rigid respiratory inlet covering that also provides head protection against impact and penetration.

High efficiency particulate air (HEPA) filter: a filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

Hood: a respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

Immediately dangerous to life or health (IDLH): an atmosphere that poses an immediate threat to life, would cause irreversible adverse health

effects, or would impair an individual's ability to escape from a dangerous atmosphere.

Loose-fitting facepiece: a respiratory inlet covering that is designed to form a partial seal with the face.

Negative pressure respirator (tight fitting): a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

Oxygen deficient atmosphere: an atmosphere with an oxygen content below 19.5% by volume.

Physician or other licensed health care professional (PLHCP): an individual whose legally permitted scope of practice allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required medical evaluation.

Positive pressure respirator: a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

Powered air-purifying respirator (PAPR): an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Pressure demand respirator: a positive pressure atmosphere-supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.

Qualitative fit test (QLFT): a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

Quantitative fit test (QNFT): an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

Respiratory inlet covering: that portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both. It may be a facepiece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

Self-contained breathing apparatus (SCBA): an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

Service life: the period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

Supplied-air respirator (SAR) or airline respirator: an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

Tight-fitting facepiece: a respiratory inlet covering that forms a complete seal with the face.

User seal check: an action conducted by the respirator user to determine if the respirator is properly sealed to the face.

RESPIRATOR SELECTION

Respirators will be selected on the basis of hazards to which the employee will be exposed. Using an inappropriate respirator is just as bad, if not worse, than using no respirator at all because it can evoke a false sense of security while offering no protection to the hazard at hand.

All respirators will be NIOSH approved.

Work area surveillance will be made by the Program Administrator taking into consideration the actual work area conditions, the degree of exposure and employee stress.

Respirator selection will take into consideration the air quality; the contaminant; the amount of the contaminant; the time exposure to that contaminant; and the work area surveillance.

Oxygen-deficient atmospheres as well as atmospheres in which the respiratory hazard exposure cannot be determined are considered immediately dangerous to life or health and the use of one of the below listed respirators is required:

- a. a full facepiece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes, or
- b. a combination full facepiece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply.

NOTE: Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

Generally, but not always, atmospheres work areas that require respiratory protection are not IDLH and in these cases respirator selection offers more options. The respirator selected will be adequate to protect the health of the employee and ensure compliance with all other OSHA statutory and regulatory requirements under routine and reasonably foreseeable

emergency situations. Of course, the respirator selected will be appropriate for the chemical state and physical form of the contaminant.

For protection against gases and vapors, the respirator provided will be:

- a. atmosphere-supplying.
- b. air-purifying, provided that:
 - 1. it is equipped with an end-of-service-life indicator (ESLI) certified by NIOSH for the contaminant; or
 - 2. if there is no ESLI appropriate for conditions in respiratory hazard area, a change schedule for canisters and cartridges will be used that is based on objective data that will ensure that canisters and cartridges are changed before the end of their service life.

The Program Administrator will rely on past experience and cartridge manufacturer recommendations. If the competent person on site or any respirator user notices that breathing becomes more strained, the change schedule will be modified.

For protection against particulates, the respirator provided will be:

- a. atmosphere-supplying; or
- b. air-purifying equipped with a filter certified by NIOSH under 30 CFR part 11 like a HEPA filter; or

NOTE: Filters manufactured under 30 CFR part 11 standards may continue to be used, however, as of July 10, 1998, other than PAPR's, they are not to be purchased. Only 42 CFR part 84 type filters will be used.

- c. air-purifying equipped with a filter certified for particulates by NIOSH under 42 CFR part 84; or

NOTE: These respirators and filters, other than PAPR's are identified on the packaging with numbers that take the form: TC-84A-XXX.

- a) Filters will have an "N", "R", or "P" designation followed by "100", "99" or "95". Examples: N100 or R99
 - 1. "N" indicates the filter is for any solid or non-oil containing particulate contaminant.
 - 2. "R" indicates the filter is for any particulate contaminant. If used for an oil containing particulate, a one shift use limit applies.
 - 3. "P" indicates the filter may be used with any particulate contaminant.
- b) The number indicates the filter efficiency -- the higher the number, the more efficient. 100 = 99.97% efficiency; 99 = 99% efficiency; and 95 = 95% efficiency.
- d. air-purifying equipped with any filter certified for particulates by NIOSH for contaminants consisting primarily of particles with mass median aerodynamic diameters (MMAD) of at least 2 micrometers.

Often, the permissible exposure limit (PEL) and suggested respirator is listed on an MSDS. Published exposure limits for the contaminant at hand will assist in determining respirator selection.

The Program Administrator will select respirators based on:

- a. the nature of the hazardous operation or process.
- b. the type of respiratory hazard including permissible exposure limits.
- c. the period of time for which respiratory protection must be worn.
- d. the activities of workers in the hazardous area.
- e. the respirator's characteristics, capabilities, and limitations.

PARTICULATE RESPIRATOR SELECTION

Prior to respirator selection, the following factors must be known:

- a. the identity and concentration of the particulates in the workplace air.
- b. the permissible exposure limit (PEL), the NIOSH recommended exposure limit (REL) or other occupational exposure limit.
- c. the hazard ratio (HR). The (HR) is obtained by dividing the airborne particulate concentration by the exposure limit.
- d. the assigned protection factor (APF) for the type of respirator to be used. The (APF) is the minimum anticipated level of protection provided by each type of respirator worn in accordance with an adequate respiratory protection program. For example, an (APF) of 10 means that the respirator should reduce the airborne concentration of a particulate by a factor of 10 (or to 10% of the workplace concentration).
- e. the immediately dangerous to life or health (IDLH) concentration, including oxygen deficiency.

The (APF) should be greater than the (HR) and multiplying the occupational exposure limit by the APF gives the maximum workplace concentration in which the respirator may be used.

All filters will have a 99.97% efficiency rating indicated by the number 100.

SERVICE LIFE OF FILTERS

If the selected filters have an end-of-service-life indicator (ESLI), the filters will be used until the indicator shows that it is time to be replaced.

In the absence of an ESLI, the following is our policy of service life of filters:

All HEPA filters manufactured under 30 CFR part 11 (for PAPR's) will be replaced at least daily (once each work shift) or if breathing resistance becomes excessive or if the filter suffers physical damage (tears, holes, etc.) If PAPR filters become available under 42 CFR part 84 standards, they will be used and fall under the below schedule:

All filters will be replaced whenever they are damaged, soiled, or causing noticeably increased breathing resistance.

N-series filters may be used and reused subject only to considerations of hygiene, damage, and increased breathing resistance. If the competent person determines the workplace to be exceptionally dirty, the filters will be changed each work shift.

R-series filter will be changed every work shift if oil is present. If oil is not present, they may be used and reused subject only to considerations of hygiene, damage, and increased breathing resistance. If the competent person determines the workplace to be exceptionally dirty, the filters will be changed each work shift.

P-series filters will be used and reused in accordance with the manufacturer's time-use limitations when oil aerosols are present.

P-series filters can be used and reused subject only to consideration of hygiene, damage, and increased breathing resistance if oil aerosols are not present.

MEDICAL APPROVAL FOR RESPIRATOR USE

Before respirator use -- even before fit testing -- it must be determined that one is physically capable to wear the type of respirator to be assigned. Wearing negative pressure respirators can place an increased strain on one's respiratory system, and, depending on the task and the environmental conditions (especially heat and cold), respirators can put an additional strain on your whole body. Prior to respirator use, an employee must have a medical examination. The actual medical tests, if any, depend on the hazards involved, the condition of the employee, and the judgment of the physician or other licensed health care professional (PLHCP). If respirators are used to prevent exposure to certain toxic and hazardous substances (for example, lead or asbestos), then additional medical tests and surveillance procedures are required appropriate for the hazard.

A PLHCP will be identified to perform medical evaluations using the medical questionnaire with this program. The PLHCP will be given a copy of this program as well as the appropriate standards.

A follow-up medical examination will:

- a. be given to an employee who gives a positive response to any question among questions 1 through 8 in Section 2, Part A of Appendix C, or whose initial medical examination demonstrates the need for a follow-up medical examination.
- b. include any medical tests, consultations, or diagnostic procedures that the PLHCP deems necessary to make a final determination.

The medical questionnaire and examinations will be given confidentially during normal working hours or at a time and place convenient to the employee. The employee will be given the opportunity to discuss the questionnaire and examination results with the PLHCP.

The PLHCP will be provided the following information to be used in determining an employee's ability to use a respirator:

- a. the type and weight of the respirator to be used by the employee.
- b. the duration and frequency of respirator use.
- c. the expected physical work effort.
- d. additional protective clothing and equipment to be worn.
- e. temperature and humidity extremes that may be encountered.

An annual review of medical status is not required and additional medical evaluations are required only if:

- a. an employee reports medical signs or symptoms that are related to ability to use a respirator.
- b. a PLHCP, supervisor, or the respirator program administrator determines that the employee needs to be reevaluated.
- c. fit testing and work area program evaluation indicates a need.
- d. a change occurs in workplace conditions (e.g., physical work effort, protective clothing, temperature) that may result in a substantial increase in the physiological burden placed on an employee.

A negative pressure respirator may place an undue burden on an employee's system and the PLHCP may recommend a PAPR be used instead.

Medical records will be retained for 30 years.

Once medical approval is received allowing the respirator use, fit testing may proceed. The employee will be provided with a copy of this determination.

RESPIRATOR FIT TEST

There are various protocols for fit testing respirators and they can be found in Appendix A, 29 CFR 1910.134. One (1) of the four (4) qualitative protocols listed below will be used:

<u>Protocol/Fit Test Procedure</u>	<u>Appendix A to 29 CFR 1910.134</u>
a. Isoamyl Acetate Fit Test Procedure	Paragraph B2 Paragraph B2(b)
b. Saccharin Solution Aerosol Fit Test Procedure	Paragraph B3 Paragraph B3(b)
c. Bitrex™ Solution Aerosol Fit Test Procedure	Paragraph B4 Paragraph B4(b)
d. Irritant Smoke (Stannic Chloride) Fit Test Procedure	Paragraph B5 Paragraph B5(c)

The purpose of fit testing is to ensure that the respirator selected will actually do the job for which it was intended. Different manufacturers make different sizes of each model. Fit testing, following the OSHA approved protocols, will ensure that the specific make, model and size is appropriate for the user. An employee may only use the specific respirator(s) on which he/she has passed a fit test.

Eye glasses and contact lenses pose special problems when dealing with respirators. Contact lenses will not be worn during the fit test or during respirator use. Normal eye glasses, while they do not interfere with the skin to facepiece seal of a ½ face respirator, will prevent a proper seal on a full face respirator and thus will not be worn. If glasses are needed, special adapters can be provided to hold lenses within the respirator.

Upon successful completion of respirator fit testing, a Record of Respirator Fit Test form will be completed and maintained with the employee's records. Only the latest fit test record need be retained. The Respirator Fit Test will be repeated at least annually or when:

- a different respirator facepiece (size, style, model or make) is used.
- there has been a weight change of at least 20 pounds.
- there has been significant facial scarring in the area of the facepiece seal.
- there has been significant dental changes; i.e., multiple extractions without prosthesis or acquiring dentures.

- e. reconstructive or cosmetic surgery.
- f. any other condition that may interfere with facepiece sealing.

As explained in the protocols, the fit tests shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface. Further, there shall not be mustaches that are so long as to interfere with the inlet or exhaust valves in the respirator. Of course, these requirements apply not only to fit testing procedures, they apply to actual on the job use where the seal between face and respirator must be maintained.

USER SEAL CHECK

A user seal check, performed in accordance with the manufacturer's instructions or Appendix B-1 to 29 CFR 1910.134 (found immediately after this program), will be made prior to each use by the wearer of a tight-fitting respirator.

A user seal check is solely for respiratory protection of the employee and without this check there is no way of knowing if the selected respirator is actually working. Failure to perform a seal check may result in the use of a respirator which is of little or no value.

HAZARD COMMUNICATION & EMERGENCY PROCEDURES

One would not be wearing a respirator in the first place if there were not some detrimental health consequences of non-use. Often, these consequences are chronic (long term) and immediately unnoticeable.

If respirator failure would lead to noticeable physical or mental impairment, then, in these situations, two (2) employees will be assigned in the same area and in view of each other. If one employee presents symptoms of physical or mental distress, the second employee will remove the first employee from the area. If there is not an immediate, total recovery, the affected employee will be provided medical care by emergency responders.

In the event work is being performed in an IDLH atmosphere, a safety harness and safety lines will be used so that the employee may be pulled to safety. Suitable rescue equipment will be available and a standby man or men with suitable self-contained breathing apparatus shall be at the nearest fresh air base for emergency rescue.

All personnel should be aware of the appropriate MSDS for the products they are working with, and particular attention should be given to health hazards, both acute and chronic; symptoms of overexposure; first aid measures; emergency procedures; and exposure limits.

WORK AREA SURVEILLANCE

The competent person at the work area where respirator use is required will maintain appropriate surveillance 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 Program Administrator or competent person will reevaluate the continued effectiveness of the respirator.

Employees are to leave the respirator use area:

- a. to wash their faces and respirator facepieces as necessary to prevent eye or skin irritation associated with respirator use.
- b. if they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece.
- c. to replace the respirator or the filter, cartridge, or canister elements.

Defective respirators will be repaired or replaced before returning to the respirator use area.

AIR QUALITY

Atmosphere-supplying respirators, depending on the type (supplied-air or SCBA) use compressed air, compressed oxygen, liquid air or liquid oxygen. Compressed and liquid oxygen must meet the requirements of the United States Pharmacopoeia for medical or breathing oxygen. Compressed breathing air must meet the requirements of Grade "D" breathing air including: oxygen content (v/v) of 19.5-23.5%; hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less; carbon monoxide content of 10 ppm or less; carbon dioxide content of 1,000 ppm or less; and lack of noticeable odor. Compressed oxygen shall not be used in supplied-air respirators or open circuit self-contained breathing apparatus that have previously used compressed air. Oxygen must never be used with air line respirators.

Breathing air may be supplied to respirators from cylinders or air compressors. If cylinders are used, they will be tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 178).

If a compressor is used for supplying breathable air by way of air line hoses to a respirator mask, it is a Type "C" system. The hose couplings used on these systems must not be compatible with any other gas systems.

Breathable air -- not pure oxygen -- is used in these systems. All safety and standby devices will be maintained in working order such as alarms to warn of compressor failure or overheating. Compressors will be located so

that contaminated air does not enter the system and suitable in-line filters will be installed. A receiver of sufficient capacity to enable the respirator wearer to escape from a contaminated atmosphere in the event of a compressor failure shall be in place. If an oil lubricated system is used, it shall have a high temperature and carbon monoxide alarm.

CLEANING; INSPECTION; AND MAINTENANCE

Respirators issued for the exclusive use of one worker will be cleaned and disinfected after each day's use or more often, if necessary. A respirator used by more than one person will be cleaned and disinfected after each use by the employee who used it. Cleaning should be done using the manufacturer's recommendations or the guidelines in Appendix B-2 to 29 CFR 1910.134. Remove or protect the filters/cartridges before cleaning because moisture can defeat the effectiveness of a filter. During cleaning, an inspection of the respirator will be made to ensure it retains its original effectiveness. Valves, straps, canisters, elasticity, facepieces, if applicable, will be inspected per the manufacturer's instructions. Defective parts will be replaced before reuse.

Employees who use respirators will be instructed in the replacement of parts as allowed by the manufacturer (such as valves and straps). Respirators that require a higher level of repair will be returned to the manufacturer. All replacement parts will be of the same manufacture as the respirator and all replacement parts will be NIOSH approved. Maintenance will be limited to replacing parts (straps, filters, valves, etc.) allowed by the manufacturer. Only respirators in 100% working order will be used.

Cleaning supplies and replacement parts will be provided at no cost. In the event a respirator is not used for thirty (30) days, it will be inspected by a competent person. Particular attention will be paid to SCBA apparatus and Type "C" connections. SCBA apparatus shall be inspected monthly and air and oxygen cylinders will be fully charged according to the manufacturer's instructions. All warning devices will be checked to ensure they are properly functioning.

MAINTENANCE OF EMERGENCY/UNASSIGNED RESPIRATORS

Emergency and unassigned respirators (respirators used by more than one person) will be cleaned and inspected for defects every thirty (30) days and after each use. Particular attention will be given to the elasticity of the respirator and ensuring that the respirator is defect free. Only the latest record of this inspection will be maintained. A tag showing the name of inspector, the date, and condition of the respirators will be attached to the respirator.

STORAGE OF RESPIRATORS

Respirators will be stored in a convenient, clean, and sanitary location in such a manner as to protect them from dust, heat, sunlight, extreme cold, excessive moisture, and damaging chemicals. On a job site, a plastic bag can help protect a respirator from dust and moisture. Respirators will not be stored in lockers or tool boxes unless they are in cases or cartons. Respirators will be stored with the facepiece and exhalation valve resting in a normal position. This will also prevent the soft, pliable material of which respirators are made from setting in an abnormal position, changing shape, and reducing face to mask seal.

PROGRAM EVALUATION

This Program will be evaluated on a continual basis and updated if the need arises. Reasons for upgrading would include new atmospheric hazards; new respiratory protection equipment; new or altered work procedures; the introduction of new engineering controls; the failure of employees to follow standard operating procedures.

Often, the effects of breathing contaminated atmospheres are chronic in nature and thus some employees may tend to become lax in using their respirators properly. Supervisors must be on alert for this tendency.

Employees must realize that they must use the provided respiratory protection in accordance with the instructions and training received.

TRAINING

Training will be given by a competent person, prior to use, to ensure each affected employee can demonstrate knowledge of at least the following:

- a. why a respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator.
- b. what the limitations and capabilities of the respirator are.
- 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.
- e. the procedures for maintenance and storage of the respirator.
- f. how to recognize medical signs and symptoms that may limit or prevent the effective use of respirators.
- g. the general concepts of this program.

Retraining will be given annually and when:

- a. changes in the workplace or the type of respirator render previous training obsolete.
- b. inadequacies in the employee's knowledge or use of the respirator indicates that the employee lacks the required understanding or skill.
- c. a situation arises in which retraining appears necessary to ensure safe respirator use.

DUST MASKS - USE OF RESPIRATORS WHEN NOT REQUIRED

The Program Administrator or competent person in the work area will determine when respirator use is **required**. Dust masks may be used at any time to reduce annoying particles in the air on a job site.

An employee who wants to wear an actual respirator on the job site for comfort or an additional level of safety that is **not required** for health reasons according to standards must obtain medical approval for respirator use according to the procedures outlined in this program.

Additionally, that employee should read this program (formal training is not required) and:

- a. read and heed all manufacturer's instructions on use, maintenance, cleaning and care, and warnings regarding the respirator's limitations.
- b. choose a respirator certified for use to protect against the contaminant of concern. The respirator must be NIOSH approved.
- c. not wear the respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. A respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
- d. not interchange the respirator with another employee.

Disposable Respirators:

OSHA requires that employees who voluntarily use disposable respirators in situations where respiratory protection is not specifically required by OSHA standard (in atmospheres where exposures are below the permissible exposure limit) essentially for personal comfort or additional, though not required, respiratory protection be informed of 29 CFR 1910.134 Appendix D, printed below.

All disposable respirators, such as Moldex, 3M, Willson, North Safety, etc. must be marked with the manufacturer's name, the part number, the protection provided by the filter, and "NIOSH".

Disposable filters are actually negative pressure respirators. They protect the user by filtering particles out of the air breathed.

Though disposable filters cannot be fit-tested in the traditional sense, they must be fit-tested in accordance with the manufacturer's instructions.

Under no circumstances may any respirator other than the above disposable respirators be used without compliance with a respiratory protection program.

Standard Number: 1910.134 App D

Standard Title: (Mandatory) Information for Employees Using Respirators When not Required Under 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 a hazard. 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.

[63 FR 1152, Jan. 8, 1998; 63 FR 20098, April 23, 1998]

RESPIRATORY PROTECTION PROGRAM

EVALUATION FORM

The Respiratory Protection Program Administrator or a designated competent person will conduct job site and administrative evaluations to ensure the provisions of our respiratory protection program are being properly implemented. Discrepancies noted will be immediately corrected.

A random sampling of affected personnel addressed the below listed concerns and the responses are indicated below:

	<u>Yes</u>	<u>No</u>
Is the respiratory protection program understood?	<input type="checkbox"/>	<input type="checkbox"/>

Problem areas: _____

Corrective action: _____

Do respirators fit without interfering with job performance?	<input type="checkbox"/>	<input type="checkbox"/>
--	--------------------------	--------------------------

Problem areas: _____

Corrective action: _____

Are respirators being properly maintained?	<input type="checkbox"/>	<input type="checkbox"/>
--	--------------------------	--------------------------

Problem areas: _____

Corrective action: _____

Are appropriate respirators selected for the hazard?	<input type="checkbox"/>	<input type="checkbox"/>
--	--------------------------	--------------------------

Problem areas: _____

Corrective action: _____

(Signature of Person performing evaluation)

(Date)

Note: Retain only the latest evaluation.

REPORT OF MEDICAL EXAMINATION

(Date)

(Applicant's Name)

(Applicant's SSN)

Job for which person is being examined: _____

Reason for medical examination: Respirator use.

Type(s) of respirator to be used: _____

Atmospheric hazards for which the above respirators will be used: _____

NOTE: Circle the appropriate paragraphs and subparagraphs.

1. Based on the information available to me, it is my opinion that the above named person may be placed in the job position with no restrictions in work assignments.
2. Based on all the information available to me, it is my opinion that the above named person has a detected medical condition(s) or finding(s) which:
 - a. Places this person or others at increased risk of material impairment of health from anticipated or potential occupational exposures or activities.
 - b. May be aggravated by occupational exposures or activities.
 - c. May interfere with safe and/or effective performance.
 - d. Needs follow-up. This includes changes which may be with "normal limits" based on the current assessment and/or comparison with previous results. Based on available data, the casual relationship of these findings to occupational exposures appears to be positive/negative/ill defined.
 - e. Other: (Explain) _____
3. On the basis of the above, I recommend:
 - a. No restrictions in work assignments for the above job.
 - b. Restricted activities: (List) _____
 - c. Limited exposure: (Note) _____
 - d. Special protective measures: (Note) _____
 - e. Medical follow-up: (Note) _____
 - f. Limitation on the use of a negative pressure or air purifying respirator: (Explain) _____

 - g. Other: (Note) _____

4. I have advised the employee of any detected medical condition of finding which dictates further medical examination or treatment and have appropriate recommendations regarding medical follow-up and exposure. This will be documented in writing.

5. Additional comments: _____

6. I understand that a copy of this report will be given to the examinee by the person receiving it.

DATE: _____

(Physician's Signature)

(Address)

(City, State, ZIP)

(Telephone Number)

Return this form to:
CorTech LLC

50 Glenlake Parkway Suite 340
Atlanta, GA 30328

MEDICAL OPINION FOR RESPIRATOR WEAR

(Date)

(Applicant's Name)

(Applicant's SSN)

TO: CorTech LLC
Respiratory Protection Program Administrator
50 Glenlake Parkway Suite 340
Atlanta, GA 30328

RE: Medical Opinion for Respirator Use

On this date, based on the employee medical questionnaire and/or further medical examination, the above named applicant is found to be:

a. Eligible to use a respirator. _____
(Respirator type, i.e., ½ face; full face; PAPR; SCBA)

b. Eligible to use a respirator with the following restrictions:

(Respirator type, i.e., ½ face; full face; PAPR; SCBA)

c. Not eligible to use a respirator.

(Signature of physician or licensed healthcare professional)

(Typed or Printed Name)

(Street Address)

(City, State, ZIP)

CorTech LLC

RESPIRATOR FIT TEST SUMMARY

Name of employee: _____ SSN: _____

Date of Testing: _____ Test Conducted By: _____

Respirator(s) Selected: _____
(Manufacturer) (Model/Series)

☐ Pass

☐ Fail _____
(Respirator Size) (NIOSH Certification #)

Respirator(s) Selected: _____
(Manufacturer) (Model/Series)

☐ Pass

☐ Fail _____
(Respirator Size) (NIOSH Certification #)

Respirator(s) Selected: _____
(Manufacturer) (Model/Series)

☐ Pass

☐ Fail _____
(Respirator Size) (NIOSH Certification #)

Testing Agent (Protocol): Circle One

- | | |
|---|-----------------------|
| a. Isoamyl Acetate Protocol. | (Banana Oil) |
| b. Saccharin Solution Aerosol Protocol. | (Saccharin Taste) |
| c. Bitrex™ Solution Aerosol Protocol | (Denatonium Benzoate) |
| d. Irritant Smoke Protocol. | (Irritant Smoke) |

Signature of Person Conducting the Test: _____

Signature of Employee: _____

The Respirator Fit Test will be repeated at least annually or when:

- a different respirator facepiece (size, style, model or make) is used.
- there has been a weight change of at least 20 pounds.
- there has been significant facial scarring in the area of the face-piece seal.
- there has been significant dental changes; i.e., multiple extractions without prosthesis or acquiring dentures.
- reconstructive or cosmetic surgery.
- any other condition that may interfere with facepiece sealing.

CorTech LLC

RECORD OF INSPECTION

All emergency and unassigned respirators were inspected and cleaned on the date indicated. Any defects found were corrected or the respirator was removed from service. This inspection was performed after each use and/or monthly.

[illegible]

Note: Only the latest record must be retained.

CorTech LLC
SCAFFOLD & LADDER

CorTech LLC

Safety Program

SECTION III

SCAFFOLD & LADDER

INDEX

TOPIC	PAGE
OVERVIEW	1
SCAFFOLD SAFETY	1
DEFINITIONS	1
GUIDELINES FOR SCAFFOLD USE	3
GUIDELINES FOR THE CONTROL OF ELECTRICAL HAZARDS	7
GUIDELINES FOR THE CONTROL OF FALL HAZARDS	7
SPECIAL PRECAUTIONS FOR THE PREVENTION OF FALLING	8
FALL PROTECTION DURING ERECTION & DISMANTLING OF SUPPORTED SCAFFOLDS	10
GUIDELINES FOR THE CONTROL OF FALLING OBJECTS	11
ACCESS	12
GENERAL VERSUS SPECIFIC SCAFFOLD SAFETY GUIDELINES	13
LADDERS	13
TRAINING	15

OSHA Standards:

Scaffold Standards:

29 CFR 1926.450 *Scope, Application and Definitions Applicable to this Subpart*

29 CFR 1926.451 *General Requirements*

29 CFR 1926.452 *Additional Requirements Applicable to Specific Types of Scaffolds*

29 CFR 1926.454 *Training Requirements (For Scaffold Safety)*

1926 Subpart L App A: *Scaffold Specifications*

1926 Subpart L App D: *List of Training Topics for Scaffold Erectors and Dismantlers*

1926 Subpart L App E: *Drawings and Illustrations*

Ladder Standards:

29 CFR 1926.1051 *General Requirements (Ladders)*

29 CFR 1926.1053 *Ladders*

29 CFR 1926.1060 *Training Requirements (Ladders)*

OVERVIEW

Scaffolds and ladders are everyday items on most construction sites and their use presents specific hazards -- the most common being electrical shock, falls and falling objects. This program addresses these hazards and provides safety rules for the use of this type of equipment.

Affected individuals must be aware of the specific hazards applicable to their work situation and the proper safety procedures for avoiding these hazards.

All scaffold and ladder applications require a knowledge of: equipment inspection, load capacities, ground conditions, effects of weather, fall protection, potential electrical hazards, and protection from falling objects. It is expected that all personnel understand how to perform work in a safe manner while on a scaffold or ladder, recognize unsafe work situations, and effectively deal with them. If you are aware of a ladder or scaffold hazard (or any safety hazard), immediately bring it to the attention of your immediate Supervisor or the competent person on the job site.

SCAFFOLD SAFETY

A scaffold, by definition, is any temporary elevated platform and its supporting structure used for supporting employees or materials or both. Because of the numerous types of scaffolds, the infinite possible combinations of uses, the various surface features on which the scaffold may rest, and the varying conditions in which scaffolds may be used, it would be impossible to detail what to do in every situation. The goal of any safety program - including scaffold safety - is to eliminate the possibility of harm to employees while they are performing their duties.

Only safety harnesses, not belts, will be used in fall protection.

Leading causes for scaffold accidents and injuries are plank slippage, being struck by falling objects, and the actual collapse of the support structure or planking.

DEFINITIONS

There are a number of terms and phrases which must be understood by all employees when dealing with scaffolds. Below are listed important definitions to aid in the understanding of this Program, however they are not all-inclusive. A complete list of definitions, including the many types of scaffolds and their individual components is found in 29 CFR 1926.450.

BODY HARNESS: a design of straps which may be secured about the employee in a manner to distribute the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders with means for attaching it to other components of a personal fall arrest system.

COMPETENT PERSON: one who is capable of identifying existing and predictable hazards in the surrounding or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

EXPOSED POWER LINES: electrical power lines which are accessible to employees and which are not shielded from contact. Such lines do not include extension cords or power tool cords.

FAILURE: load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.

GUARDRAIL SYSTEM: a vertical barrier consisting of, but not limited to, top rails, mid rails, and posts erected to prevent employees from falling off a scaffold platform or walkway to lower levels.

LANDING: a platform at the end of a flight of stairs.

LIFELINE: a component consisting of a flexible line that connects to an anchorage at one end to hang vertically (vertical lifeline), or that connects to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

LOWER LEVELS: areas below the level where the employee is located and to which an employee can fall. Such areas include, but are not limited to, ground levels, floors, roofs, ramps, runways, excavations, pits, tanks, materials, water, and equipment.

MAXIMUM INTENDED LOAD: the total load of all persons, equipment, tools, materials, transmitted loads, and other loads reasonably anticipated to be applied to a scaffold or scaffold component at any one time.

OPEN SIDES AND ENDS: the edges of a platform that are more than 14 inches away horizontally from a sturdy, continuous, vertical surface (such as a building wall) or a sturdy, continuous, horizontal surface (such as a floor), or a point of access. Exception: For plastering and lathing operations, the horizontal threshold distance is 18 inches.

PERSONAL FALL ARREST SYSTEM: a system used to arrest an employee's fall. It consists of an anchorage, connectors, a body harness and may include a lanyard, deceleration device, lifeline, or combinations of these.

PLATFORM: a work surface elevated above lower levels. Platforms can be constructed using individual wood planks, fabricated planks, fabricated decks, and fabricated platforms.

QUALIFIED PERSON: one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work, or the project.

RATED LOAD: the manufacturer's specified maximum load to be lifted by a hoist or to be applied to a scaffold or scaffold equipment.

SCAFFOLD: any temporary elevated platform (supported or suspended) and its supporting structure (including points of anchorage) used for supporting employees or materials or both.

UNSTABLE OBJECTS: items whose strength, configuration, or lack of stability may allow them to become dislocated and shift and therefore may not properly support the loads imposed on them. Unstable objects do not constitute a safe base support for scaffolds, platforms, or employees. Examples include, but are not limited to, barrels, boxes, loose brick, and concrete blocks.

GUIDELINES FOR SCAFFOLD USE

ALL SCAFFOLDS:

Employees who work on any type of scaffold must follow the below listed guidelines:

- a. scaffolds and scaffold components shall not be loaded in excess of their maximum intended loads or rated capacities, whichever is less.
- b. scaffolds and scaffold components will be inspected for visible defects by a competent person before each work shift and after any occurrence which could affect a scaffold's structural integrity.
- c. damaged or weakened parts will be immediately replaced.
- d. scaffolds shall be erected, moved, dismantled or altered only under the supervision and direction of a competent person qualified in scaffold erection, moving, dismantling or alteration. Such activities shall be performed only by experienced and trained employees selected for such work by the competent person.
- e. work on or from scaffolds is prohibited during storms or high winds unless a competent person has determined that it is safe for employees to be on the scaffold and these employees are protected by a personal fall arrest system or wind screens.
- f. personnel may not work on scaffolds covered with snow, ice or other slippery material except to remove the material with extreme care.

- g. where swinging loads are being hoisted onto or near scaffolds such that the loads might contact the scaffold, tag lines or equivalent measures to control the loads shall be used.
- h. debris shall not be allowed to accumulate on platforms.
- i. make-shift devices on top of scaffold platforms shall not be used to increase the working level height of employees.
- j. guardrails should have smooth surfaces to prevent puncture, laceration, or snagging injuries.
- k. make-shift parts will not be used. A nail is not a substitute for a pin.

SUPPORTED SCAFFOLDS:

Employees who work on supported scaffolds must follow the below listed rules and guidelines. These guidelines cover most, but not all situations. The competent person will address unusual situations.

- a. Each platform unit on all working levels of a scaffold shall be fully planked or decked between the front uprights and the guardrail supports and each platform unit shall be installed so that the space between adjacent units and the space between the platform and the uprights is no more than 1 inch wide (where feasible.)
- b. Supported scaffolds must have a height to base (including outrigger supports, if used) width ratio of no more than 4:1 unless restrained from tipping by guying, tying, bracing, or equivalent means. The competent person will direct the procedures for prevention of tipping.
- c. Supported scaffold poles, legs, posts, frames and uprights must rest on **base plates AND** mud sills or other adequate firm foundation.

Note: Base plates must always be used on supported scaffolds

- 1. Footings must be level, sound, rigid, and capable of supporting the loaded scaffold without settling or displacement.
- 2. Unstable objects can not be used to support scaffolds or platform units.
- 3. Unstable objects shall not be used as working platforms.
- 4. Front-end loaders and similar pieces of equipment shall not be used to support scaffold platforms unless they have been specifically designed by the manufacturer for such use.
- 5. Fork-lifts shall not be used to support scaffold platforms unless the entire platform is attached to the fork and the fork-lift is not moved horizontally while the platform is occupied.

- d. Supported scaffold poles, legs, posts, frames and uprights shall be plumb and braced to prevent swaying and displacement.
- e. Scaffolds shall not be moved horizontally while employees are on them unless they have been designed by a registered professional engineer specifically for such movement or, in the case of mobile scaffolds:
 - 1. the surface on which the scaffold is being moved is within 3 degrees of level and free of pits, holes, and obstructions.
 - 2. the height to base width ratio of the scaffold during movement is two to one or less.
 - 3. outrigger frames, when used, are installed on both sides of the scaffold.
 - 4. when power systems are used, the propelling force is applied directly to the wheels and does not produce a speed in excess of 1 foot per second.
 - 5. no employee is on any part of the scaffold which extends outward beyond the wheels, casters, or other supports.
 - 6. before the scaffold is moved, each employee on the scaffold must be made aware of the move.

SUSPENDED SCAFFOLDS:

Employees who work on suspended scaffolds must follow the below listed rules and guidelines. These guidelines cover most, but not all situations. The competent person will address unusual situations.

- a. All suspension scaffold devices shall rest on surfaces capable of supporting at least 4 times the load imposed on them by the scaffold operating at the rated load of the hoist (or at least 1.5 times the load imposed on them by the scaffold at the stall capacity of the hoist, whichever is greater).
- b. Direct connections on suspension scaffolds must be evaluated before use by a competent person who shall confirm that the supporting surfaces are capable of supporting the loads to be imposed.

- c. Counterweights shall be made of non-flowable material. Sand, gravel and similar materials that can be easily dislocated may not be used as counterweights.
 - 1. Only items specifically designed as counterweights shall be used as counterweights. Construction material shall not be used as counterweights.
 - 2. Counterweights shall not be removed from an outrigger beam until the scaffold is disassembled.
- d. The use of repaired wire rope as suspension rope is prohibited.
- e. Wire ropes shall not be joined together except through the use of eye splice thimbles and secured by eye splicing or equivalent means.
- f. Wire ropes shall be inspected for defects by a competent person prior to each work shift and after every occurrence which could affect a wire rope's integrity. Wire ropes will be **replaced** if any of the following conditions exist:
 - 1. any physical damage which impairs the function and strength of the rope.
 - 2. kinks that might impair the tracking or wrapping of rope around the drum(s) or sheave(s).
 - 3. six randomly distributed broken wires in one rope lay or three broken wires in one strand in one rope lay.
 - 4. abrasion, corrosion, scrubbing, flattening or peeling causing loss of more than one third of the original diameter of the outside wires.
 - 5. heat damage caused by a torch or any damage caused by contact with electrical wire.
 - 6. evidence that the secondary brake has been activated during an overspeed condition and has engaged the suspension rope.
- g. Gasoline-powered equipment and hoists shall not be used on suspension scaffolds.
- h. Gears and brakes of power-operated hoists used on suspension scaffolds shall be enclosed.
- i. Manually operated hoists shall require a positive crank force to descend.

GUIDELINES FOR THE CONTROL OF ELECTRICAL HAZARDS

To prevent the possibility of electrical shock, neither the scaffold nor any conductive material handled on the scaffold shall come closer to exposed and energized power lines as noted below:

INSULATED POWER LINES

<u>Voltage</u>	<u>Minimum Distance</u>	<u>Alternatives</u>
Less than 300 volts	3 feet	
300 volts to 50 kv	10 feet	
More than 50 kv	10 feet plus 0.4" for each 1 kv over 50 kv	2 X's the length of the line insulator, but never less than 10 feet

UNINSULATED POWER LINES

<u>Voltage</u>	<u>Minimum Distance</u>	<u>Alternatives</u>
Less than 50 kv	10 feet	
More than 50 kv	10 feet plus 0.4" for each 1 kv over 50 kv	2 X's the length of the line insulator, but never less than 10 feet

Scaffolds may be closer to power lines if it is necessary to accomplish the work, but only after the utility company or electrical system operator has been notified of the need to work closer, and the utility company or electrical system operator has deenergized or relocated the lines or installed protective coverings to prevent accidental contact with the lines.

When using 110 volt electrical power tools or lights, ground fault circuit breakers must be used. Electrical extension cords must be inspected for cuts or cracks in the insulation before use.

GUIDELINES FOR THE CONTROL OF FALL HAZARDS

Each employee working on a scaffold more than 10 feet above a lower level must be protected from falling to that lower level as noted below:

<u>SCAFFOLD TYPE</u>	<u>FALL PROTECTION REQUIREMENTS</u>
Boatswains' Chair Catenary Scaffold Float Scaffold Needle Beam Scaffold Ladder Jack Scaffold	Personal Fall Arrest System

SCAFFOLD TYPE

FALL PROTECTION REQUIREMENTS

Single-Point Adjustable
Suspension Scaffold
Two-Point Adjustable
Suspension Scaffold

Personal Fall Arrest System
and a
Guardrail System

Crawling Board
(Chicken Ladder)

Personal Fall Arrest System;
*Guardrail System or a $\frac{3}{4}$ " diameter grabline
or equivalent handhold securely fastened
beside each crawling board.

Self-Contained Adjustable
Scaffold

*Guardrail System when the platform is
supported by the frame structure; by
both a Personal Fall Arrest System and a
*Guardrail System when the platform is
supported by ropes.

Walkway Located within
a Scaffold

*Guardrail System installed within $9\frac{1}{2}$ " of
and along at least one side of the
Walkway.

Supported Scaffolds used
while performing Overhand
Bricklaying

Personal Fall Arrest System or a *Guardrail
System (except at the side next to the wall
being laid.)

All Other Scaffolds not
specified above

Personal Fall Arrest System or a *Guardrail
System

*Guardrail Systems must have a minimum 200 pound toprail capacity.

SPECIAL PRECAUTIONS FOR THE PREVENTION OF FALLING

PLANKING REQUIREMENTS:

Plank slippage causes falls and falls cause injuries. Below are requirements for platforms and/or planks used on scaffolds and walkways:

- a. each platform unit (e.g., scaffold plank, fabricated plank, fabricated deck, or fabricated platform) shall be installed so that the space between adjacent units and the space between the platform and the uprights is no more than 1 inch wide.

1. Exceptions to the above:

when a wider space is necessary (for example, to fit around uprights when side brackets are used to extend the width of the platform). In this instance, the platform must be planked or decked as fully as possible and the remaining open space between the platform and the uprights shall not exceed $9\frac{1}{2}$ ", or

when planking or decking is used solely for walkways or solely for use by personnel erecting or dismantling the scaffold. In these instances, only the planking the competent person establishes as necessary to provide safe working conditions is required.

b. Each scaffold platform and walkway shall be at least 18 inches wide.

1. Exceptions to the above:

each ladder jack scaffold, top plate bracket scaffold, roof bracket scaffold, and pump jack scaffold shall be at least 12 inches wide.

there is no minimum width for boatswain's chairs.

where working areas are so narrow that platforms and walkways cannot be at least 18 inches wide, the platforms and walkways shall be as wide as feasible. In these instances, personnel shall be protected from fall hazards by the use of guardrails and/or personal fall arrest systems regardless of the height.

c. The front edge of all platforms shall not be more than 14 inches from the face of the work unless guardrail systems are erected along the front edge and/or fall arrest systems are used.

1. Exceptions to the above:

for outrigger scaffolds, the maximum distance from the face of the work shall be 3 inches.

for plastering and latching operations, the maximum distance from the face of the work shall be 18 inches.

d. Each end of a platform, unless cleated or otherwise restrained by hooks or equivalent means, shall extend over the centerline of its support by at least 6 inches and not more than:

1. twelve (12) inches for a platform 10 feet or less in length unless the platform is designed and installed so that the cantilevered* portion of the platform is able to support personnel and/or material without tipping, or has guardrails which block access to the cantilevered end.

2. eighteen (18) inches for a platform greater than 10 feet in length unless it is designed and installed so that the cantilevered* portion of the platform is able to support personnel without tipping or has guardrails which block access to the cantilevered end.

*NOTE: Cantilevered portion of the platform is the portion of the platform which extends beyond the support by 12 or 18 inches.

- e. On scaffolds where scaffold planks are abutted to create a long platform, each abutted end shall rest on a separate support surface. The use of common support members such as “T” sections to support abutting planks or hook on platforms designed to rest on common support is acceptable.
- f. Where platforms are overlapped to create a long platform, the overlap shall occur only over supports and shall not be less than 12 inches unless the platforms are nailed together or otherwise restrained to prevent movement.
- g. At points of a scaffold where the platform changes direction, such as turning a corner, any platform that rests on a bearer at an angle other than a right angle shall be laid first; platforms which rest at right angles over the same bearer shall be laid second on top of the first platform.
- h. With the exception that the edges may be marked for identification, wood platforms shall not be covered with opaque finishes. Platforms may be coated with wood preservatives, fire-retardant finishes, and slip-resistant finishes as long as the coatings allow the actual wood to be seen. This is so the wood platforms may be inspected for damage and/or deterioration.
- i. Scaffold components manufactured by different manufacturers can not be intermixed unless the components fit together without force and the scaffold’s structural integrity, as determined by a competent person, is maintained.
- j. Scaffold components made of dissimilar metals shall not be used together unless a competent person has determined that galvanic action will not reduce the strength of any component below acceptable levels.

FALL PROTECTION DURING ERECTION & DISMANTLING OF SUPPORTED SCAFFOLDS

Supported Scaffolds: The competent person must determine the feasibility and safety of providing fall protection for employees erecting and dismantling supported scaffolds.

Suspended Scaffolds: Fall protection for those erecting and dismantling suspended scaffolds is possible because the anchorage points used for supporting the scaffold would certainly support a fall protection system. Therefore, fall protection will be utilized for personnel erecting or dismantling supported scaffolds.

GUIDELINES FOR THE CONTROL OF FALLING OBJECTS

All personnel working on a scaffold must wear hard hats. Further protection from falling objects will be provided, if needed, by toeboards*, screens, or guardrail systems; or through the erection of debris nets, catch platforms, or canopy** structures that contain or deflect the falling objects.

Objects that are too heavy or massive to be prevented from falling by the above measures will be kept away from the edge of the scaffold and secured as necessary to prevent their falling.

Where there is a possibility of falling objects (tools, materials, or equipment), the below safeguards must be implemented:

- a. the area below the scaffold to which objects can fall shall be barricaded and employees shall not be permitted to enter the hazard area, **or**
- b. a toeboard will be erected along the edge of platforms more than 10 feet above lower levels for a distance sufficient to protect employees below.

When tools, material, or equipment are piled to a height higher than the top edge of the toeboard, the below listed safeguards must be implemented:

- a. paneling or screening extending from the toeboard or platform to the top of the guardrail shall be erected for a distance sufficient to protect employees below, **or**
- b. a guardrail system shall be installed with openings small enough to prevent passage of potential falling objects, **or**
- c. a canopy structure, debris net or catch platform strong enough to prevent passage of potential falling objects shall be erected over the employees below.

***NOTE:** Toeboards must be capable of withstanding, without failure, a force of at least 50 pounds applied in any downward or horizontal direction and be at least 3½" high from the top edge of the walking/working surface. Further, toeboards must be secured to the outermost edge of the platform and not have more than ¼" clearance above the walking/working surface. Toeboards must either be solid or have openings not over 1" in the greatest dimension.

****NOTE:** Canopies used for falling object protection must be installed between the falling object hazard and the employees below.

ACCESS

Two feet -- 24 inches -- is the height at which some sort of access is required to reach a scaffold platform. When a scaffold platform is two (2) feet above or below the point of access (often the ground level), portable ladders, hook-on ladders, ramps, walkways, ladder stands, etc. must be used. Never use a crossbrace as a means of getting on or off a scaffold.

Hook-on and attachable ladders must:

- a. be positioned so they do not tip the scaffold.
- b. have the bottom rung within 24 inches of the supporting level.
- c. have rest platforms at least at 35-foot vertical intervals when used on supported scaffolds.
- d. be designed for use with the scaffold being used.
- e. have a minimum spacing between rungs of 16 $\frac{3}{4}$ inches and a minimum rung length of 11 $\frac{1}{2}$ inches.

Stairway type ladders have essentially the same requirements except that:

- a. the rest platforms must be at the 12 foot (maximum) vertical level.
- b. the minimum step width is 16 inches (mobile scaffold stairway-type ladders: 11 $\frac{1}{2}$ inches).
- c. slip-resistant treads are required on all steps and landings.

Stairtowers, if used, must have the bottom step within 24 inches of the supporting level and have

- a. a toprail and midrail (stairrail) on each side.
- b. a landing platform at least 18 inches by 18 inches at each level.
- c. a width of 18 inches between stairrails.
- d. resistant surfaces on treads and landings.

Employees must be able to safely get on and off a scaffold platform and, at 24 inches, you will need a specific method of access.

GENERAL VERSUS SPECIFIC SCAFFOLD SAFETY GUIDELINES

General safety guidelines apply to all situations. In all situations, employees must be aware of:

- a. potential electrical hazards, fall hazards, and falling object hazards and how to eliminate them.
- b. the proper use of scaffolds and the proper handling methods of materials on the scaffold being used.
- c. the maximum intended load and the load-carrying capacities of the scaffold being used and never exceeding these limits.

Within the broad categories of suspended and supported scaffolds, there are many specific types of scaffolds -- each with its own limitations and special characteristics. Each job site has its own unique ground composition on which a supported scaffold is erected, or unique attachment points for suspended scaffolds. The competent person on the job site will instruct affected employees on any unusual or unique items that must be known about a specific circumstance.

LADDERS

Ladder safety is no less important than scaffold safety. How easy it is to overlook ladder safety. After all, who hasn't used a ladder? All employees using ladders are required by OSHA standard to receive training and understand proper procedures for ladder use before using a ladder in a work situation. For employees who have been using ladders safely for years, consider this a refresher course.

American National Standards Institute (ANSI) and NIOSH approval labels should never be covered with paint or tape. Having ladders that are constructed to standard will prevent collapse and resultant falls.

Specific operational procedures for ladders directly relating to the elimination of fall hazards are listed below:

- a. a stairway or a ladder will be provided at all personnel points of access where there is a break in elevation of 19 inches or more.
- b. ladders will never be overloaded.
- c. ladder rungs, cleats, and steps must be parallel, level, and uniformly spaced when a ladder is in position for use.
- d. ladders will not be tied or fastened together unless they are so designed.

- e. portable ladders used for gaining access to an upper level will extend at least 3 feet above the upper landing surface or the ladder will be secured at its top.
- f. ladders must be free of oil, grease, or other slipping hazards.
- g. ladders must be used for the purpose for which they were designed.
- h. non-self supporting ladders will be used at an angle that the horizontal distance from the top support to the foot of the ladder is approximately $\frac{1}{4}$ of the working length of the ladder.
- i. ladders will only be used on stable and level surfaces unless secured to prevent displacement.
- j. ladders shall not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement.
- k. ladders placed in any location where they can be displaced by workplace activities or traffic will be secured to prevent accidental displacement, or a barricade will be used to keep the activities or traffic away from the ladder.
- l. the area around the top and bottom of the ladder shall be kept clear.
- m. ladders shall not be moved, shifted, or extended while occupied.
- n. the top step of a stepladder shall not be used as a step.
- o. portable ladders with structural defects will be immediately marked in a manner that readily identifies them as defective and removed from service until repaired.
- p. when ascending or descending a ladder, one must face the ladder.
- q. employees must use at least one hand to grasp the ladder when progressing up and/or down the ladder.
- r. employees are not to carry any object or load that could cause loss of balance and a resultant fall.

Fixed ladders where the length of climb is less than 24 feet but the top of the ladder is greater than 24 feet above the lower level must have cages, wells, ladder safety devices, or self-retracting lifelines.

Fixed ladders where the length of climb equals or exceeds 24 feet shall have at least one of the following:

- a. ladder safety devices;
- b. self-retracting lifelines and rest platforms not exceeding 150 feet;
- c. a cage or well, and multiple ladder sections not exceeding 50 feet in length. At the maximum interval of 50 feet, ladder sections will be offset on landing platforms.

TRAINING

Interactive training will be given to all employees who will be performing work on scaffolds by a competent person; it will focus on the hazards associated with the type(s) of scaffolding used on our job site, as well as the methods to minimize or eliminate those hazards.

For those employees who will be erecting, disassembling, moving, operating, repairing, inspecting, or maintaining our scaffolds, the competent person will provide additional training applicable to their job requirements.

Retraining will be provided should new types of scaffolding be introduced, standards change, or on-the-job performance indicate that a particular employee has not retained the required proficiency in scaffold safety.

Training will be given, as necessary, to all employees who will be performing work using ladders by a competent person. Issues addressed will include:

- a. the nature of fall hazards in the work area.
- b. the correct procedures for erecting, maintaining, and disassembling the fall protection systems to be used.
- c. the proper construction, placement, care and handling of all ladders.
- d. the maximum intended load-carrying capacities of ladders used.
- e. the availability of the ladder standards which are contained within this program.

Retraining will be provided, as necessary. Observation of failure to follow established ladder safety procedures would be a cause for retraining.