

Environmental Safety and Health Plan



**CENTRAL CAROLINA
TECHNICAL COLLEGE
2015-2016**

*The safety rules, procedures, and practices described
in the manual are not to be misconstrued as
representing all safety rules, procedures,
and practices that may apply to
any one category.*

Environmental Safety and Health Team

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INTRODUCTION

Central Carolina Technical College recognizes its obligation to provide for environmental health and safety on the campus. This means that steps will be taken to minimize health hazards and risk of injury. The physical wellbeing of students, faculty, staff and visitors will be given priority consideration. This manual establishes appropriate safety standards, guidelines for the operation, use of the facilities, and equipment of the College.

The responsibility for the College's Environmental Health and Safety Program is assigned to the Vice President for Business Affairs. However, the success of this program requires full cooperation of all FACULTY, STAFF, AND STUDENTS in adhering to applicable rules.

It is the responsibility of the Vice President for Business Affairs, Academic Deans, Department Heads, Program Managers, and other Administrative Department Managers to include general education in safe practices and specialized training in safe use of equipment and facilities in their particular department area.

STUDENTS ARE TO BE INSTRUCTED IN THE PROPER USE OF MATERIALS AND EQUIPMENT USED IN SPECIFIC CURRICULUM AREAS AS OUTLINED IN COURSE REQUIREMENTS. STUDENTS ARE ALSO EXPECTED TO ADHERE TO ALL SAFETY PRACTICES, WHICH APPLY THROUGHOUT THE VARIOUS CAMPUS AREAS.

Training on this manual is completed once each year by each employee of the college through the professional development program. Training on this manual is also given during the new employee orientation sessions throughout the year. New employee orientations are documented on the sign-in rosters maintained in the Personnel Office.

PROCEDURE FOR EVALUATION

This safety plan is to be evaluated in the summer of each year using annual reports and current legislation to make determinations relative to its effectiveness.

TABLE OF CONTENTS

I. Personal Responsibility for Safety

A.	Individual Responsibility.....	7
B.	Supervisor or Employee in Charge-Responsibility.....	7
C.	Accident Investigation and Reporting.....	7
D.	Firearms.....	8
E.	Controlled Substances.....	8
F.	Inappropriate Actions.....	8

II. Motor Vehicles

A.	Driver's License Requirements.....	8
B.	Use of College Vehicles.....	8
C.	Accident Reports.....	9

III. Solvents, Chemical Cleaning, and Blood Borne Pathogen Hazards

A.	Hazard Communication Plan.....	9
B.	Chemical Hygiene Plan.....	25
C.	Chemical Management Program.....	28
D.	Blood Borne Pathogen Exposure.....	31

IV. Lifting

A.	General.....	34
B.	Lifting Procedure.....	34

V. Ladders, Platforms, and Barricades

A.	Ladders.....	35
B.	Portable Work Platforms.....	37
C.	Barricades.....	37
D.	Emergency Procedures for Elevators.....	37

VI. Tools and Equipment

A.	Personal Protective Equipment.....	37
B.	Proper Work Practices.....	38
C.	Handling of Pointed Tools.....	40
D.	Care of Tools.....	40

VII. Power Tools

A.	Personal Protective Equipment.....	41
B.	Proper Work Practices.....	41

TABLE OF CONTENTS

VIII. Arc and Gas Welding and Cutting

A.	Employee Responsibility.....	42
B.	Storage, Handling & Use of Oxygen & Fuel-Gas Cylinders.....	42
C.	Oxygen and Fuel-Gas Cylinders-General.....	43
D.	Hose and Hose Connections.....	44
E.	Arc Welding.....	45
F.	Fire Prevention and Protection.....	46
G.	Welding or Cutting Containers.....	46
H.	Protection of Personnel.....	46
I.	Ventilation.....	48

IX. Electrical Work

A.	General.....	48
B.	Favorable Work Conditions.....	48
C.	Protective Equipment.....	48
D.	Lockout/Tagout.....	48

X. Vehicle and Machine Repair

A.	Responsibility.....	50
B.	Tools.....	50
C.	Hydraulic Jacks, Mechanical Jack Stands.....	50
D.	Transmission Jacks.....	50
E.	Vehicle Hoists.....	50
F.	Portable Cranes and Chain Hoists.....	51
G.	Monoxo-Vent System.....	51
H.	Housekeeping.....	52

XI. Office Safety

A.	Responsibility.....	52
B.	Housekeeping.....	53
C.	Chemicals.....	53
D.	Fire Protection.....	53
E.	General.....	53

TABLE OF CONTENTS

XII. Physical Plant

A.	General.....	54
B.	Dress and Personal Protective Equipment.....	55
C.	Housekeeping.....	55
D.	Vehicles.....	55
E.	Fire Protection.....	56
F.	Chemicals.....	56
G.	Materials Handling.....	56
H.	Machines and Equipment.....	56
I.	Air Quality.....	57
J.	Confined Space Program.....	57

XIII. Weather Advisories

A.	Purpose of Plan.....	57
B.	Campus Closing Due to Bad Weather.....	58

XIV. Emergency Procedures

A.	Other Guidelines.....	58
B.	Emergency Telephone Numbers.....	59
C.	First Aid Kit Locations.....	59
D.	Civil Disturbance.....	59

XV. Appendix

A.	Confined Space Program.....	60
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I. PERSONAL RESPONSIBILITY FOR SAFETY

No safety rule is a complete substitute for common sense, nor can safety rules be devised to cover every situation you may experience. Each employee is responsible, without being notified by his/her supervisor or the employee in charge, for the following:

A. Individual Responsibility

Follow the approved practices and procedures outlined in this manual, and any other approved manual or standards which apply to any work you perform for Central Carolina Technical College.

Use only appropriate and approved protective equipment and devices as specified in this manual or other applicable manuals. Use such equipment or devices whenever the hazard justifies their use or when so instructed by your supervisor, or the employee in charge.

Make frequent inspections of tools and other equipment used to make sure such tools and equipment are in good physical condition.

Report to your supervisor or the employee in charge any condition that injures any person or damages any property. The hazard should be pointed out to the exposed employee to correct or avoid it before an accident occurs.

Any injury that occurs at work, no matter how slight, or any accident which causes damage to property, shall be reported immediately to the person in charge. All minor injuries shall be properly treated and reported to the employee's supervisor by the end of the work period. If any injury requires the services of a physician, the injured party should designate the hospital or physician he/she wishes to use.

An employee shall not drink alcoholic beverages or be under the influence of any drug that impairs judgment during the time he/she is paid by the college, or report for a work assignment evidencing any effect of alcoholic consumption or drug misuse.

B. Supervisor or Employee in Charge - Responsibility

Supervisors and employees in charge are responsible on every job for all rules and safe practices outlined in this manual and any other applicable manuals. The supervisor or employee in charge is responsible for conducting a briefing prior to beginning the work as well as adequate inspection of tools, equipment and the work area. The supervisor is also responsible for observing work in progress to the greatest possible extent to see or foresee any hazards or potential hazardous condition.

C. Accident Investigation and Reporting

Every employee who suffers an injury during work shall promptly report such injury to his or her supervisor no later than the end of the work period on the day in which the injury occurred.

The supervisor shall notify the Personnel Department and assist with completing necessary forms. When any injury happens on campus or off campus while conducting college business, the Personnel Department must be contacted immediately.

Every accident shall be investigated by Campus Safety/Security to determine the cause and the steps needed to prevent recurrence.

I. PERSONAL RESPONSIBILITY FOR SAFETY (Con't)

D. Firearms

No one will bring firearms, ammunition or other weapons onto College property except for law enforcement personnel in performance of their official duties.

E. Controlled Substances

Controlled substances including, but not limited to marijuana and cocaine are illegal by state and federal law. Their use and possession are prohibited on college property.

F. Inappropriate Actions

Irresponsible actions, practical jokes and all types of clowning around are prohibited.

II. MOTOR VEHICLES

A. Driver's License Requirements

No employee of the College shall be permitted to operate a college vehicle unless he/she possesses a valid driver's license. If an employee who is required to drive a college vehicle has had driving privileges suspended or license revoked, they must report this situation to their supervisor immediately.

B. Use of College Vehicles

Employee responsibility – It is the responsibility of the employee to always operate a college vehicle in conformance with the applicable motor vehicle laws, all local ordinances and within the guidelines of this section.

Before Starting – It is the driver's basic responsibility to make sure the vehicle is in safe operating condition before starting each trip. The employee shall check all lights, horn, windshield wipers, brakes, tires, gas, rear view mirrors, seat belts, and windows for clear visibility. In winter, de-ice windshield before traveling.

Seat Belts shall be worn by driver and passengers in college vehicles whenever the vehicle is in motion on public or private thoroughfares and roads. Employees who drive their personal vehicles for college business or who are passengers in personal vehicles being used for college business shall also wear seat belts.

Distracted Driving—In accordance with state law, employees shall not compose, send, or read text-based communications on an electronic device while operating a College or personal vehicle on College business.

Parking – avoid high-risk parking areas. After a vehicle has been parked, always turn off the ignition; remove ignition key and lock doors before leaving vehicle. Remove all valuables from the front of the vehicle and pack them in the trunk.

Backing – Vehicles, wherever possible, should be positioned or parked where backing will not be necessary. If a vehicle must be backed, it is the responsibility of the driver to back safely. If alone, visually check the area behind the vehicle immediately prior to backing up or sound the horn twice to warn others in area.

II. MOTOR VEHICLES (Con't)

1. If traveling with other employees, request that another employee check the area in back of the vehicle and act as a safety guide during the backing operation.

Emergencies – No job is so important that it requires an employee to operate a vehicle in any manner that is considered unlawful or unsafe. An emergency call does not permit the driver to disregard traffic laws and regulations.

Driver must report any repairs or suspected conditions using the mileage sheet, or by contacting the college maintenance department if the vehicle requires immediate attention.

C. Accident Reports

1. Any accident involving a College vehicle, regardless of the extent of damage, must be investigated.
2. A report of the accident (Incident Report) must be filed with Campus Safety/Security. The Director of Safety and Security will notify the Vice President for Business Affairs of any accidents.

III. SOLVENTS, CHEMICAL CLEANING, AND BLOODBORNE PATHOGEN HAZARDS

A. Hazard Communication Plan

The Occupational Safety and Health Administration (OSHA) specifies in 29 CFR 1910.1200 that all employers must communicate to employees the hazards presented by chemicals and products that contain hazardous chemicals in the workplace. It is the policy of Central Carolina Technical College that this be implemented and vigorously enforced. This Hazard Communication Plan (HCP) is intended to meet the requirements of that regulation.

The plan and all attachments will be available at any time to any employee or representative of OSHA or their counterparts in state government.

Applicability

The HCP shall be administered by the Director of Safety and Security. He/She shall be responsible for implementing this plan, keeping the HCP up-to-date, initial training, and annual refresher training.

This plan applies to all employees of Central Carolina Technical College. A Chemical Hygiene Plan (CHP) will address the unique requirements of the laboratories. This HCP will serve as a primary source of information and training for the HCP. The existence of the CHP does not remove the responsibility for communicating the contents of the HCP.

III. SOLVENTS, CHEMICAL CLEANING, AND BLOOD BORNE PATHOGEN HAZARDS (Cont'd.)

Documentation

1. List of Hazardous Substances

The college will maintain a list of all chemicals and products purchased by the college, which are intended for use by the employees. No other chemicals or products are allowed on the campus for use in any job. The list will be maintained by the department heads and managers in their respective workplaces. A master list will be maintained by the Director of Safety /Security.

2. Hazard analysis and Material Safety Data Sheets (MSDS)

The college will evaluate the hazardous substances to determine the hazard they present to employees by referring to 29 CFR 1910, Subpart Z or the MSDS provided for that chemical or product. Each hazardous substance shall be identified as one of the following:

Flammable	Asphyxiants
Reactive	Sensitizers
Acute Toxicity	Irritant
Chronic Toxicity	Corrosive

3. MSDS's for hazardous substances shall be located the following areas:

The immediate area where the hazardous substance is used and stored and as listed below:

The Safety/Security Office
Building 300C Maintenance Office
On-line for the Chemistry/Biology Labs
Custodial Office

4. The following individuals are responsible for administering the HCP for the employees working for them or assigned to their area of responsibility. If any MSDS's are missing or incomplete, it is the responsibility of these personnel to obtain an MSDS from the manufacturer or supplier immediately.

Science Department Head
Machine Tool Department Head
Automotive Department Head
HVAC Department Head
Welding Department Head
Director of Physical Plant
Custodial Supervisor

Signage and Labels

The system for labeling hazardous materials is found in the standard operating procedures for Management of Hazardous and Non-hazardous Materials and Waste.

1. Containers are clearly labeled with the approved labeling system identifying their contents.

III. SOLVENTS, CHEMICAL CLEANING, AND BLOODBORNE PATHOGEN HAZARDS (Cont'd.)

2. Appropriate hazard warnings are noted.

Employee and Student Training

1. Hazardous Substances

The college shall provide training to all employees that are exposed to hazardous substances in the normal course of their work or who may be exposed in foreseeable emergency situations. The training will be given initially upon employment or upon assignment to a different job or program and any time a new hazardous substance is introduced to the specific workplace environment of that employee. Each employee is required to undergo annual refresher training as well. They shall be trained as to the specific hazardous substances in their work and the dangers they pose. They shall be trained as to the contents of the HCP and 29 CFR 1910.1200. Additionally, the training shall address at least the following:

- a. Recognition of labels and warnings. Each employee or student who is exposed to hazardous substances shall be trained to recognize the labeling system in use for primary and secondary containers.
- b. Recognition of symptoms resulting from exposure. Each employee or student who is exposed to hazardous substances shall be trained to recognize the symptoms of over exposure to the specific hazardous substances to which they are normally exposed.

2. Spills, Releases, and Personal Protection

Employees will be trained to recognize the dangers associated with a spill or release and the appropriate action to take when a spill or release is discovered.

- a. Spills and Releases. Each employee shall be trained to recognize a spill or release and to either sound alarms or initiate the proper notification sequence.
- b. Personal Protection. Personal Protective equipment (PPE) is essential for the safe handling of hazardous substances either in their normal use or in situations such as spills and releases. Each employee who is exposed to hazardous substances in their workplace will be trained on the proper PPE to use while handling the specific hazardous material.

3. Understanding MSDS's

Each employee or student will be trained to understand what information is communicated on the MSDS and where the MSDS's are located. Each section of an MSDS shall be explained as to contents and meaning. Particular attention will be paid to hazard identification, manufacturer identification, PPE and first aid.

4. Emergency Plans

Each employee or student shall be trained on the emergency evacuation routes for their workplace and an emergency evacuation route shall be posted in various locations, main corridors, and hallways. They shall also be trained in the recognition of all warnings, alarms or other means of rapid communication and in how they are activated. Only specifically designated personnel shall require training in first aid, emergency response, or remediation.

III. SOLVENTS, CHEMICAL CLEANING, AND BLOODBORNE PATHOGEN HAZARDS (Cont'd.)

5. First Aid

Each employee or student shall be trained in how to call for assistance.

6. Non-Routine Tasks

Employees may be required to perform jobs or participate in programs that are non-routine and may pose different hazards than those found during the course of their normal day. Prior to beginning any such job or program, the department head or manager shall inform the employee and students of the appropriate safe handling of methods for each hazardous substance to be used. The specific chemical hazards, PPE and emergency procedures will be communicated.

Training for the Hazardous Communication Plan

The following is a training plan and materials necessary to train employees in accordance with this HCP and 29 CFR 1910.1200. Instructors using this plan should use the summary sections as a guide to conducting the training.

Introduction, Definitions and Principles

- a. The law requires that each employee be informed of 29 CFR 1910.1200 and have access to the regulation. Employees have internet access to the HCP, the regulation, the chemical list, and the MSDS at the following locations:
 1. The immediate area where the hazardous substance is used and stored.
 2. The Safety/Security Office
 3. The Physical Plant Directors Office
 4. Electronic copies available in labs of Building 600.
 5. The Custodial Office
- b. Employees are entitled to know the hazards posed from hazardous substances in the workplace. The following terms are frequently used in describing the dangers associated with hazardous substances.

ASPHYXIANTS – There are two types of asphyxiants –simple and chemical. A simple asphyxiant is one that will displace or dilute the oxygen to a point below that necessary for life. Examples of simple asphyxiate are methane, carbon dioxide and helium. Chemical asphyxiate are those that prevent the uptake of oxygen by the body. Carbon monoxide is a good example of a chemical asphyxiant. Carbon monoxide binds to hemoglobin 300 times more efficiently than oxygen, quickly lowering the oxygen depending on the route of exposure and the toxin.

BOILING POINT – The temperature at which the vapor pressure of a liquid is equal to the external pressure on the liquid.

CARCINOGENS – Are agents that cause cancer in living organisms.

CORROSIVES – A corrosive is a reactive compound that produces a chemical change in the material it comes into contact with. Corrosive materials are capable of destroying body tissues, plastics, metals and a host of

III. SOLVENTS, CHEMICAL CLEANING, AND BLOODBORNE PATHOGEN HAZARDS (Cont'd.)

other materials. Common corrosives are halogens, acids and bases. A common reaction when coming into contact with acids and bases is skin irritation and burns. Acids and bases can be compared on the pH scale. The scale ranges from 0 to 14 with strong acids having a low pH and strong bases having a high pH.

Important Considerations

The following determinations must be made when dealing with corrosives in the field:

1. Is the corrosive an irritant and will it cause severe burns?
2. Will the corrosive material cause structural damage to container and other potentially harmful materials releasing them into the environment?

CUTANEOUS HAZARDS – Chemicals which affect the dermal (skin) layer of the body. These will cause deflating of the skin, leaving a drawn tight appearance (dish pan hands): they will also cause rashes and burns.

EVAPORATION RATE – For HCP training, it is the evaporation rate of a substance as compared with an equal volume of Butyl Acetate.

EYE HAZARDS – Chemicals which affect the eye or visual capacity. These can cause conjunctivitis, corneal damage and burns.

FLAMMABLE – Chemicals that fall into one of the following categories: (1) Aerosol flammable – is one that yields a flame projection exceeding 18 inches at full valve opening or a flashback extending to the valve at any degree of opening. (2) Liquid flammable – is one which has a flash point below 100°F. (3) Solids flammable – is a solid other than a blasting agent or explosive that is liable to cause fire through friction, absorption of moisture, spontaneous chemical change, or is easily ignited and when ignited will burn so vigorously and persistently as to create a serious hazard.

FLAMMABLE LIMITS – For HCP training, this is the range of concentration in the air of a substance within which a material will ignite and burn.

FLASH POINT – For HCP training purposes, means the minimum temperature at which a liquid gives off a vapor in sufficient concentration to ignite when tested by one of the methods described in 29 CFR 1910.

HEPATOTOXINS – Chemicals that produce liver damage. These will cause jaundice, a yellowing of the skin especially around the mouth and eyes. They will also cause liver enlargement.

IRRITANTS – Irritants cause inflammation of membranes through the process of a drying or corrosive action. Exposing skin to high concentrations of irritating materials may result in contact dermatitis with symptoms of redness, itching and drying of the skin. Dermatitis-causing materials such as organic solvents are known as "primary" or "absolute" irritants and produce a response within minutes. Skin ulceration and destruction of tissue can occur if a material is extremely corrosive. Respiratory tissues respond with a reflex action followed by involuntary coughing when exposed to irritant gases or fumes. Ammonia, Chlorine, Ozone and Sulfur Dioxide are examples of irritant gases that can cause inflammation of the major air passages commonly known as bronchitis or tracheitis. There are more destructive irritating agents, which can cause pulmonary edema (accumulation of fluid in the lungs), pneumonia and death when the terminal respiratory passages (alveoli) located deep in the lungs are reached.

III. SOLVENTS, CHEMICAL CLEANING, AND BLOODBORNE PATHOGEN HAZARDS (Cont'd.)

Other irritants can cause the gastrointestinal tract to respond in a similar manner causing nausea, vomiting, etc. Not all irritants cause these severe effects. Particulate such as dust can be severely irritating even though they are not chemically active hazards.

LOW EXPLOSIVE LIMIT (LEL) is the concentration of a substance in air below which ignition will occur.

LUNGS, Agents which damage: Chemicals which irritate or damage the pulmonary tissue. They cause coughing, tightness in the chest, and shortness of breath.

MELTING POINT – The temperature at which a solid changes to a liquid.

MUTAGENS are agents that cause changes in genes of the sperm or egg cells of the parents. It is not the parent, but the offspring who suffers the consequences of exposure. Birth defects are the result.

NEPHROTOXINS – Chemicals which produce kidney damage. These toxins can cause edema, (general swelling of body tissue.) The swelling can be localized as well, affecting the hands, toes or face, for example. The effect will be different depending on the toxin and the method of exposure.

PEL (Permissible Exposure Limit) Employee exposure limits set by OSHA.

REACTIVE – Reactive hazards are of a violent nature such as a water-reactive flammable solid which will spontaneously combust upon contact with water. Reactive hazard also refers to any substance that undergoes a violent reaction in the presence of water; or in an environment with a normal room temperature devoid of added heat, friction or shock.

Chemical Reactions

Chemical changes occur as a result of two or more substances interacting. These reactions are mostly grouped into two types – endothermic and exothermic. Endothermic reactions require an external source of heat to maintain the reaction. When the heat source is removed, the reaction stops. Exothermic reactions are generally far more dangerous because they produce heat. The rate of both reactions depends on the following:

Physical state of a reactant (solid, liquid, gas)

Concentration of reactants

Pressure

Temperature

Surface area of the reactant – Dust is much more reactive than solid blocks.

Presence of a catalyst

Non-Compatible Substance

Because of the dangers associated with hazardous reactions, non-compatible substances should always be separated. One of the most common problems is the storage of flammable materials with oxidizers. (For example, storing paints and solvents with pool chemicals or oxygen bottles).

III. SOLVENTS, CHEMICAL CLEANING, AND BLOODBORNE PATHOGEN HAZARDS (Cont'd.)

Compatibility and non-Hazardous reactions

If two or more materials do not react after being in contact, they are considered compatible. Not all reactions are considered hazardous. Acids and bases will react to form salts and water which may not be corrosive.

One of the most dangerous compatibility issues comes from hazardous waste. Often the characteristics of the waste are unknown. Personnel who must determine compatibility should refer to A Method for Determining the Compatibility of Hazardous Waste, published by the EPA Office for Research and Development (Publication # EPA 600/2-80-076).

REPRODUCTIVE TOXINS – Chemicals which affect the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis). These cause birth defects and sterility.

ROUTES OF EXPOSURE

Contact with Skin, Eyes and Hair

Skin acts as a protective barrier against the entrance of foreign materials into the body. However, the skin provides a large surface area for contact with toxic agents. When this barrier is overcome, the toxic chemicals can readily enter through the skin.

Inhalation

Inhalation, the most rapid route for entry, immediately introduces toxic chemicals to respiratory tissues and into the bloodstream. Once in the bloodstream, chemicals are quickly transported to all organs of the body.

Ingestion

Ingestion is the least likely form of exposure in that it normally results from a conscious “hand-to-mouth” effort. Additionally, the number of substances that can be ingested readily is limited as it is difficult to swallow gases and vapors. Although the acids, alkali’s and enzymes in the gastrointestinal tract can serve to limit the toxicity level, they can also serve to enhance the toxic nature of a compound.

Critical Considerations

Before a chemical is introduced into the workplace, these items should be considered:

- Are these toxic agents present?
- How much is present?
- What is the route of exposure?
- What are the affects of the agent?
- How will we monitor employee exposure?
- What PPE will be required?
- Will special disposal procedures be needed?
- Will my reporting status be changed?

III. SOLVENTS, CHEMICAL CLEANING, AND BLOODBORNE PATHOGEN HAZARDS (Cont'd.)

SENSITIZERS – Becoming sensitized to chemicals occurs when a substance enters the body and antibodies are produced, which react with the substance serving to immunize the body. Prior to and at the time of first exposure to a chemical, the body has no antibodies specific to the chemical. After each subsequent exposure, the antibody level increases until a point is reached whereby the level is high enough that upon exposure to the chemical, an allergic reaction occurs. Symptoms of skin and respiratory sensitizers range from mild discomfort from poison ivy to death from isocyanates. In addition, symptoms may mimic those from “irritant”.

SOLUBILITY IN WATER – The measure of how well a material will dissolve in water.

SPECIFIC GRAVITY – The weight of a substance compared with an equal volume of water.

TLV-TWA (Threshold Limit Value-Time Weighted Average) – TLV is an exposure level established by the American Council of Government Industrial Hygienist based on an 8-hour time weighted average. The figure is a limit of exposure that should not be exceeded in an 8-hour day.

TLV-C (Threshold Limit Value-Ceiling) – An exposure level that cannot be exceeded even instantaneously.

TLV-STEL (Threshold Limit Values-Short Term Exposure Limit) – is a time period other than an 8-hour period associated with TLV that employee exposure may not exceed.

TARGET ORGAN – The organ that a chemical acts on or affects.

TERATOGENS – Chemicals that affect the offspring through direct exposure of the embryo of fetus.

TOXIC – A substance that is capable of negative effects in living organisms. There are two general types of toxins: (1) Acute Toxins, which have rapid or immediate effect, and (2) Chronic Toxins, which are those whose effect is slow to detect. In some cases, chronic toxins can often take decades to show their effects. Toxins are categorized by the effect they have on the organism.

TOXICITY – is a description of the effect of a toxic substance. Toxic materials are capable of causing both “systematic” and “local” effects in living organisms. Exposure to toxic materials does not always cause death; however, this is the foremost concern. Toxic hazards are categorized based on the physiological effect they have on the organism, and may initiate more than one physiological reaction.

Chemical agents acting on specific organs or organ systems are known as “systematic” poisons. Anesthetics and narcotics are included in a sub group of these poisons. They are of specific concern to emergency response personnel as they can impair judgment and thought processes. For these reasons, they are considered extremely hazardous. Anesthetics and narcotics act as a depressant on the central nervous system resulting in a lack of sensation, which, in large doses, can cause coma and even death.

UPPER EXPLOSIVE LIMIT (UEL) – The concentration of a substance in air above which ignition will not occur.

VAPOR DENSITY – The relative density of a vapor to ambient air.

VAPOR PRESSURE - The pressure of the vapor of a substance in contact with its liquid or solid in a sealed container.

III. SOLVENTS, CHEMICAL CLEANING, AND BLOODBORNE PATHOGEN HAZARDS (Cont'd.)

MATERIAL SAFETY DATA SHEETS (MSDS)

MSDS's are intended to communicate basic information on the hazards associated with a chemical or product. There are some general guidelines that all MSDS's must follow:

- No blank fields are allowed. N/A for not applicable, NE for not established and ND for no data are allowed but should have footnotes explaining why that information is not included.
- The company's name, address, and emergency phone number must be clearly shown.
- The emergency phone number must be answered 24 hours per day.
- MSDS's must give target organ information and the primary route of exposure.
- MSDS's may be generic for a family of products.
- PPE section may not go overboard with precautions but should consider expected exposure in anticipated emergencies.

Each MSDS must name the material at the top of page one – the name here must be the one used on the container. The rest of the MSDS is divided into sections.

Section I – is used to identify the manufacturer's name, address, emergency phone number, and date this MSDS was prepared.

Section II – is used to explain the hazardous ingredients information. The Permissible Exposure Level and the Threshold Limit Level are given here. LD50/LC50 information can also be found in this section.

Section III – describes the physical and chemical characteristics – See the definition in section A to define these.

Section IV – covers fire and explosive hazards – This should tell you the flammable characteristics, the extinguishing media to be used, and any special instructions needed in firefighting.

Section V – describes reactivity – generally this section will describe the chemical or substance as stable or unstable, storage requirements, and the potential for hazardous decomposition.

Section VI – describes the health hazard data – generally this will tell you if it is hazard by inhalation, ingestion, etc. It will also tell you if it is a regulated substance and if there is a toxic effect such as “causes CNS depression, known to cause cancer in...”

Section VII – covers precautions to be taken for safe handling – including: in case of a release, how to properly dispose of the material, how to store the material, etc.

Section VIII – This sections covers how to control the material – this where you find out the proper PPE to use while working with the material.

A sample MSDS form is attached.

Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910 1200. Standard must be consulted for specific requirements.

U.S. Department of Labor

Occupational Safety and Health Administration
(Non-Mandatory Form)

Form Approved

OMB No. 1218-0072

IDENTITY (as Used on Label and List)

Note: Blank spaces are not permitted. If any item is not applicable or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's name

Emergency Telephone Number

Address (Number, Street, City, State and ZIP Code)

Telephone Number for Information

Date Prepared

Signature of Preparer (optional)

Section II—Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity, Common Name(s))

OSHA PEL

ACGIH
TLV

Other Limits

Recommended

% (optional)

Section III—Physical/Chemical Characteristics

Boiling Point

Specific Gravity (H₂O = 1)

Vapor Pressure (mm Hg)

Melting Point

Vapor Density (AIR = 1)

Evaporation Rate (Butyl Acetate = 1)

Solubility in Water

Appearance and Odor

Section IV—Fire and Explosion Hazard Data

Flash Point (Method Used)

Flammable Limits

LEL

UEL

Extinguishing Media

Special Fire Fighting Procedures

Unusual Fire and Explosion Hazards

(Reproduce locally)

OSHA 174 Sept. 1985

Section V—Reactivity Data

Stability	Unstable		Conditions to Avoid
	Stable		

Incompatibility (*Materials to Avoid*)

Hazardous Decomposition or Byproducts

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur		

Section VI—Health Hazard Data

Route(s) of Entry	Inhalation?	Skin?	Ingestion?
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Health Hazards (*Acute and Chronic*)

Carcinogenicity	NTP?	IARC Monographs?	OSHA Regulated?
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Signs and Symptoms of Exposure

Medical Conditions
Generally Aggravated by Exposure

Emergency and First Aid Procedures

Section VII—Precautions for Safe Handling and Use

Steps to Be Taken in Case Material Is Released or Spilled

Waste Disposal Method

Precautions to Be Taken in Handling and Storing

Other Precautions

Section VII—Control Measures

Respiratory Protection (*Specify Type*)

Ventilation	Local Exhaust	Special
	Mechanical (<i>General</i>)	Other

Protective Gloves	Eye Protection
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Other Protective Clothing or Equipment

Work/Hygienic Practices

Measures to control The Chemical's Hazards

- Engineering controls
- Personal protective equipment
- Safe storage of the chemical
- Safe handling practices

Information about the Chemical's Health Hazards

- Safe exposure limits, such as the Permissible Exposure Limit and the Threshold Limit Value
- Acute and chronic symptoms of exposure
- The chemical's main routes of entry into the body
- Medical conditions that can be made worse by exposure
- Emergency first-aid treatment

How to Deal with Spills and Leaks

- Cleanup techniques
- Personal protective equipment to be used during cleanup
- How to dispose of waste materials

You Should ...

- Know where the MSDS for every hazardous chemical in your work area is kept
- Be familiar with the most important points for each hazardous material you use
- Check the MSDS whenever you need more information
- Be ready to find emergency response information on the MSDS form quickly

Warning Labels

Warning labels are designed to alert you that a chemical is dangerous. They must identify all the hazards of a material.

Labels are required on:

- All containers of hazardous material in the workplace
- All containers of hazardous material being shipped from one workplace to another

Warning labels must give the following information:

- The name of the chemical
- All of its physical hazards and health hazards
- Labels on containers being shipped from one location to another must also give the name, address and phone number of a responsible source of information about the chemical

DO YOUR PART and use the information effectively:

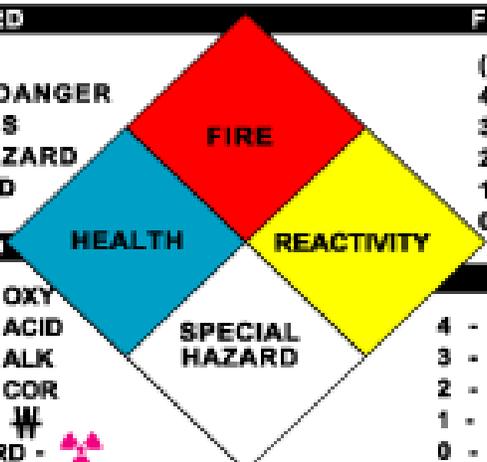
- Read the label on the container of every chemical you use
- Check the MSDS whenever you need more information about how to control the material's hazards
- Follow the instructions the label give you

Color and Number Coded Label System

Developed by the National Fire Protection Association (NFPA) and other Organizations

These systems utilize colors to represent the kind of hazard, and the numbers to show the degree of hazard.

EMPLOYEE HAZARD COMMUNICATION CARD

HEALTH HAZARD		FIRE HAZARD	
4 - DEADLY		(FLASH POINTS)	
3 - EXTREME DANGER		4 - BELOW 73°F	
2 - DANGEROUS		3 - BELOW 100°F	
1 - SLIGHT HAZARD		2 - BELOW 200°F	
0 - NO HAZARD		1 - ABOVE 200°F	
SPECIAL HAZARD OXIDIZER - OXY ACID - ACID ALKALINE - ALK CORROSIVE - COR USE NO WATER -  RADIATION HAZARD - 		REACTIVITY	
		4 - MAY DETONATE	
		3 - EXPLOSIVE	
		2 - UNSTABLE	
		1 - NORMALLY STABLE	
		0 - STABLE	
NATIONAL FIRE PROTECTION ASSOCIATION CODE 704 ALLSTATE SIGN & PLAQUE CORP.		800-845-8330	



Hazardous Material Classification

NFPA hazard identification coding system

Fire Hazard Identification System



Fire Hazard - Flash Points

- 4 - Below 73 F
- 3 - Below 100 F
- 2 - Below 200 F
- 1 - Above 200 F
- 0 - Will not burn



Health Hazard

- 4 - Deadly
- 3 - Extreme danger

- 2 - Hazardous
- 1 - Slightly hazardous
- 0 - Normal material

Reactivity

- 4 - May detonate
- 3 - Shock and heat may detonate
- 2 - Violent Chemical change
- 1 - Unstable if heated
- 0 - Stable

Specific Hazard

- Oxidizer - OXY
- Acid - ACID
- Alkali - ALK
- Corrosive - COR

no water - 

Radiation Hazard - 

Hazard Communication Standard Pictogram

As of June 1, 2015, the Hazard Communication Standard (HCS) will require pictograms on labels to alert users of the chemical hazards to which they may be exposed. Each pictogram consists of a symbol on a white background framed within a red border and represents a distinct hazard(s). The pictogram on the label is determined by the chemical hazard classification.

HCS Pictograms and Hazards

Health Hazard	Flame	Exclamation Mark
		
<ul style="list-style-type: none"> ▪ Carcinogen ▪ Mutagenicity ▪ Reproductive Toxicity ▪ Respiratory Sensitizer ▪ Target Organ Toxicity ▪ Aspiration Toxicity 	<ul style="list-style-type: none"> ▪ Flammables ▪ Pyrophorics ▪ Self-Heating ▪ Emits Flammable Gas ▪ Self-Reactives ▪ Organic Peroxides 	<ul style="list-style-type: none"> ▪ Irritant (skin and eye) ▪ Skin Sensitizer ▪ Acute Toxicity ▪ Narcotic Effects ▪ Respiratory Tract Irritant ▪ Hazardous to Ozone Layer (Non-Mandatory)

<p style="text-align: center;">Gas Cylinder</p> <p style="text-align: center;"></p> <ul style="list-style-type: none"> ▪ Gases Under Pressure 	<p style="text-align: center;">Corrosion</p> <p style="text-align: center;"></p> <ul style="list-style-type: none"> ▪ Skin Corrosion/Burns ▪ Eye Damage ▪ Corrosive to Metals 	<p style="text-align: center;">Exploding Bomb</p> <p style="text-align: center;"></p> <ul style="list-style-type: none"> ▪ Explosives ▪ Self-Reactives ▪ Organic Peroxides
<p style="text-align: center;">Flame Over Circle</p> <p style="text-align: center;"></p> <ul style="list-style-type: none"> ▪ Oxidizers 	<p style="text-align: center;">Environment</p> <p style="text-align: center;">(Non-Mandatory)</p> <p style="text-align: center;"></p> <ul style="list-style-type: none"> ▪ Aquatic Toxicity 	<p style="text-align: center;">Skull and Crossbones</p> <p style="text-align: center;"></p> <ul style="list-style-type: none"> ▪ Acute Toxicity (fatal or toxic)

III. SOLVENTS, CHEMICAL CLEANING, AND BLOODBORNE PATHOGEN HAZARDS (Cont'd.)

B. Chemical Hygiene Plan

INTRODUCTION

At Central Carolina Technical College, the most important rule is that everyone involved in laboratory operation must be safety minded. Safety awareness can become part of everyone's habits only if the issue of safety is reviewed repeatedly and the supervisor(s) evoke a sincere and continued interest. However, each individual must accept responsibility for carrying out their own work in accordance with good safety practices. All personnel should know what safety and emergency equipment is available and its location. Also, personnel should maintain safe practices at all times, which would include, but not to be limited to, good housekeeping, wearing of personal protective equipment (safety goggles, aprons, gloves, etc.) and no smoking or eating where chemicals are present.

Advance planning is one of the best ways to avoid serious incidents. Before starting any procedures (experiments), laboratory workers should consider the worst case scenario, and be prepared to handle the situation. Familiarity with particular chemicals or procedures can result in underrating or overlooking the hazards involved. Attitudes like this can lead to a false sense of security, which may result in carelessness. Every laboratory worker has a basic responsibility to themselves, colleagues, and students to plan and execute laboratory operations in a safe manner.

SELECTION OF CHEMICALS

Laboratory experiments/procedures should be reviewed to see if another experiment or procedure could teach the same principle using less toxic or physically hazardous chemicals. Special attention should be given to eliminate the use of highly acute toxins, carcinogens, and reproductive toxins.

Minimize the amount of chemicals being stored by only ordering what is needed for a specific period of time.

LABELING AND TRANSPORTING CHEMICALS

Chemicals obtained from outside suppliers should be properly labeled, and care should be taken so that the label is not defaced. The name on the label shall correspond with the name on the Material Safety Data Sheet (MSDS). Labels shall also convey the hazards associated with that chemical (such as toxicity, flammability, or reactivity). If a chemical is transferred into a new container, then that container must also be labeled. Also, all mixtures and newly created compounds must be properly labeled. Transporting chemicals should be done so as to minimize risk of accidental spills. Furthermore, if transportation involves moving chemicals through the hallways, this should be done when there are as few people as possible in the hallways. The amount and number of chemicals should be kept to a minimum.

STORAGE OF CHEMICALS

The primary concerns with storage are avoiding contact between incompatible chemicals, minimizing amounts, and ensuring that dangerous storage conditions (heat, electrical shorts, light, etc.) are not present. All flammable/combustible chemicals (those with flashpoints below 200°F) are stored in a specifically designed flammable storage cabinet(s). Photosensitive chemicals shall be stored away from light. Incompatibles such as acids and sodium cyanide, acids and bases, or ethyl ether and oxidizers, shall be stored separately.

III. SOLVENTS, CHEMICAL CLEANING, AND BLOODBORNE PATHOGEN HAZARDS (Cont'd.)

PERSONAL HYGIENE

Wear appropriate eye protection any time one is dealing with chemicals. Use other protective clothing as needed (see previous section and MSDS for specific needs). Confine loose clothing and long hair when in the laboratory. **DO NOT USE** mouth suction when pipetting liquid chemicals or starting a siphon; always use a pipet safety bulb or aspirator. **AVOID** breathing gases, vapors or mists which may be toxic (see OHA 29 CRF 1910.1000 Subpart 2 for list of Permissible Exposure Limits, Appendix C) by the use of fume hoods(s) or confinement apparatus. **BE ALERT** to unsafe conditions or actions, and call attention to them so that corrections can be made as soon as possible. **USE** equipment only for its intended purpose. **AVOID** distracting or startling others in the laboratory. Allow no horseplay or practical jokes in the laboratory or storage areas. **ALWAYS** wash exposed skin before leaving the laboratory.

ABSOLUTELY no consuming of food, beverages, or smoking in areas where chemicals are being used or stored. Areas where food or drinks are permitted shall be well marked and no hazardous chemicals allowed within that area. Glassware used for laboratory operations shall not be used for food or beverage consumption. Containers that were used for food or beverage should not be used to store laboratory chemicals. Laboratory refrigerators or ice chests shall not be used to store food, even if the food is within sealed containers.

GLASSWARE

Careful storage and handling procedures should be used to avoid damaging glassware. All damaged glassware should be discarded or properly repaired. Hand protection shall be worn when inserting glass tubing into rubber or cork stoppers, or when placing rubber/plastic tubing on glass tubing or connections. All glass tubing should be fire polished or rounded, and lubricated when making connections. Vacuum jacketed glass apparatus, such as Dewar flasks, should be handled with extreme care to prevent implosion. Hand protection (gloves) should be used when picking up broken glass.

LABORATORY EQUIPMENT

Fume hoods and ventilation equipment are described separately below. Good maintenance on equipment is important for safe and efficient operation. Equipment should be inspected and maintained regularly, following manufacturer's recommendations at a minimum. All faulty equipment should be secured and tagged "Do Not Use" so that accidental reuse of it is not possible prior to repair. Guards will be in place to prevent access to moving parts (such as belts and wheels on pumps) on equipment. Safety shielding will be used during an experiment or operation in which a possible explosion or high pressures exist. If electrical devices are used around high moisture conditions, a Ground Fault Interrupter Device (GFID) shall be used. Pressurized apparatus, like cylinders are required to have an appropriate relief device and be secured (chained) to a stationary object at all times.

FLAMMABLE SUBSTANCES

DO NOT USE an open flame to heat a flammable liquid or carry out a distillation under reduced pressure. Before lighting any flame, be sure all flammable substances are removed from the area or are in tightly sealed containers away from the heat. Use an open flame only when necessary and extinguish as soon as it is no longer needed. When volatile flammable chemicals are present: use only intrinsically safe or non-sparking electrical equipment. Also, storage of flammable substances (with a flashpoint below 200°F) should be in a safety cabinet designed for flammables.

III. SOLVENTS, CHEMICAL CLEANING, AND BLOODBORNE PATHOGEN HAZARDS (Cont'd.)

WASTE DISPOSAL

All disposals shall be in accordance with federal, state and local regulations. No hazardous waste, as defined by EPA under 40 CFR 261, shall be disposed except in a manner which is pre-approved by state and/or local officials. Before any chemicals are disposed of “down the drain”, prior approval by the local wastewater treatment plant should be granted. During disposal of any chemicals, care should be taken to protect all workers in the laboratory or building who may be exposed to any potential dangers. All disposal methods should also take into account the effects on the environment.

PROTECTIVE EQUIPMENT

All laboratories will be equipped with an emergency shower, eye wash station, fire extinguisher and first aid kit, with signs indicating the location of each. Also, all exits will be labeled with a sign. Personal protective equipment, such as goggles, aprons, gloves, respirators, or lab coats shall be provided to employees as needed.

EMPLOYEE EXPOSURE MONITORING

If there is a reason to believe that the PELs or other published recommended exposure limits are routinely exceeded, then monitoring for the exposure shall be done. Monitoring may be done by several different methods, such as personal sampling pump with captive tubes, calorimetric detector tubes, and dosimeter monitors (badges and tubes), combustible gas detectors, and toxic organic gas monitors. If monitoring shows that the PELs are exceeded, medical monitoring is also required.

EVALUATION OF VENTILATION AND FUME HOODS

Evaluation should measure the quality and quantity of ventilation present. Airflow should be consistent, with no areas in the lab having static airflow or high velocity airflow.

Adequate ventilation systems change the room air at least four (4) times per hour, although a higher air exchange rate may be needed depending upon chemicals used. Airflow paths can be monitored with use of smoke tubes: however, these do not determine velocities. Pitot tubes are used for measuring duct velocities, and anemometers or velometers are used to measure airflow rates within rooms and at the faces of fume hoods. These instruments are available from supply stores and personnel should be trained in using them. You should consult technical references that describe the type of operations you conduct, or ask your local OSHA office for guidance on an appropriate velocity.

An experiment that uses a chemical with a PEL of 50 ppm or less requires use of a fume hood or an experiment seal.

The preferred system for evaluation is a continuous monitoring device which reads velocity of air moving through the fume hood. An alternative method of evaluation is the anemometer or velometer which measures velocity of air across the face of the hood. Measurements should be taken at multiple points along the hood and averaged. Minimum face velocity (linear feet/min.) is 60-to-100 Ifm. *A program of quarterly measurements and a minimum performance of 100 Ifm is very likely to be accepted for all high level hazards.*

III. SOLVENTS, CHEMICAL CLEANING, AND BLOODBORNE PATHOGEN HAZARDS (Cont'd.)

In order to ensure air quality, the fume hood should be checked for impaired performance. Employee observation, orders and development of symptoms (eye irritation, dizziness) are indications of inadequate ventilation. Also, detector tubes may be used to determine if any air contamination is occurring.

C. Chemical Management Program

PURPOSE

Provide Central Carolina Technical College with procedures to regulate the procurement, handling, storage, labeling and usage of toxic, hazardous and non-hazardous materials to ensure compliance with federal and state laws.

SCOPE

This program applies to all materials classified as “hazardous or non-hazardous” by Federal, State, and Local Agencies, and by this institution.

REFERENCE

29 CFR 1910 Occupational Safety and Health Standards

49 CFR 172.101 Hazardous Material Transportation Uniform Safety Act

40 CFR 260-272 Resource Conservation and Recovery Act

40 DFR 240-260 Solid Wastes

DEFINITIONS

Hazardous Material – Any material which poses a physical or health hazard.

Health Hazard – A material for which there is statistically significant evidence based on scientific study that either immediate or delayed health effects may occur in exposed humans.

Physical Hazard – A material which is a combustible liquid, a compressed gas, explosive flammable, oxidizer, pyrophoric, unstable or water reactive.

Non-Hazardous Material: Any material which is not a physical or health hazard and is classified as a solid waste by 40 CFR 240-262.

Non-Hazardous Waste – Is a solid waste defined as any garbage, refuse, sludge from a waste treatment plant, water supply treatment, or air pollution control facility, and other discarded material, including solid, semi-solid, or gaseous material.

Hazardous Waste – A waste is hazardous if it exhibits one of the following characteristics: Ignitable, Corrosiveness, Reactivity and Toxic Characteristic Leaching Procedure (TCLP) Toxicity.

III. SOLVENTS, CHEMICAL CLEANING, AND BLOODBORNE PATHOGEN HAZARDS (Cont'd.)

Material Safety Data Sheets (MSDS) – A descriptive bulletin accompanying purchased material, detailing its hazards, and providing safe handling and storage procedures.

RESPONSIBILITIES

Employees – When an employee wants to order a chemical or other hazardous material, he/she shall ask the vendor for an MSDS before submitting a purchase request.

SHIPPING AND RECEIVING

If any discrepancy in the manifest or damage to material is found it shall be noted on the bill of lading and signed by the carrier's driver.

If there is any doubt about the order, the requestor shall be notified to make a final adjustment as to acceptance or rejection of the material.

All vendor certifications shall be forwarded to the person responsible for the order.

A running inventory of all hazardous and non-hazardous material shall be maintained and a physical inventory shall be performed once a year.

Only personnel with written job responsibilities for waste handling may be involved in the movement, transfer, or otherwise handling of hazardous waste.

All personnel handling hazardous waste should receive annual training.

Prior to movement of a container of hazardous waste, personnel shall make the following review at a minimum:

- Integrity of container
- Presence of completed label
- Tops, plugs, caps, etc. secured
- No leaks
- Protective clothing and equipment

NOTE: If any of the above items cannot be positively addressed, the Director of Safety/Security shall be promptly notified and the situation addressed.

If at any point during the handling of hazardous waste an accidental discharge of 10 gallons or more occurs, the Director of Safety/Security must be notified. If it is believed to be a substance that is listed as an extremely hazardous or toxic substance, the Director of Safety/Security must be notified of any accidental discharge volume.

III. SOLVENTS, CHEMICAL CLEANING, AND BLOOD BORNE PATHOGEN HAZARDS (Cont'd.)

Only the Lab Manager should schedule a waste shipment. It is also their responsibility to select an off-site treatment, storage, disposal and reclamation facility that is compliant and poses the least amount of liability for the institution.

NON-HAZARDOUS WASTE

Non-Hazardous Waste shall be collected in a type 17-H steel drum or other approved containers.

All disposal containers shall be provided and approved by the Lab Manager.

The Lab Manager shall label containers for waste as to contents prior to use, utilizing the none-hazardous waste label.

Do not mix waste without the approval of the Lab Manager.

All waste storage sites shall be designated by the Lab Manager. If there is any doubt, the Director of Safety/Security should be contacted.

HAZARDOUS WASTE

All shipments of hazardous waste will be coordinated through the Lab Manager, and Director of Safety/Security. Only an approved waste disposal transporter should be used to ship chemical waste off-site.

Waste Labels – All drum/containers of hazardous waste must be identified and marked using a hazardous waste label. The following information must be denoted at a minimum.

- Generator Name/ID Number – Central Carolina has a RCRA number on file in the business office.
- Generator Address
- Waste Code
- Waste Name
- Accumulation Start Date/Date of Generation
- Proper DOT Shipping Name
- Hazardous Class
- UN or NA Number

All containers used to manage hazardous waste must meet the approval of the Director of Safety/Security. No container may be substituted without approval of the Director of Safety/Security.

The approved disposal company shall provide bulk containers for hazardous waste disposal with labels when it is appropriate.

III. SOLVENTS, CHEMICAL CLEANING, AND BLOOD BORNE PATHOGEN HAZARDS (Cont'd.)

All other container markings (if any) shall be removed or painted over. Only the Hazardous Waste Label should be affixed to the container.

Each container of hazardous material must be labeled. Each category of Hazard (i.e. Health, Flammability, and Reactivity) has a rating scale from zero (0) to four (4), with a zero as the minimum hazard and four as the maximum. The rating for each substance or chemical is usually defined on the pertinent MSDS. If a label becomes faded or obliterated, the rating numbers shall be redone, or, if necessary, a new label applied. In addition to the rating boxes, specify any protective clothing or devices required for material handling.

All compressed gas cylinders are to be stored either secured by straps or chains or stored in proper storage cages.

METHODS

All purchase requisitions for hazardous material must be carefully processed so that the material is identified and handled as required above and by government environmental and health agencies.

Once delivered by shipping/receiving to the proper department, is the responsibility of the department to properly distribute the material further. Secondary containers should be labeled **prior** to distribution. If a secondary container is discovered which is not labeled, and the contents are positively identified, the container shall be labeled immediately. If the content of an unlabeled primary or secondary container is unknown, the Lab Manager and Director of Safety/Security shall be immediately notified. Any analysis and disposal of the material will be charged to the accounts of the department head or manager who was responsible for labeling the container.

The requirements of this document do not apply to tobacco products, wood products, food, over the counter drugs, or cosmetics intended for personal consumption by employees; nor any consumer products where it can be demonstrated that it is used in the same manner as normal consumer use, and which results in a duration and frequency of exposure which is not greater than exposures experienced by consumers.

D. Blood borne pathogen exposure plan

- 1) This section will provide employees an awareness of blood borne pathogens (BBP) and who is authorized and trained to cleanup and dispose of BBP contaminates.
- 2) Pathogens are disease-producing bacteria or microorganisms present in human blood that can lead to diseases. Although there are many disease causing microorganisms, we will only cover the most common and those of primary concern.

a. Human Immunodeficiency Virus (HIV)

The Center for Disease Control and Prevention (CDC) provides the following information on HIV and how it is transmitted from one person to another:

- HIV is the virus that leads to acquired immune deficiency syndrome (AIDS). A person can carry HIV for many years and not have symptoms until it turns into full-blown AIDS.

III. SOLVENTS, CHEMICAL CLEANING, AND BLOODBORNE PATHOGEN HAZARDS (Cont'd.)

- AIDS attacks the person's immune system, which makes it difficult for the body to fight off disease.
- Scientists and Medical Authorities agree that HIV does not survive well outside the body. Drying HIV-infected human blood or other body fluids reduces the risk of environmental transmission to essentially zero.
- HIV is found in very low quantities in saliva and tears from some AIDS patients. HIV has not been found in the sweat of HIV infected patients. Contact with saliva, tears or sweat has never been shown to result in transmission of HIV.

b. Hepatitis B (HBV)

- The CDC provides the following facts on HBV.
- 1-1.25 million Americans are chronically infected with HBV.
- Symptoms include: jaundice, fatigue, abdominal pain, loss of appetite, intermittent nausea and vomiting.
- May lead to chronic liver disease, liver cancer and death.
- HBV can survive for at least one week in dried blood.

c. Hepatitis C (HCV)

- CDC provides the following facts on HCV.
- HCV is the most common chronic blood borne infection in the United States.
- Symptoms include: jaundice, fatigue, abdominal pain, loss of appetite, intermittent nausea, and vomiting.
- May lead to chronic liver disease and death.

1. Potential transmission pathways at CCTC:

- a. BBP's can only be transmitted to you if you physically make contact with an infected person's blood or bodily fluid which contains blood.
- b. The contaminated blood/bodily fluid can enter your body through mucous membranes such as your eyes, nose or mouth.
- c. A contaminated sharp, such as a needle or broken glass, could potentially transmit BBP's because of the penetration of the skin.

2. Potential exposure risks at CCTC:

- a. Nursing program instructors/students from contaminated sharps.
- b. All employees in the administering of basic first aid.
- c. Janitorial and maintenance workers in cleanup of a BBP spill.
- d. Janitorial workers in the cleanup process of bathroom toilets and sinks.

3. Universal Precautions:

- a. OSHA defines Universal as "an approach to infection control".

III. SOLVENTS, CHEMICAL CLEANING, AND BLOODBORNE PATHOGEN HAZARDS (Cont'd.)

- b. Use of personal protective equipment will enable personnel to avoid contact with infectious material and BBP's.
- c. PPE protects personnel who are directly involved with the cleanup process and who will possibly be in direct contact with the bodily fluids.
- d. ALWAYS wear the appropriate PPE when handling any type of bodily fluids.
- e. Universal precautions require adequate cleanup and decontamination of you, equipment and tools. Always wash your hands after handling any type of bodily fluids, even when wearing PPE.

4. Protective Equipment:

- a. The college maintains BBP cleanup kits in the housekeeping offices and on the cleaning carts.
- b. The most common PPE used at the college is gloves.
- c. For spurting blood, more than just gloves are required. Protect your eyes, mouth and nose with a face shield or mask. Wear protective clothing such as an apron, smock, and shoe covers to protect your skin.
- d. For post-accident cleanup, usually all that is required are gloves. For larger spills, gloves, rags or mops may be necessary.
- e. Janitorial and maintenance workers must wear gloves when working in the restrooms.

5. Decontamination:

- a. Cleanup plays an important role in preventing exposure to BBP's
- b. The kits available at the college contain the following:

Absorbent powder	Spray disinfectant
Latex gloves	Two scoops/scrapers
Protective face shield	Absorbent towel
Shoe covers	Antiseptic towelettes
Apron	Isolation mask
Two biohazard disposal bags	Instruction sheet

- c. If no disinfectant solution is available; a solution of ½ cup bleach per gallon of water may be used.
- d. All contaminated surfaces must be wiped down with the solution to ensure all BBP's are destroyed.
- e. Dispose of all contaminated gloves, rags, absorbent towels, and powders, etc. They are to be placed in the biohazard disposal bag.

6. BBP Safe work practices

- a. Remove contaminated clothing or PPE as soon as practical.
- b. If blood were to splash onto your shoes, pants or shirt, remove those items as soon as practical.
- c. Wash your skin in the area underneath the clothing that was contaminated.

III. SOLVENTS, CHEMICAL CLEANING, AND BLOODBORNE PATHOGEN HAZARDS (Cont'd.)

- d. Thoroughly wash your hands, face and other areas of your skin that may have come into contact with bodily fluids.

7. Disposal of BBP waste

- a. Regulated medical wastes including blood or other potentially infected bodily fluids that are in liquid form can be cleaned up by using rags or a mop.
- b. After cleaning up a spill, the spill material can be placed in a double bag and disposed of in a dumpster.
- c. For the Health Sciences building, all sharps, including needles and broken glass are disposed of in the appropriate biohazard containers in the classrooms.
- d. Band-Aids and tissues that would typically be thrown in a wastebasket can also be disposed of in a college wastebasket.
- e. If the cleanup material is super saturated with bodily fluids, then it should be disposed of in a biohazard bag, and sent to an authorized medical waste disposal company.

8. Labels and signs

- a. All regulated medical waste must be labeled in accordance with EPA requirements for biohazard waste.
- b. Any refrigerator used to store biohazards must be labeled for biohazard use.
- c. Any container that may store potentially infectious material must be adequately labeled.

IV. LIFTING

A. General

Even with mechanical lifting aids, we encounter certain things that have to be lifted manually. In order to avoid back strains, you must lift properly.

Many lifting injuries are caused by incorrect lifting.

If you use your body correctly, your lifting job will be easier and safer.

Think before you lift! The most important part of your body to use when lifting is your head.

Solid footing is essential whenever you attempt to lift an object of any substantial weight.

If the load is too heavy, obtain help.

B. Lifting procedure

1. Stand close to the load to eliminate excessive strain on the back muscles. Anticipate the direction the load will be moved after lifting and position the feet to allow this movement.

IV. LIFTING (Con't)

2. Place one foot alongside the object to be lifted and the other slightly behind the lift with the heel flat, not raised. This provides a wider, more stable base from which to lift.
3. Bend your knees and squat down. Tuck your chin while keeping your back as vertical as possible.
4. Take a firm grip from underneath the object. Be sure hands or gloves and the surface of the object are not slippery. Keep arms straight allowing shoulder muscles to help lift the load.
5. Straighten your legs gradually from the squatting to an erect position. Jerking when lifting is as dangerous as setting down a load too quickly. Never twist your body during this step.
6. Carry the load close to your body, as near your own center of balance as possible. Keep your chin up. If your chin is up, your back is likely to be straight.
7. If you have to turn while carrying the load, turn using your feet, not your torso. Avoid twisting your body, because this motion places the load outside your center balance and puts a terrific strain on muscles not normally used in lifting.
8. To set the load down, simply reverse the lifting operation. With your back erect, bend your knees to a squatting position, lower your load slowly and smoothly, and then withdraw your hands from the object.
9. When lifting as a team, one person should give the direction for the team. Efforts should be completely coordinated. The load should be well balanced and, as far as possible, distributed evenly. For a team, the lifting procedure is the same as it is for just one person; squatting position, firm grip, erect body, lifting with the legs and reversing the technique to set the load down.
10. When raising an object to shoulder height or higher, first lift to about waist height, rest one end of it on a bench or ledge and then, if necessary shift the position of the hand to accomplish the lift to the higher level. Reverse the process when lowering objects.
11. Remember, keep your back as erect as possible and bend at the knees.

V. LADDERS, PLATFORMS, AND BARRICADES

A. Ladders

Portable, straight or extension ladders shall be used only for the purpose for which they are designed. Before using, inspect carefully for any visible defects.

All straight or extension ladders shall be equipped with approved safety feet. When the safety feet do not overcome the hazard of slipping, the ladder should be secured by other adequate means.

If ladders are used near a door or aisle through which there is traffic, warning signs shall be set up or other appropriate precautions taken to prevent potential accidents.

V. LADDERS, PLATFORMS, AND BARRICADES (Cont'd)

Ladders improperly used are responsible for many accidents. When working with ladders, the following shall be observed:

1. A ladder should be thoroughly inspected before each use. Rungs should be firm and unbroken, braces fastened securely, and ropes, pulleys, and other moving parts in good working order.
2. Place the ladder so that the horizontal distance of the base to the vertical plane of the support is approximately $\frac{1}{4}$ the ladder length between supports. For example, place a 12-foot ladder so the bottom is three feet away from the object against which the top is leaning.
3. The feet of the ladder should be level and positioned widely on the ground. If the ground is soft or uneven, use boards under the legs for support. Test the ladder to verify it is secure.
4. If a straight ladder is used on a slippery surface or where there is any probability of the ladder slipping or tipping, the ladder shall be held in place by a person at the foot of the ladder and/or by adequately securing the top of the ladder in place.
5. Make sure hands, shoes, and ladder rungs are dry. Keep a three-point grip on the ladder at all times (two hands and one foot or one hand and two feet). Avoid distractions that make you turn away from the front of the ladder. Climb slowly with weight centered between side rails. Do not lean back.
6. Employees must not work or stand on either of the top two rungs of a stepladder or the top four rungs of an extension ladder.
7. Bulky or heavy materials which would interfere with the use of the hand or would over burden the ladder shall be raised and lowered by block and tackle or ropes.
8. Employees shall not slide down ladders.
9. Two ladders shall not be spliced together; only approved extension ladders shall be used when greater length is required.
10. Ladders used near live electric circuits shall not be made of metal nor have metal rung braces, trusses, or struts, because of the danger of short circuits or accidental contacts with live parts of the circuit.
11. Stepladders shall be fully opened before being used.
12. Wooden ladders shall never be painted. Paint hides the grain of the wood and any defects.
13. Ladders shall not be used in a horizontal position.
14. Except for safety platform ladders, employees shall not work from the steps of a stepladder.

V. LADDERS, PLATFORMS, AND BARRICADES (Cont'd)

15. Ladders shall not be left in an upright position against any supporting object when not intended for immediate use. A ladder should be stored in such a manner to provide ease of access and inspection. If stored in a horizontal position, the ladder should be supported at a sufficient number of points to avoid sagging.
16. Tools or equipment shall not be left on ladders or ladder platforms.

B. Portable Work Platforms

Portable work platforms shall be well constructed and maintained in a safe condition. Adequate guardrails shall be provided and used.

Platforms with castors or wheels shall be equipped with safety locking devices.

No one shall be allowed to ride a work platform between work locations.

C. Barricades

Barricades shall be used to insure the safety of others when hazardous conditions are created by the work performed, such as material dropping, flying, or spraying, and uneven or slippery footing.

D. Emergency Procedures for Elevators

If an individual is stranded in the elevator, the individual should use the emergency telephone and dial extension 223 to report the condition to Campus Safety/Security. Campus Safety/Security will contact the physical plant department and notify the City of Sumter Fire Department using 911.

VI. TOOLS AND EQUIPMENT

Experience shows that many accidents are caused by the employees' improper use of tools and by the use of defective tools and equipment. Employees shall use the tools only for the purpose of which they are designed.

It shall be the responsibility of each employee to make frequent inspections of tools and other equipment used to make sure tools and equipment are in good operating condition.

A. Personal Protective Equipment

The type of personal protection equipment (PPE) you need when using hand tools depends on the tool being used. At a minimum, eye protection – in the form of safety glasses or goggles – must be worn at all times. The simple act of snipping copper wire with side-cutting pliers, striking a nail with a hammer or sawing wood can propel small pieces of debris into the air.

It is also important to protect your hands from cuts, abrasion and repeated impact. Cut-resistant gloves made of Kevlar®, Spectra® or stainless steel can help protect against the effects of a misplaced blade. Wearing standard cotton or leather gloves can help prevent wood splinters or skin abrasions from handling lumber. On jobs that require long periods of hammering, impact-resistant gloves with gel or rubber palms can reduce vibration.

VI. TOOLS AND EQUIPMENT (Con't)

Safety shoes with a reinforced toe can help protect your feet from injury caused by a dropped tool. Safety footwear comes in a variety of types and is widely available. Choose footwear that offers adequate traction for your work site.

B. Proper Work Practices

Wrenches

Wrenches come in an endless variety of styles such as socket, open-end, combination, adjustable and torque, just to name a few. Wrenches are designed to turn or hold bolts, nuts or multiple-threaded fasteners. They are sized to keep the leverage and load in an acceptable balance.

1. Choose a wrench that properly fits the fasteners you wish to turn. Use metric wrenches for bolts and American inch wrenches for inch-sized bolts. By using the correct size, the wrench is less prone to slip or round off the fastener corners.
2. Avoid using an extension to improve the leverage of a wrench.
3. Do not use open-ended or adjustable wrenches for final tightening or loosening frozen fasteners. These wrenches do not have the strength of a box end or socket wrench.
4. Apply penetrating oil on frozen fasteners before using a striking face box, socket or heavy-duty box wrench.
5. Do not expose a wrench to temperatures that could weaken tool hardness.
6. Always try to pull on a wrench (instead of pushing) in case the fasteners loosen.
7. Adjustable wrenches must be adjusted tightly to the fasteners and then pulled, putting the force on the fixed end.
8. Turn power off and use electrically insulated wrenches when working on or around electrical components.
9. Never alter a wrench.
10. Do not over torque a fastener. Use a torque wrench to tighten the fasteners to the exact torque required.
11. Inspect wrenches periodically for damage, such as cracking, severe wear or distortion.
12. Always use non-sparking wrenches when in the presence of flammable vapors or dust.

Pliers

Pliers come in all shapes and sizes, such as lineman, diagonal cutting, and needle nose, slip joint, locking tongue and groove. Pliers are used for gripping, cutting, turning and bending. Pliers are a versatile tool, but

VI. TOOLS AND EQUIPMENT (Con't)

must be used according to how they are designed. Do not increase a pliers handle length to gain more leverage, instead choose larger sized pliers.

1. Never subject pliers to temperatures that could decrease tool hardness.
2. Cut hardened wire only with pliers designed for that purpose.
3. Do not substitute pliers for a wrench when turning nuts and bolts.
4. Be sure that the pliers jaw can grasp properly when bending rigid wire.
5. Do not hammer with a pair of pliers.
6. Cut wire at right angles without bending wire back and forth against the cutting edge of pliers.
7. Always use non-sparking pliers when in the presence of flammable vapors or dust.

Hammers

Hammers are one of the most often used tools in our toolboxes. Unfortunately, they are also the most abused tool. Nail, soft-face, ball-peen, chipping, sledge, and setting are just a few of the hammers we use in the workplace and home. Many hammer types are specific to a particular industry such as bricklayers, machinists and loggers. Each kind of hammer has a head that is tailored to work best for a particular application. Recently, even hammer handles have been improved to be stronger, ergonomically shaped and transmit less shock to the user.

1. Always use a hammer of the proper weight and size for the task.
2. Do not strike the surface at an angle. The hammer face should contact the striking surface squarely, so the two are parallel.
3. Do not use a hammer if the handle is damaged or loose.
4. Use a hammer face that is 3/8" larger in diameter than the striking tool.
5. Never weld, heat or regrind a hammerhead.
6. Remove from service any hammer exhibiting signs of excessive wear, cracks, mushrooming or chips.
7. Do not use one hammer to strike another.
8. Does not use the wrong hammer for the job; match the proper types of hammer to the task it is designed to perform.
9. Always use non-sparking hammers in the presence of flammable vapors or dust.

VI. TOOLS AND EQUIPMENT (Con't)

Screwdrivers

Screwdrivers are intended for turning a variety of threaded fasteners, such as machine or wood screws, in or out of materials. Screwdriver tips come in a variety of different shapes and sizes. The slotted and Phillips® tips are the most common; however, torque, hex, square and various others are also used. As with any tool, it is important to match the type of screwdriver you use to the types of job you are doing.

1. Never use a screwdriver as a pry bar, chisel, punch, stirrer or scraper.
2. Always use a screwdriver tip that properly fits the slot of the screw.
3. Throw away screwdrivers with broken or worn handles.
4. Never expose screwdrivers to temperatures that could reduce tip hardness.
5. Turn power off and use electrically insulated screwdrivers when working on or around electrical components. Use lock out tag out protocols when dealing with electricity.
6. Straighten tips or redress rounded edges with a file.
7. Never use pliers on a screwdriver for extra leverage. Only use a wrench on screwdrivers specifically designed to accept them.
8. Use magnetic or screw-holding screwdrivers to start fasteners in tight areas.
9. Use both ends when using a screwdriver-one to guide the top and the other to turn the handle. Final tightening requires both hands on the screwdriver handle.
10. Always use non-sparking screwdrivers in the presence of flammable vapors or dust.

C. Handling of Pointed Tools

Pointed tools shall never be carried edge or point up in a workman's pocket. They should be carried in a toolbox, carrying belt, pouch, or in hand with points and cutting edges away from the body.

Tools should be handed from one worker to another, never thrown. Edged or pointed tools should be passed with the handle toward the receiver.

D. Care of Tools

Tools and equipment shall be left in proper operating condition and used only for the purpose for which they are designed. If proper and safe tools are unavailable, report this to your supervisor.

Inspect all tools at regular intervals, and any tool which develops defects while in use shall be taken from service, tagged and not used again until restored to proper working condition.

VII. POWER TOOLS

A. Personal Protective Equipment

Power tools present more hazards than hand tools due to the speed at which they operate. Although similarities exist, there are distinct differences between the PPE suggested for the use with hand tools and the PPE recommended for safe power tool use.

Eye protection, such as safety glasses or goggles, are especially important when using power tools. The speed in which drills, saws, grinders, sanders, and routers operate can propel small particles much faster and farther than do hand tools. Others working around the area where power tools are used should also wear protective eyewear. Certain power tools require using a face shield in addition to safety glasses or goggles. For example, a face shield is recommended while using a grinder, due to amount of hot metal particles generated.

Standard cotton or leather work gloves can protect your hands from minor scrapes and cuts while working with various materials. Unfortunately, cut-resistant gloves are not designed for, or even capable of, providing protection against a moving blade or bit. The best way to prevent injury from moving parts is to keep hands on the tool's handles and keep all guards in place. Anti-vibration gloves minimize the vibration created by hammer drills and rotary hammer drills.

Safety footwear is recommended when using power tools because power tools are heavy and they can cut. Safety shoes with a non-slip, insulated sole and a steel toe protect against dropped objects and misdirected electricity.

The higher sound levels generated by some power tools, especially if used over extended periods of time, may require the use of earplugs or earmuffs. Even the use of a dust respirator may be necessary in sanding and cutting operations. Each situation must be analyzed to determine the type of PPE that is required for the safe use of each type of power tool.

Along with PPE, proper attire is also important while using power tools. Avoid loose fitting clothing which could be caught in moving machinery or blades. Long hair should be tied back or covered and all jewelry removed for the same reason.

B. Proper Work Practices

The following safety rules are common to all power tools. In addition, each type of tool has its own unique hazard which must be taken into account.

1. Read the tool's owners' manual to understand the tool's proper applications, limitations, operations and hazards.
2. Do not use electric power tools in the proximity of flammable vapors, dusts or construction materials. Also avoid using electric tools in wet environments.
3. Protect yourself from electric shock by insuring that your tools are properly grounded and insulation is intact; use a ground fault circuit interrupter (GFCI) for corded tools. Always check for hidden wires that may contact bladed tools.
4. Select a tool based on the task it is designed to do. Only use attachments specifically recommended for your power tools, and ensure their proper installation.

VII. POWER TOOLS (Con't)

5. Inspect tools for damage including the cord, presence of guards, correct alignment, binding of components, or any condition that would affect the operation of the tool. If a tool is damaged, or a condition develops while a tool is in use, have the tool fixed before putting it back into service.
6. Avoid excessive force to make cutting tools cut faster. Feed material only as fast as the tool is designed to accept it. This will prevent excessive wear and decreased control.
7. Keep others away from the work area, or provide shields to stop flying debris and other distractions.
8. Always maintain tool control by keeping a tight grip on a tool. Also maintain your balance and do not overreach. Do not operate a power tool if you are under the influence of medications or alcohol, or if you are tired or distracted.
9. Secure your work in a vise or clamp for increased stability. Use the tool's side handle, if available, for better control.
10. Verify that all tools are unplugged or that the power source is removed when changing blades, performing maintenance, or when tools are not in use. Be sure adjustment knobs are tightened and remove any adjustment keys before use.
11. Keep tools in a secure location when not in use. Do not use any power tools without a ground plug in place on the cord.
12. Avoid unintentional tool start up by keeping your finger off of the power switch.

VIII. ARC AND GAS WELDING AND CUTTING

A. Employee Responsibility:

The employee is responsible without being told by a supervisor or person in charge for following these required safe practice rules in welding and cutting operations.

B. Storage, Handling and Use of Oxygen and Fuel-Gas Cylinders

1. Storage

All stored cylinders shall be kept away from radiators and other sources of heat. They shall be securely fastened to a fixed object, such as a wall post, etc., in the upright position.

Cylinders shall be stored in well-protected, well-ventilated dry locations, well away from highly combustible materials such as oil, rags, or accelerants.

Cylinders shall be stored in a defined place away from elevators, stairs, or gangways. Assigned storage spaces shall be located where cylinders will not be knocked over or damaged by passing or falling objects. Cylinders shall not be kept in unventilated enclosures such as lockers and cupboards.

VIII. ARC AND GAS WELDING AND CUTTING (Con't)

Oxygen cylinders in storage shall be separated from fuel gas cylinders or combustible materials (especially oil or grease) by a minimum distance of 20 feet or by a noncombustible barrier at least five (5) feet high having fire-resistant rating of at least one-half hour.

Full cylinders of oxygen and acetylene shall be used in rotation as received from the supplier.

Empty cylinders shall have their valves closed.

When a cylinder is not in use, the valve shall be closed and a valve protection cap shall be placed hand-tight.

Cylinders **SHALL NOT** be permitted to stand unsupported. Cylinders **SHALL** be lashed in place with cylinder valves up at all times.

Leaking cylinders shall be immediately removed from the building to the outdoors and allowed to vent into the atmosphere. The cylinder shall be tagged defective and the vendor notified for pickup. No repairs shall be made on a leaking cylinder.

2. Handling

Cylinders shall be handled carefully. They **SHALL NOT** be dropped with or without pad, or struck by another object, or used for supports or rollers.

A platform, cage, or suitable stand shall be used on cylinders that are to be handled by a crane or derrick.

Never lift cylinders by slings, caps or electrical magnets.

Cylinder valves shall be closed before moving cylinders and protective caps installed, unless on an approved welding cart or truck designed to accommodate such cylinders.

Unless cylinders are secured on a special truck, regulators shall be removed and valve protection caps shall be put in place before cylinders are moved. Cylinders properly secured on a welding truck qualify it as a special truck.

Valve protection caps shall not be used for lifting cylinders from one vertical position to another. Before raising cylinders provided with valve protection caps from a horizontal to a vertical position, the cap shall be properly in place and turned clockwise to see that it is hand tight; then the cylinder can be raised by grasping the cap.

Empty cylinders shall be marked empty, segregated from full cylinders, and regularly returned to the supplier with valves closed and valve protection caps in place.

C. Oxygen and Fuel-Gas Cylinders-General

Before connecting a regulator to a cylinder valve, the valve shall be opened slightly and closed immediately (this action is generally termed cracking). It is intended to clear the valve of dust or dirt that might otherwise enter the regulator. The valve shall be opened while standing on one side of the outlet, never in front of it. **NEVER CRACK A FUEL-GAS CYLINDER VALVE NEAR OTHER WELDING WORK OR HEAT, SPARKS, FLAMES, OR OTHER POSSIBLE SOURCES OF IGNITION.**

VIII. ARC AND GAS WELDING AND CUTTING (Con't)

Before a regulator is removed from a cylinder valve, the cylinder valve shall be closed and gas released from the regulator.

Valves and regulators shall be kept free from oil and grease. Compressed oxygen and oil form a highly explosive mixture.

The tee wrench shall be left in place on the valve when the acetylene cylinder is in use, in order that the valve cap may be turned off quickly in case of an emergency.

Cylinder valves shall be closed when work is finished.

Cylinders shall be kept far enough away from the actual welding or cutting operations so that sparks, hot slag or flame will not reach them.

Connections and fittings shall be checked for leaks before working in confined or poorly ventilated areas.

A hammer or wrench shall not be used to open oxygen cylinder valves.

An acetylene cylinder valve shall not be opened more than one and one-half turns of the spindle. This will provide for quick shutoff in case of emergency.

When the oxygen cylinder is in use, the valve shall be opened fully in order to prevent leakage around the valve stem.

D. Hose and Hose Connections

Hoses for oxygen or fuel-gas service shall comply with the specification for rubber welding hoses set by the International Acetylene Association and Rubber Manufacturers' Association. They shall be a twin-type connected hose with standard red color for acetylene and fuel-gas and standard green color for oxygen.

When parallel lengths of oxygen and acetylene hose are taped together for convenience and to prevent tangling, not more than four (4) inches out of twelve (12) inches shall be covered by tape.

Hoses and torches shall be inspected frequently for leaks, weak places and loose connections. Leaks may be detected by immersion of the hose in water under normal working pressure. Damaged hose shall be repaired by temporary methods. Damaged sections of hoses shall be cut out and discarded. The serviceable portion of hoses shall be reconnected with proper fittings.

Check valves shall be used between cylinder regulators and the torch to prevent back flow of the regulator. The check valve shall be placed at the torch end of the hoses.

If the hose comes in contact with oil or grease, clean it immediately.

New hose is dusted on the inside with fine talc; blow this out before using. The oxygen hose can be blown out with a low-pressure oxygen supply (five pounds). Blow out the acetylene hose with oxygen by blowing through hose with service air. Do not blow out hose with acetylene.

VIII. ARC AND GAS WELDING AND CUTTING (Con't)

A flashback renders a piece of hose unsafe because of the burning of the inner walls. Any hose in which a flashback has occurred shall be replaced.

Protect hose from being trampled on or run over. Avoid tangles and kinks, and place hose so it will not be tripped over. Connections could be pulled off or the cylinders and equipment could be opened by a sudden tug on the hose. If it becomes necessary to lay hose across an aisle, roadway, etc., protect it from damage with suitable bridging.

All hose and torch storage boxes shall be vented.

Torches shall be ignited by approved friction lighters only.

E. Arc Welding

Workers designated to operate arc-welding equipment shall be properly instructed and qualified to operate equipment.

Before starting operations, all connections to the machines shall be checked to make certain that they are properly made. The work lead will be attached firmly to the work. Frames of all electric welding machines operated from power circuits shall be effectively grounded.

When the electrode holder is not in use, it shall be placed so that it will not cause an arc. Electrodes rods shall not be left in the holder.

It is especially important that welders know how to avoid electric shock. Voltages required for arc welding are low and normally will not cause injury or severe shock. These voltages are, nevertheless, sufficiently high that, under certain conditions, they may be dangerous to life. The danger is especially serious during hot, humid weather when the welder is perspiring freely or is wet. The welder should keep his/her body insulated from both the work, the metal electrode and the machine frame when possible, and should not allow the electrode covering or any metal part of the electrode holder to touch either the bare skin or any wet portion of the body.

Do not cool hot electrodes by dipping in water.

Never change electrodes with bare hands, wet gloves or when grounded.

Always return welding current to the machine by means of single cable of the same or larger size than the welding conductor.

No chain or wire rope shall be used as part of a ground return circuit.

When work has to be performed outside a booth, the arc shall be screened, shielded or other safeguards provided to prevent injury to others. However, each employee has the personal responsibility of shielding their own eyes.

Only cable free from repair or splices for a minimum distance of 10 feet from the cable end to which the electrode holder is connected shall be used, except that cable with stranded insulated connectors or with splices when insulating quality is equal to that of the cable are permitted.

VIII. ARC AND GAS WELDING AND CUTTING (Con't)

Cables in need of repair shall not be used. When a cable other than the cable lead within 10 feet of the holder becomes worn to the extent of exposing bare conductors, the portion thus exposed shall be protected by means of rubber and friction tape or other equivalent insulation.

The ground and lead connectors at the welding machine shall be insulated.

A welder shall not curl or loop welding cable around the body.

F. Fire Prevention and Protection

The basic precautions for fire prevention in welding or cutting work are:

1. Where practical, move the object to be welded or cut to a location where there will be no possibility of setting a fire.
2. If work cannot be moved, materials that burn easily should, if possible be removed from the work area a minimum of 35 feet.
3. If the object to be welded or cut cannot be moved and if all the fire hazards cannot be removed, then metal guards, or curtains, or similar protections must be used to confine the heat, sparks and slag. A fire watch should be posted in the area for ½ hour after welding operation ceases.
4. Floor area should be kept clean and free of combustible materials.
5. If there are floor openings or cracks in the flooring that cannot be closed, care shall be taken not to expose combustible materials on the floor below to sparks that might drop through the floor. The same precautions shall be observed with regard to cracks or holes in walls, open doorways, and open or broken windows.
6. Suitable fire extinguishing equipment shall be maintained in a state of readiness for instant use. Such equipment may consist of pails of water or sand, hose lines or portable extinguishers, depending upon the nature and quantity of the combustible materials exposed.

G. Welding or Cutting Containers

No welding, cutting or other hot work shall be performed on used drums, barrels, tanks, or other containers until they have been cleaned thoroughly to assure that no flammable materials are present or any substances such as greases, tars or acids which, when subjected to heat, might produce flammable or toxic vapors. After the container is thoroughly cleansed, fill with water, purge with steam or nitrogen and adequately vent.

H. Protection of Personnel

1. General

Welders shall place welding cable and other equipment so they are clear of passageways, ladders and stairways.

VIII. ARC AND GAS WELDING AND CUTTING (Con't)

2. Eye and Ear Protection

Welder's helmets with proper filter lenses and with protective glass or goggles underneath shall be worn for electric welding work. Protective goggles are required underneath the helmet to protect eyes from injurious rays, from adjacent work and flying objects when the helmet is raised up as in checking or chipping the weld. The lenses may be clear or filtered, depending upon the amount of exposure to adjacent welding operations. If filtered glass is used, the sum of the shade numbers of the helmet and the spectacles or goggles should add up to the recommended filter shade number.

Earplugs shall be worn when the ear canal is exposed to fuming, molten metal. Electric welding helpers and observers shall use eye protection-protective glasses, goggles or hand held face shields with the proper filter lenses that are required for those watching or working near electric welding work. The filter lenses required for those watching are about one-half as dense as those required by a welder.

3. Welding and Cutting - Gas

Welder's goggles with proper filter lenses shall be used for welding and cutting work. Goggles are needed to protect the eyes from possible accidental injury by light radiation, flare, flying sparks and scale.

Earplugs shall be worn when the ear is exposed to fuming, molten metal.

4. Helper and Observer

Gas welding and cutting helpers or observers shall use eye protection protective glasses, goggles or hand held face shields with proper filter lenses are required for those welding or working near gas welding or cutting work. The filter lenses required are about on half as dense as those required by a welder or cutter. The observer will stay for thirty (30) minutes after completion of the job to look for fires.

5. Protective Clothing

Personal protective equipment must be approved and shall comply with specifications of the welding industry. The equipment listed herein is the required protection for welding operations. Because of the varied conditions under which welders work, personal protective equipment suitable for each job cannot be specified. The supervisor is responsible for obtaining the proper personal protective equipment necessary to do the job safely.

Outer clothing shall be kept reasonably free from oil and grease.

Sparks may be lodged in rolled-up sleeves or pockets of clothing or cuffs of trousers. It is suggested that sleeve and collars are kept buttoned and pockets are eliminated from the front of overalls and aprons. For the same reason, trousers or overalls should not have turned-up pant cuffs.

For heavy welding work, fire-resistant (Perma-Proof) leggings should be used.

When working overhead or in extremely confined spaces, caps or jackets made of leather or Perma-Proof should be used.

Employees shall not wear low-cut shoes with unprotected toes.

VIII. ARC AND GAS WELDING AND CUTTING (Con't)

If heavy, fire resistant clothing is not worn, welding gauntlet sleeves and apron cape or jacket will be worn.

I. Ventilation

When welding must be performed in a space entirely screened on all sides, the screens shall be so arranged so that no serious restriction of ventilation exists. It is desirable to have the screens so mounted that they are about two (2) feet above the floor unless the work is performed at so low a level that the screen must be extended nearer to the floor to protect nearby workers from the glare of welding.

All welding and cutting operations carried on in confined spaces shall be adequately ventilated or an airline respirator shall be worn. This applies not only to the welder but also to helpers and other personnel in the immediate vicinity. One standby person must be present at all times.

Oxygen from a cylinder or torch shall never be used for ventilation.

Because of toxic vapors which could cause serious illness, special precaution should be taken when welding or cutting alloy metals of zinc, copper, lead and tin. Also, welding will take place in a well-ventilated place, and suitable respirators shall be worn.

IX. ELECTRICAL WORK

A. General

COLLEGE POLICY REGARDING ELECTRICAL WORK IS: ALL ELECTRICAL WORK WILL BE DONE ON DE-ENERGIZED CIRCUITS.

B. Favorable Work Conditions

This means a dry working area, no storms in progress, adequate work space and a minimum of exposed, energized equipment or conductors adjacent to ground equipment.

C. Protective Equipment

All protective devices shall be readily available and put into use to assure proper protection when needed.

Eye Protection – When working on energized equipment where making, breaking, shorting or grounding may result in flash, eye protection must be worn. Also, proper eye protection must be worn when performing work that may result in flying particles/debris which may be produced.

D. Lockout/Tag out

Purpose

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

IX. ELECTRICAL WORK (Cont'd.)

Compliance With This Program

All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance, shall not attempt to start, energize, or use that machine or equipment.

Sequence of Lockout

1. Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine must be shut down and locked out to perform the servicing or maintenance.
2. The authorized employee shall refer to the company procedure to identify the type and magnitude of the energy that the machine or equipment utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy.
3. If the machine or equipment is operating, shut it down by the normal stopping procedure (depress the stop button, open switch, close valve, etc.)
4. Deactivate the energy isolation device(s), so that the machine or equipment is isolated from the energy source(s).
5. Lock out the energy isolating devices(s) with assigned individual lock(s).
6. Stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, air, gas, steam or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.
7. Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other normal operating control(s), or by testing to make certain the equipment will not operate.

CAUTION

Return operating control(s) to neutral or "off" position after verifying the isolation of the equipment

8. The machine or equipment is now locked out.

Restoring Equipment to Service

1. Check the machine or equipment and the immediate area around the machine to ensure that nonessential items have been removed, and that the machine or equipment components are operationally intact.
2. Check the work area to ensure that all employees have been safely positioned or removed from the area.
3. Verify that the controls are in neutral.

IX. ELECTRICAL WORK (Cont'd.)

4. Remove the lockout devices and re-energize the machine or equipment.

NOTE

The removal of some forms of blocking may require re-energization of the machine before safe removal.

5. Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.

X. VEHICLE AND MACHINE REPAIR

A. Responsibility

Supervisor – Supervisors shall be responsible for the safe work practices of the employees.

Employee – Employees shall be responsible for carrying out their personal responsibilities as outlined in the Environmental Safety and Health Plan.

It is recommended that personnel should not wear rings or wristwatches during the performance of their job duties to prevent possible injuries.

Sturdy footwear should be worn at all times to protect the feet from abrasions and punctures. Protective shoes may be required by the supervisor for some work assignments.

B. Tools

Employees shall be responsible for the inspection and proper use of tools and equipment.

Tools and equipment shall only be used for their intended purpose. Tools that require repair should be tagged and returned to the tool crib or be reported to the supervisor immediately. Refer to Tools and Equipment (Section VI) and Power Tools (Section VII).

C. Hydraulic Jacks, Mechanical Jack Stands

When working on vehicles or equipment raised by hydraulic floor jacks, mechanical jack stands shall be placed under the vehicle or equipment with the weight of the vehicle or equipment resting upon the jack stands to prevent dropping or falling in the event of hydraulic jack malfunction.

D. Transmission Jacks

Safety chains and/or safety holding devices shall be used when a load is supported on transmission jacks.

E. Vehicle Hoists

Operating control handle locking devices shall be kept in operable condition and must be used at all times.

Plates, covers and lids will be in place at all times and all openings for operating controls and hoist post pits will be covered, except:

X. VEHICLE AND MACHINE REPAIR (Cont'd.)

1. When plates, covers, or lids are removed for servicing, cleaning, etc., barricading shall be erected around the opening.
2. A vehicle will be in the lowered position when left unattended for extended periods of time, except when lowering would create a greater hazard, at which time:
3. A vehicle left in the raised position, unattended for an extended period of time, will be adequately blocked, fixed, etc., to prevent it from dropping, falling, or moving in the event of hoist malfunction.

F. Portable Cranes and Chain Hoists

Chain hoists, portable cranes and other hoisting equipment shall be inspected at regular intervals. These shall not be used if found to be defective. All hoisting equipment shall be labeled as to its capacity.

Any hoisting equipment found defective should immediately be tagged as unsafe and not used until repaired or replaced.

Chains will not be spliced or joined by makeshift means as open links, bolts or wire. New links shall be inserted by a competent person or by an outside agency.

The rating of hooks, rings, devices and other fittings used on chains, cable or lifting devices shall be equal to or exceed the lifting capacity of the chain, cable or lifting devices.

Particular care must be exercised to see that cables, chains and other hoisting equipment are not unduly stressed by improper use. All cables, chains, slings, etc., shall be discarded when they have worn or deteriorated to the point where their safe use may be questionable in the judgment of the supervisor in charge.

Portable floor cranes shall not be loaded beyond their rated capacity or to the point of being unstable.

G. Monoxo-Vent System

Monoxo-vent systems shall be used on all vehicles and equipment when the engine is in operation within the garage area.

Monoxo-vent systems must be used in such a manner as to prevent the accumulation of dangerous gases within the work area.

Materials used in conjunction with the Monoxo-vent systems must be able to withstand the heat to which it is to be subjected.

Monoxo-vent hoses and tubes shall be stored in such a manner as to prevent rupturing or destruction and shall be inspected at frequent intervals to ascertain their integrity.

Monoxo-vent hoses shall be inspected monthly.

X. VEHICLE AND MACHINE REPAIR (Cont'd.)

H. Housekeeping

Equipment Repair Area – All equipment areas shall be maintained in a safe, orderly condition with adequate ventilation and fire protection facilities.

Floors shall be kept clean and free of oil, grease, and other slipping and tripping hazards.

Discarded oil waste rags shall be kept in approved metal waste cans until disposed of.

Waste cans shall never be overfilled, preventing the lid from closing.

Gasoline or carbon tetrachloride shall never be used for cleaning or degreasing purposes: only approved solvents shall be used.

Monoxide ventilating systems shall be kept in safe operating condition and used to prevent monoxide poisoning.

Walkways, aisles, stairways and all other passageways shall be kept clear of all obstructions.

Tools and materials shall not be placed where they can cause tripping or stumbling hazards, or where they may fall and strike someone below.

Used motor oil shall be placed in the waste oil-recycling tank and collected for recycling.

XI. OFFICE SAFETY

A. Responsibility

Employee Responsibility:

Employees will immediately report any unsafe conditions or defective equipment to his/her supervisor, and submit a work order for repair or correction of any unsafe condition.

Employees who suffer an injury during work shall promptly report such injury to his/her supervisor no later than the end of the work period on the day in which the injury occurred. An incident report should be completed for any injury requiring medical attention.

The Supervisor shall notify the Personnel Department and assist with completing the necessary forms. When any injury happens on campus or off campus while conducting college business, the Personnel Department must be contacted immediately.

Equipment shall only be used for its intended purpose. Improper use may result in accident, injuries, or maintenance problems.

XI. OFFICE SAFETY (Cont'd.)

B. Housekeeping

Good housekeeping is a sign of good workmanship and provides safe working conditions. Good housekeeping will prevent accidents caused by tripping, stumbling, slipping, stepping on or bumping into equipment, materials or other objects. A work order should be submitted if custodial services are needed.

C. Chemicals

Employees handling flammable liquids or chemicals of any type will wear appropriate protective clothing and will comply with safety instructions on the containers. Read and follow the instructions on the MSDS for proper handling, protection, and disposal.

Chemicals and materials with toxic fumes are to be used only in well-ventilated areas unless approved respirators are used.

See SOLVENTS, CHEMICAL CLEANING, AND BLOODBORNE PATHOGEN HAZARDS (Section III).

D. Fire Protection

Maintain free and unobstructed access to fire equipment, fire doors and exits in the work areas.

Know the location of emergency exits and follow emergency evacuation procedures.

E. General

Think ‘safety’ at all times.

Lock office doors whenever leaving, even if gone only a few minutes. Keep purses, wallets, and other valuables in a secure location such as a locked desk or filing cabinet.

Immediately report any suspicious person loitering in your area to Campus Safety/Security.

Report all crimes, no matter how minor, to Campus Safety/Security.

Avoid working alone at night. Keep all outside doors locked, and walk with other employees to and from your car.

If you are entrusted with a key to a specific area, **never** loan it to anyone.

Use handrail when going up or down stairs.

Water, oil and other liquids or excessive dust, dirt or any other debris spilled on floors represent serious slipping hazards and shall be cleaned up immediately upon observation.

XI. OFFICE SAFETY (Cont'd.)

Offices shall be arranged to allow ample passageway with no exposed cords or outlets, and furniture or fixtures should not be placed near entryways or around corners.

Do not lean back or sideways on chairs or stools to a point where all four legs or castors are not in contact with the floor.

Pointed objects, such as pencils, knives, or scissors, should not be carried with the point exposed.

Paper cutters shall have a guard and be kept in the locked down position when not in use.

Do not leave desk or file drawers open.

Use adequate care in opening file cabinet drawers. Never open more than one drawer at a time.

Broken glass, sharp objects and pressurized containers require special handling and disposal. They shall not be placed in wastebaskets.

Cords for electrical equipment shall not be strung across walkways or aisles where people may trip over them. Power strips shall be plugged directly into an outlet, not into one another to form a "daisy chain."

Cords for electrical equipment shall be inspected periodically and replaced if frayed or shows signs of broken insulation.

XII. PHYSICAL PLANT

A. General

Employees are expected to be alert and use common sense at all times to avoid hazards, and avoid committing unsafe acts and creating hazards that may cause injury to other employees.

Employees will immediately report any unsafe conditions, damaged tools or defective equipment to their supervisor.

No one will bring firearms, ammunition or other weapons on college property unless they have necessary permits and approval of the College.

All spills, including liquid, oil, grease, etc., shall be wiped up immediately.

Employees shall keep their work areas neat and orderly.

Employees' use of intoxicants and controlled substances is prohibited and will result in disciplinary action up to and including termination.

Inappropriate activities and practical jokes are absolutely prohibited.

XII. PHYSICAL PLANT (Cont'd.)

B. Dress and Personal Protective Equipment

Personal clothing shall not be worn in those work functions where the College furnishes and prescribes a particular uniform.

To prevent injury due to abrasions, cuts, splinters, etc., protective gloves are required to be worn when handling heavy or rough items or materials.

Loose clothing, long sleeves, ties, gloves or hanging jewelry are not be worn when handling heavy or rough items or materials.

Employees will wear protective equipment as specified for particular jobs and activities, including but not limited to: protective gloves, goggles, face shields, protective shoes, hard hats, gloves, respirators, ear protection, etc.

Hand and eye protection shall be worn when working with caustic chemicals such as bowl and tile cleaners, solvents, drain cleaners, and degreasers.

Canvas topped or open toe shoes are not to be worn. Protective shoes with composition soles are required, as they reduce foot injuries and minimize slipping.

C. Housekeeping

Good housekeeping is a sign of good workmanship and provides safe working conditions. Good housekeeping will prevent accidents caused by tripping, stumbling, slipping, stepping on or bumping into tools, materials or other objects.

Dirty, cluttered vehicles and littered work sites create unsafe conditions.

Truck beds shall be kept clean and orderly, providing the employee safe access.

Maintain orderly work sites at all times. Remove unused or unnecessary materials and litter.

Hand tools shall be kept clean and stored in a proper place when not in use.

Equipment shall be kept free of excess grease and uncluttered to prevent restriction of operation.

Truck and machine cab interiors shall be kept clean and orderly.

Oily rags, solvent waste, flammable liquids shall be kept in fire-resistant covered containers until disposed of.

D. Vehicles

No one other than the driver shall ride on any forklifts, tractors, or attached equipment at any time. All motor vehicles shall be operated at speeds to permit safe emergency stopping.

Employees will always be seated when riding in authorized vehicles. Seat belts are to be used whenever provided. Riding on the back of a pickup is prohibited.

XII. PHYSICAL PLANT (Cont'd.)

E. Fire Protection

Employees will maintain free and unobstructed access to fire equipment, fire doors and exits in the area in which they work. Storage of materials in front of or blocking electric distribution panels is prohibited.

F. Chemicals

Employees will never mix cleaning compounds or other chemical products unless authorized by their supervisor.

Employees will wear appropriate protective clothing and will comply with safety instructions on the containers.

Chemicals and materials with toxic fumes are to be used only in well-ventilated areas unless approved respirators are used.

See: SOLVENTS, CHEMICAL CLEANING, AND BLOODBORNE PATHOGEN HAZARDS (Section III).

G. Materials Handling

All materials shall be stored neatly, orderly and securely so that they do not topple or create tripping or fire hazards.

Material is to be stored on shelves whenever possible. Materials cannot be stored within two feet of the ceiling of the room.

Hand trucks or forklift trucks are to be used for moving heavy items from one location to another. No one other than the driver shall ride on the forklift truck.

Barricades or proper signing shall be used to insure safety for others when hazardous conditions are created by the work performed, such as torn carpets, uneven or slippery floors, and open excavations and during tree trimming and removal operations.

Employees will not operate or attempt to repair, clean or adjust equipment unless it is part of the employees' assigned duties and the employee has been properly trained.

H. Machines and Equipment

Extreme care will be used when working with electrical devices and tools.

Employees will not walk, stand or work under any raised or hoisted equipment or load which is not secured by an adequate safety restraint.

All electrical power tool cords and extension cords should have rubber insulation, and a ground plug. Damaged cords are not to be used. (Extension cords should only be used on a temporary basis).

Employees will make sure electrical power tools and equipment are properly grounded. Refer to Power Tools (Section VII).

XII. PHYSICAL PLANT (Cont'd.)

When overhead work is being performed, reasonable areas must be blocked off around the work area to keep other employees from being injured by falling tools or other objects.

Machinery will be shut off and locked out when being repaired or adjusted.

Removal of lockout tags or devices on any machinery by unauthorized personnel is prohibited.

Machine guards are only removed for authorized maintenance purposes. The guard shall be replaced before the machinery is returned to operation. All riding type mowers shall be shut off before operators dismount from machine.

Because of the close proximity of hospitals, intensive care units, ambulances, and for a variety of other reasons: It is the College's policy to rely on them for emergency medical first aid treatment and transportation to the hospitals.

Following such an incident, witnesses will be asked to assist with an Accident Injury Report.

I. AIR QUALITY:

In order to ensure safe air quality at the College, maintenance changes HVAC duct filters quarterly.

J. CONFINED SPACE PROGRAM:

Central Carolina has a confined space entrance procedure which can be found as an Appendix to this manual.

XIII. WEATHER ADVISORIES

A. Purpose of Plan

The purpose of this plan is to provide a guideline for the preparedness and response functions for Central Carolina Technical College, its employees, students, and visitors. The risk created by various natural hazards (i.e. tornados, hurricanes, winter storms and other weather conditions) dictate that the College must plan prior to the occurrence in order to provide an appropriate response.

Should the report of developing or impending severe weather be received by the administration, faculty, or staff of the college, the following individuals (or their designees) will be promptly notified:

Safety/Security	Ext. 223
President of the College	Ext. 240
Public Relations Director	Ext. 335
Vice Presidents	
Business Affairs	Ext. 224
Academic Affairs	Ext. 482
Student Affairs	Ext. 252
Administration and Planning	Ext. 236
Director of Physical Plant	Ext. 290
Switchboard	Ext. 0

XIII. WEATHER ADVISORIES (Cont'd.)

In the event of immediate severe weather or the report of a tornado, five or more short blasts of the alarm system will signal the need to find appropriate shelter. Everyone should move quickly and quietly to the nearest sheltering location in halls and classrooms, away from glass doors and windows, and on interior walls on the ground floor. Doors and windows should be closed if time permits. Sit on the floor and attempt, as much as possible to provide protection to your upper body with clothing, a book, or even hands and arms. In some cases individuals may even seek cover under desks or other furniture. Faculty and staff must account for their constituents.

Remain in the shelter location until the “all clear” is sounded, which is three (3) short blasts of the alarm/siren.

B. Campus Closing Due to Bad Weather

If there is a significant threat of severe weather, classes will be dismissed and/or cancelled. The decision to close the campus is solely the responsibility of the President of the College or designee after conferring with certain staff and community emergency management personnel.

The President of the College or designee will communicate the decision to dismiss or cancel classes internally by e-mail. In addition, the Public Information Office will contact local radio and television stations to communicate the decision externally.

A decision to close the College should be communicated to the local television and radio stations by 6:45 AM for day classes and 4:00 PM for evening classes.

When possible, closing will also be announced on the College’s telephone message system, College website, Facebook and Twitter accounts.

XIV. EMERGENCY PROCEDURES

See College directives for specific information on the following:

- 4.06 Medical Emergencies
- 4.07 Theft-Damage-Incident-Disturbance
- 4.08 Bomb Threat
- 4.09 Emergency Response Plan

College Directives can be located on myCCTC on the Faculty/Staff tab under college applications.

A. Other Guidelines

1. All college personnel are to report emergencies to Campus Safety/Security. No one should speak to outsiders, especially to the media, on behalf of the College unless authorized. All calls from the media are to be referred directly to the Public Relations Office. Extension 335, (803) 778-7820, or (803) 774-3335.
2. The President of the College and the Vice President for Business Affairs are to be informed by Campus Safety/Security IMMEDIATELY of existing emergencies. Complete details will be made available to them including: what it is, how it began, who is involved, what is happening now, and what help has been called.

XIV. EMERGENCY PROCEDURES (Cont'd)

3. The President of the College and any other person involved shall confer and decide on the appropriate action.

B. Emergency Telephone Numbers

Fire, Ambulance, Police	911
Campus Safety/Security	Ext. 223 or 778-6623
Sumter County Law Enforcement Center	(803) 436-2790

C. First Aid Kit Locations

First aid kits are located in various areas of each building. Restocking of the kits is the responsibility of each department where the kits are located. When supplies are needed, departments can contact campus security for assistance in acquiring needed supplies.

D. Civil Disturbance

The procedure to follow in the event a civil disturbance occurs on college property or near enough to pose a threat to college property or personnel is the following:

1. Any college personnel noting a situation which could result in a civil disturbance will notify Campus Safety/Security of the nature of the situation and its location.
2. Campus Safety/Security, with the assistance of any available college official, will take action necessary to neutralize the situation. Any participants will be advised they are in violation of State Law 16-17-420, which states that it shall be unlawful: (1) For any person willfully or unnecessarily (a) to interfere with, or to disturb in any way or any place the students or teachers of any school or college in this state (b) to loiter about such school or college premises or (c) to act in an obnoxious manner thereon; or (2) For any person (a) to enter upon any such school or college premise or (b) loiter around the premises except on business, without the permission of the President of the College or the person that serves as his/her designee.
3. If a minor situation should develop into a major threat, or if a major situation exists, Campus Safety/Security will request assistance from local law enforcement agencies.
4. If local police are called in, College personnel will be notified by any means available and instructed to avoid the threatened area until the threat is over.
5. When local police arrive, Campus Safety/Security and other school officials will make themselves available to provide any assistance possible.
6. After the disturbance is over and normal activity can be resumed, a complete report of the incident will be made to the President and reported as required by Students' Right to Know/Campus Security Act

CENTRAL CAROLINA TECHNICAL COLLEGE

CONFINED SPACE PROGRAM

Table of Contents

I. Introduction

Scope.....	2
Applicability.....	2
Policy.....	3
General Requirements.....	3
Responsibilities.....	3
Contractor Requirements.....	4
Definitions.....	4

II. Permit Required Confined Space Entry Program

Purpose, Scope, and Policy.....	8
OSHA Requirements.....	8
General Requirements.....	10
Conditions for Permit Entry Without a Permit.....	11
The Permit Confined Space Entry Program Shall Consist of.....	13
Permit System.....	15
Training.....	16
Additional Information.....	18

III. Non-Permit Required Confined Spaces

Electrical.....	19
Telecommunications.....	20

Appendix I: Permit Required Confined Space Program Forms

CS-1	Confined Space Entry Permit.....	22
CS-2	Non-Permit Confined Space Certification.....	23
CS-3	Permit Confined Space Entry-Contractor Debriefing.....	24
CS-4	Confined Space Meter Calibration Form.....	25
CS-5	Employee Confined Space Training Attendance Form.....	26

Appendix II: Applicable Standards

Permit Required Confined Space Regulation 29 CFR 1910-146.....	28
Electrical Power Generation and Distribution Regulation 29 CFR 1910.269 e(1-14) and t(1-8).....	42
Telecommunications Standard 29 CFR 1910.268 o(1) – o(5).....	46

I. INTRODUCTION

Every year employees are killed as a result of hazardous condition in confined spaces. Approximately 60% of these fatalities are would-be rescuers who enter these spaces in an attempt to retrieve the fallen individual(s), only to be overcome and become victims themselves.

As part of routine maintenance activities Central Carolina Technical College (CCTC) maintenance employees and contractors are required to enter potentially hazardous enclosed spaces. Confined spaces may have atmospheric conditions and/or physical hazards present and include: manholes wet-wells, vaults, tanks, boilers, silos, bins, pits, sumps, and sanitary and storm sewers. Toxic and/or flammable gases and vapors may accumulate in these locations as a result of insufficient ventilation and deficient oxygen levels may be present as the result of corrosion and/or organic debris digestion. In addition, limited access to these locations complicated the retrieval of anyone incapacitated.

In accordance with the OSHA standard the regulation listed below provide minimum requirements for safe entry into these locations:

- **Electrical Transmission and Distribution** — 29 CFR 1910.269
- **Permit-required Confined Spaces** — 29 CFR 1910.146
- **Telecommunications** — 29 CFR 1910.268

This manual contains the procedures and practices for safe entry into locations, used at CCTC, falling under the above regulations.

Scope

The provisions of this program pertain to locations required to be entered by an employee(s) that either meet the definition or the description as outlined in the following regulations:

Permit-required Confined Spaces – 29 CFR 1910.146

Non-permit required Confined Spaces

- **Electrical Transmission and Distribution** – 29 CFR 1910.269 e(1-14) and t(1-8)
- **Telecommunications** – 29 CFR 1910.268 o(1-5)

Applicability

This program shall apply to all personnel at all campuses of CCTC.

Policy

It is the policy of CCTC to take every reasonable precaution to provide a work environment free from recognized hazards for its employees in accordance with the General Duty Clause of the OSHA Act (Public Law 91-596 Section 5 (a)(1) and in accordance with any applicable specific OSHA standards. The college's policy document is entitled Environmental Health and Safety Plan.

General Requirements

The college, in accordance with State and Federal regulations, has implemented this program to ensure safe entry into confined spaces. Before entry all potential hazards must be identified and controlled. A formalized training program has been designed to enable employees to recognize potential hazards and take the appropriate actions to control those hazards. For most work operations in electrical and telecommunication manholes safeguards and controls can be completed without entry into the location and in such cases the permit system is not required. However, if entrance into the enclosed space is required to implement hazard controls then the permit-required confined space program must be used.

Responsibilities

The maintenance supervisor is responsible for reviewing the location within his/her respective areas to identify either known or suspect confined space locations. This information shall be provided to the CCTC Safety team for final status determination.

- **Supervisors** must identify locations and provide a list of employees requiring training. *Note: Supervisors are required to attend training in accordance with the regulations pertaining to the locations their employees are required to enter.*
- **Employees** must complete the training as required by their supervisors and to follow the procedures as outlined in the training when entering a confined space. A written exam will be given to provide documentation of training proficiency. They should also assist in identifying potential confined space locations and notify their supervisor if they witness an unsafe entry.
- **The Director of Safety/Security.** The Director of Safety/Security, or designees, shall be responsible for establishing and maintaining the Confined Space Entry Program. The maintenance supervisor is responsible for maintaining current location listings of both permit-required and non-permit required confined spaces; generating and updating the written confined space program, maintaining files on completed permits; identifying and approving equipment needed for safe entry; conducting and maintaining calibration and calibration records on air monitoring meters, (see form CS-5); and to provide training and maintain training records.

Contractor Requirements

Any work at the college in confined spaces must be conducted in accordance with the regulations specific to that location. Contractors must have a written confined space program that complies with the regulation pertinent to the areas to be entered. All contractors must provide copies of their written program(s) and employee training documentation to the contracting shop/department. Contractors are also responsible to supply all needed equipment to perform safe entry. For permit required confined entries the contractor shall complete form CS-4 Contractor Debriefing with a college representative and provide a copy to the college.

When a contractor is required to enter or work in proximity to a permit required confined space, the contracting department will furnish a written copy of the hazards identified in that space to the contractor.

Definitions

Acceptable Entry Conditions: Means the conditions that must exist in a space to allow entry and to ensure that the employees involved with a confined space entry can safely enter into and work within the space.

Attendant: An individual stationed outside one or more spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's confined space program.

Authorized Entrant: An employee who is authorized by the employer to enter a confined 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 that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

Confined Space: Is defined as 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 (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and
- Is not designed for continuous employee occupancy.

Double block and Bleed: The closure of a line, duct, or pipe by closing 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(s) internal or external to the confined space, which could endanger entrants.

Engulfment: The surrounding and effective capture of a person by a liquid or finely divided solid (flowable) 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 act by which a person intentionally passes through an opening into a permit required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

Entry Permit: The written or printed document provided by the employer to allow and control entry into a permit space and that contains the information specified in section (f) of the Permit Required Confined Space standard.

- The entry permit:
 - Defines the conditions under which the permit space may be entered.
 - Stated the reason(s) for entering the space.
 - Lists the anticipated hazards of the entry.
 - For entries where the individual authorizing the entry does not assume direct charge of the entry:
 - Lists the eligible attendants, entrants, and the individuals who may be in charge of the entry; and
 - Establishes the length of time for which the permit may remain valid.
 - Establishes special procedures, hot work permits etc. that are required to ensure safe entry and work operations.

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

Note: An entry supervisor may also serve as an attendant or as an entrant, as long as that person is trained and equipped as required by this program for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

Hazardous Atmosphere: An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is escape unaided from a permit space); injury, or acute illness from one or more of the following causes:

- Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL);
- Airborne combustible dust at a concentration that meets or exceeds its LFL;
 - *Note:* This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet (1.52 m) or less.
- Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;
- Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, of this part and which could result in employee exposure in excess of its dose or permissible exposure limit;
 - *Note:* An atmospheric concentration of any substance that is not capable of causing death, incapacitation, and impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision.
- Any other atmospheric condition that is immediately dangerous to life or health.
 - *Note:* For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

Hot Work Permit: The employer's written authorization to perform operations, which could provide a source of ignition, such as riveting, welding, cutting, burning, or heating.

Immediately Dangerous to Life or Health (IDLH): Any condition, which poses an immediate threat of loss of life, may result in irreversible or immediate severe health effects, may result in eye damage, irritation or other conditions which could impair escape from the permit space.

Immediate Severe Health Effects: Any acute clinical sign(s) of a serious, exposure-related reaction manifested within 72 hours after exposure.

Inerting: Means the displacement of the atmosphere in a permit required space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible. It is a process of rendering the atmosphere of a permit required space non-flammable, non-explosive, or otherwise chemically non-reactive by such means as displacing or diluting the original atmosphere with steam or a gas that is non-reactive with respect to that space.

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; mis-aligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tag-out of all sources of energy or mechanical linkages.

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-Permitted Confined Space: A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazards capable of causing death or egregious physical harm. A location that is governed by specific regulations may require special procedures to ensure all hazards are controlled before entry (i.e. telecommunications manholes or high voltage manholes).

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.

Permit Required Confined Space (Permit Space): A confined space that has one or more of the following characteristics:

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

Permit Required Confined Space Program: The employer's overall program for controlling, and where appropriate, for protecting employees from, permit space hazards and for regulating employee entry into permit spaces.

Permit System: The employer's written procedures for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

Prohibited Condition: Any condition in a permit spaced that is not allowed by the permit during the period when entry is authorized.

Rescue Service: The personnel designated to rescue employees from confined spaces (such as the Sumter Fire Department).

Retrieval System: The equipment (including a retrieval line, chest or full-body harness, wrist-lets, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

Testing: The process by which the atmospheric hazards that may confront entrants of a space are identified and evaluated. Testing includes specifying the tests that are to be performed in the space.

Note: Testing enables employers both to devise and implement adequate control measures for the protection of authorized entrants and to determine if acceptable entry conditions are present immediately prior to and during entry.

II. PERMIT REQUIRED CONFINED SPACE PROGRAM

For confined space locations containing atmospheric or physical hazards, where neither the electrical generation and distribution nor telecommunication regulations apply, the permit – required confined space regulation (29 CFR 1910.146) must be used. The provisions of this regulation require the employer to provide the means, procedures, training, and equipment to mitigate hazards. In addition documentation is required to verify compliance through the use of a written permit. The permit required to verify compliance through the use of a written permit. The permit required confined space program has the following components:

- **Location Listings and Hazard Identification:** A list of permit-required confined spaces locations. The listing contains the location information, including a map when possible, and identifies the hazards of each location. The master list will be maintained by The Director of Safety/Security and updated annually.
- **Employee Training:** The Workforce Development Division shall provide training to all employees required to enter permit-required confined spaces and electrical and telecommunications manholes. Training must be conducted before the employee can participate in entries.
- **Permit System:** A written permit (form CS-1) must be completed at the entry location and before entry occurs to identify hazards, hazard controls, verification of availability of emergency rescue

team, and listing entry team members. The duration of the permit is a maximum of 24 hours. Completed permits are the responsibility of the initiating department to maintain.

- **Safety Equipment:** Safety equipment for use in permit-required confined space entry or confined space entry shall be approved by the maintenance supervisor. The maintenance supervisor will calibrate confined space entry monitors in accordance with manufacture specifications. Purchase and repair cost for equipment shall be the responsibility of the department owning the equipment.
- **Special Hazards:** Special permits may be required (i.e. burn permit) where welding or an open flame is to be used inside a building and also involves permit-confined space entry.

Purpose, Scope, and Policy

This section outlines the practices and procedures to protect CCTC employees and contract employees from the hazards associated with permit required confined space entry, as specified in OSHA's Confined Space Standard 29 CFR 1910.146. This document shall serve as the written program and shall apply to all personnel at all CCTC campuses. Furthermore, this section shall apply to all permit required confined spaces, or any non-permit-required space that becomes a permit-required space by introduction of a new hazard, unless there is a more applicable standard.

The Director of Safety and Security or designees shall be responsible for establishing and maintaining the Permit-Required Confined Space Entry Program. It is the policy of CCTC, as required by the OSHA Permit-Required Confined Space Standard 29 CFR 1910.146, to ensure that atmospheric and physical hazards be identified associated with confined spaces and that this information and safe entry requirements be communicated to employees responsible for entry into such space.

OSHA Requirements

The Maintenance Supervisor shall:

- Identify confined space(s) encountered by his/her employees, submit a list of the confined spaces identified to the Director of Safety/Security and post or distribute the list to affected employees. The list shall include:
 - Location
 - Physical dimensions and construction
 - Reason for employee entry
 - Potential hazards
 - Frequency of entry
- Submit the confined space list to the Director of Safety/Security within 60 days of the effective date of this program.
- Update the confined space list annually and whenever there are changes affecting work conditions or when new confined spaces are identified.
- Ensure that all associated safety equipment is maintained and routinely inspected.
- Submit a list of affected employees to the Director of Safety/Security.
- Update the list of affected employees whenever there are additions or deletions.
- Attend training for individuals in charge of or authorizing the entry or designating such individuals.
- Assure affected employees receive training as outlined below:

- Employees working in proximity to permit required confined spaces shall receive awareness training that shall consist of:
 - Understanding what constitutes a confined space
 - Identification of potential hazards requiring permit entry procedures
- Employees who are required to enter any location defined as a permit entry required confined space shall receive confined space entry training:
 - Before there is a change in assigned duties;
 - Whenever there is a change in permit space operations that presents a hazard about which an employee has not been previously trained and;
 - Whenever the employer has reason to believe that there are deviations from the permit space entry procedure required by this program or that there are inadequacies in the employee's knowledge or use of these procedures.
- The procedures and practices necessary for safe permit-required confined space entry, as outlined in the confined space training manual, include:
 - Specifying acceptable entry conditions;
 - Isolating the permit required space;
 - Purging, inerting, flushing, or ventilating the permit-required space to eliminate or control atmospheric hazards;
 - Providing pedestrian, vehicle or other barriers, as necessary, to protect the entrant from external hazards and;
 - Verifying that conditions in the permit-required space are acceptable for entry for the duration of an authorized entry.
- Ensure that procedures and entry permits are accurately completed and reviewed, and keep appropriate employee training and confined space entry permit records. Completed permits shall be maintained for a period of at least 1-year from the date of termination. Training records shall be maintained for at least 1 year from the date of an affected employee's termination.
- Contact the Director of Safety/Security before entry into any potential or know IDLH confined space is allowed.
- Ensure that confined space entry equipment is properly maintained and stored.
- Ensure that all entry permits are completed and signed upon termination of entry and appropriately filed or submitted to The Director of Safety/Security.

The Employee shall:

- Notify the supervisor of any confined space encountered not on the confined space list.
- Notify his/her supervisor whenever work operations may require a hot work permit or work operations may result in chemical exposure or generation of hazardous atmosphere.
- Attend permit entry confined space training.
- Report to the supervisor jobs requiring entry into permit entry confined spaces.
- Comply with the requirements outlined when directly involved in entry of permit-confined spaces.
- Maintain training certificate and have available for inspection.

The Director of Safety/Security along with The Maintenance Supervisor shall:

- Develop the written Confined Space Program and revise the program as necessary.
- Approve all monitoring equipment, safety equipment, and materials for safe work operations.
- Arrange with the Workforce Development to provide training to maintenance personnel.
- Approve employees to serve as authorized attendants, entrants, or entry supervisor.

- Establish employee proficiency in the duties required, including new or revised procedures. Certification shall contain each employee's name, and date of training.
- Inspect [potential] Permit Confined Space locations for determination of hazards.
- Provide signs for Permit Entry Confined Spaces.
- Provide periodic calibration of confined space entry monitoring equipment.
- Annually review completed permits.

General Requirements

Hazard identification: Each permit space shall be identified and evaluated, including a determination of the severity of the hazard. The supervisory staff shall report potential permit spaces to The Director of Safety/Security. The Director of Safety/Security shall maintain a listing of all permit spaces.

Permit System: A written permit system shall be utilized for entry into permit spaces. The Director of Safety/Security shall develop the written permit system.

Employee Information: Signs shall be posted where feasible near permit spaces to notify employees what hazards may be present and that only authorized entrants may enter the permit space. Where signage is not feasible, potentially exposed employees shall be trained with regard to the danger of unauthorized entry of permit spaces. The Director of Safety/Security shall be responsible for arranging signage of permit spaces.

Prevention of Unauthorized Entry: Unauthorized entry into permit spaces shall be prevented. Prevention measures include training, signs, and security measures. All employees in or around confined spaces shall attend confined space awareness training.

Equipment: Including: testing, monitoring, communication and personal protective equipment, shall be provided, maintained, and properly used. The Director of Safety/Security will specify minimum equipment requirements for each permit space.

Rescue: Rescue procedures and equipment shall be in place prior to entry into a permit space. The use of retrieval equipment shall be required where there exists a potential for an IDLH atmosphere, engulfment, or vertical entries. There must be adequate attachment points outside the confined space for tying-off or otherwise securing retrieval lines for all authorized entrants. Where retrieval lines themselves could constitute an entanglement hazard or otherwise cannot be used, an equivalent method for rescue shall be used.

Protection From External Hazards: Barriers necessary to protect entrants from external hazards (pedestrian, vehicle, etc.) shall be in place prior to entry into a permit space.

Conditions for Permit Entry without a Permit

The alternate procedure below may be used, provided that the following conditions are met:

- All employees involved in the entry (entry supervisor, entrant, and attendant) shall have received the training required by this program.
- The only existing hazard in the permit space is an actual or potential hazardous atmosphere;
- Continuous forced air ventilation is sufficient to maintain a safe atmosphere for entry.
- Monitoring and inspection data is developed showing that the only existing hazard was atmospheric and that forced air ventilation is adequate in removing the hazard, and this information is documented and made available to each entrant; and
- Ventilation and monitoring of the space is adequately conducted without entry. If entry is necessary, all procedures of permit entry must be followed.

For entries performed without a permit, which meet the set conditions above, the following entry procedure shall be used and documented using form CS-3:

- Any conditions making it unsafe to remove an entrance cover shall be eliminated before the cover is removed.
- When entrance covers are removed, the opening shall be promptly guarded by a railing, cover, or other temporary barrier that will prevent an accidental fall through the opening and that will protect each employee working in the space.
- Before an employee enters the space, the internal atmosphere shall be tested with a calibrated direct-reading instrument for the following conditions and in the order given:
 - Oxygen content,
 - Flammable gases and vapors, and
 - Potential toxic air contaminants.
- There may be no hazardous atmosphere within the space whenever any employee is inside.
- Continuous forced air ventilation shall be used, as follows:
 - An employee may not enter the space until the forced air ventilation has eliminated any hazardous atmosphere;
 - The forced air ventilation shall be 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
 - The air supply for the forced air ventilation shall be from a clean source and may not increase the hazards in the space.
- 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 a hazardous atmosphere is detected during entry:
 - Each employee shall leave the space immediately;
 - The space shall be evaluated to determine how the hazardous atmosphere developed; and
 - Measures shall be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place.
- The authorized entry supervisor shall verify that the space is safe for entry and that the measures required in Reclassification of Permit to Non-Permit Space section have been taken. This is accomplished by a written certification containing the date, the location of the space, and the

signature of the person providing the certification. The certification shall be made available to each employee entering the space.

Conditions for Space Reclassification – Non-Permit to Permit Space: When there are changes in the use or configuration of a non-permit confined space that might increase the hazards to entrants. The maintenance supervisor shall re-evaluate the space and, if necessary, reclassify it as a permit required confined space.

Conditions for Space Reclassification – Permit to Non-Permit: A space classified, as a permit required confined space might be reclassified as a non-permit confined space under the following procedure:

- If the permit space possesses no actual or potential atmospheric hazards and if all hazards within the space are eliminated without entry into the space, the permit space may be reclassified as a non-permit confined space for as long as the non-atmospheric hazards remain eliminated.
- If it is necessary to enter the permit space to eliminate the hazards, such entry shall be performed under the permit entry system of this program. If testing and inspection during that entry demonstrate that the hazards within the permit space are eliminated the space may be reclassified as a non-permit confined space for as long as the hazards remain eliminated.
- The maintenance work area supervisor is responsible for documenting that all hazards in a permit space have been eliminated using through a certification that contains the date, location of the space, and the signature of the person making the determination. The certification shall be available to each employee entering the space.
- If hazards arise within a permit space that has been declassified to a non-permit space, each employee in the space shall exit the space. The maintenance supervisor shall then reevaluate the space and determine whether it must be reclassified as a permit space, in accordance with other applicable provisions of this program.

Duty to other Employers (Contractors) – When CCTC arranges to have employees of another employer (Contractor) perform work that involves permit space entry, the supervising department shall:

- Inform the contractor that the workplace contains permit spaces and that permit space entry is allowed only through compliance with a permit space program meeting the requirements of this program.
- Apprise the contractor of the element, including the hazards identified and the College's experience with the space that make the space in question a permit space.
- Apprise the contractor of any precautions or procedures the college has implemented for the protection of employees in or near permit spaces where contractor personnel will be working.
- Coordinate entry operations with the contractor, when both CCTC personnel and contractor will be working in or near permit spaces. When employees of more than one employer are working simultaneously as authorized entrants in a permit space, the entry operations of one employer shall not endanger the employees of any other employer.
- Debrief the contractor at the conclusion of the entry operations regarding the permit space program followed and regarding any hazards confronted or created in permit spaces during entry operations and complete Form CS-4 and return to the maintenance supervisor.

Contractor Requirements In addition to complying with the permit space requirements that apply to all employers, each contractor who is retained to perform permit space entry operations shall:

- Obtain any available information regarding permit space hazards and entry operations from the supervising department.
- Coordinate entry operations with the supervising department when both college personnel and contractor personnel will be working in or near permit spaces, as required by this program.
- Inform the supervising department of the permit space program that the contractor will follow and of any hazards confronted or created in permit spaces, either through a debriefing (see Form CS-4) or during the entry.
- Coordinate emergency rescue availability using Form CS-2.

The Permit Confined Space Entry Program Shall Consist of:

Implementation of the necessary measures to prevent unauthorized entry.

Identification and Evaluation of the hazards of permit spaces before entry.

Following means, procedures, and practices necessary for safe permit space entry as outlined in the confined space training manual including any:

- Specifying acceptable entry conditions.
- Isolation of the permit space.
- Purging, inerting, flushing, or ventilating the permit space as to eliminate or control atmospheric hazards.
- Provision for pedestrian, vehicle or other barriers as necessary to protect entrant from external hazards.
- Verification that conditions in the permit space is acceptable for entry throughout the duration of an authorized entry.

The supervising department shall provide the following equipment listed below at no cost to the employee:

- Testing and monitoring equipment needed to evaluate oxygen content, explosive gases/vapor concentrations and specific toxic agents (e.g., carbon monoxide, hydrogen sulfide), that is within factory calibration.
- Ventilating equipment needed to obtain acceptable entry conditions.
- Communications equipment necessary for summoning rescue and emergency services.
- Personal protective equipment where feasible engineering and work practice controls do not adequately protect employees.
- Proper electrical and lighting equipment needed to enable employees to see well enough to work safely and exit the space.
- Barriers and shields as required protecting the entrant from external hazards.
- Equipment, such as ladders, needed for safe ingress and egress by authorized entrants.
- Rescue and emergency equipment, except equipment provided by rescue services.
- Any other equipment necessary for safe entry into and rescue from permit spaces.

Evaluate permit space conditions as follows when entry operations are conducted:

- Conditions shall be tested in the permit space to determine if acceptable entry conditions exist before entry is authorized to begin except if isolation of the space is 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 and, if entry is authorized, entry conditions shall be continuously monitored in the areas where authorized entrants are working.
- Test or monitor the permit space as necessary to determine if acceptable entry conditions are being maintained during the course of entry operations.
- When testing for atmospheric hazards, test first for oxygen, then for combustible gases and vapors, and then for toxic gases or vapors. **NOTE:** Atmospheric testing for sewer entry: Minimum tests are oxygen deficiency, lower explosive limit and hydrogen sulfide concentration.
- At least one attendant shall be provided outside the permit space into which entry is authorized for the duration of entry operations.
- If multiple spaces are to be monitored by a single attendant, include in the permit program the means and procedures to enable the attendant to respond to an emergency affecting one or more of the permit spaces being monitored without distraction from the attendant's responsibilities as outlined under "Duties of Attendant(s)" section of this document.
- Individuals shall be designated on the entry permit who are to have active roles (as, for example, authorized entrants, attendants, entry supervisors, or persons who test or monitor the atmosphere in a permit space) in entry operations, identify the duties of such employees, and provide each with the training specified in the "Training" section.
- Procedures for summoning rescue and emergency services, for rescuing entrants from permit spaces, and/or providing necessary emergency services to rescued employees and for preventing unauthorized personnel from attempting a rescue.
- A system for the preparation, issuance, use, and cancellation of entry permits.
- Procedures to coordinate entry operations when employees of more than one employer are working simultaneously as authorized entrants in a permit space, so that employees of one employer do not endanger the employees of any other employer.
- Procedures for summoning rescue and emergency services, for rescuing entrants from permit spaces, and/or providing necessary emergency services to rescued employees and for preventing unauthorized personnel from attempting a rescue.
- A system for the preparation, issuance, use, and cancellation of entry permits.
- Procedures to coordinate entry operations when employees of more than one employer are working simultaneously as authorized entrants in a permit space, so that employees of one employer do not endanger the employees of any other employer.
- Procedures (such as closing off a permit space and canceling the permit) necessary for concluding the entry after entry operations have been completed.
- Review entry operations when there is reason to believe that the measures taken under the permit space program may not protect employees, and revise the program to correct deficiencies found to exist before subsequent entries are authorized. **NOTE:** examples of circumstances requiring the review of the permit required confined space program are any unauthorized entry of permit space, the detection of a permit space hazards not covered by the permit, the detection of a condition prohibited by the permit, the occurrence of an injury or near-miss during entry, a change in the use or configuration of a permit space, and employee complaints about the effectiveness of the program.

- Review the permit required confined space program using the canceled permits and revise the program as necessary to ensure that employees participating in entry operations are protected from permit space hazards.

Permit System

The Entry Permit form, CS-1, shall be completed before authorizing entry into the permit-required confined space. Before the entry begins:

- Hazard determination measures shall be documented by preparing an entry permit as outlined below.
- The entry supervisor, identified on the permit, shall sign the entry permit to authorize entry.

The entry supervisor shall terminate entry and cancel the entry permit when:

- The entry operation covered by the entry permit has been completed; or
- A condition that is not allowed under the entry permit arises in or near the permit space.

The supervising department shall retain each canceled entry permit for at least 1 year to facilitate the review of the permit required confined space program. Any problems encountered during an entry operation shall be noted on the permit so that appropriate revisions to the permit space program can be made.

Entry Permit

The entry permit authorizing entry into a permit space shall identify:

- The permit space to be entered.
- The purpose of the entry.
- The date and duration of the authorized entry permit.
- The name of each authorized entrants within the space.
- The personnel, by name, currently serving as entry supervisor, with a space for the signature of initials of the entry supervisor who originally authorized entry.
- The hazards of the permit space to be entered.
- The measures used to isolate the permit space and to eliminate or control permit space hazards before entry.
- The acceptable entry conditions.
- 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.
- The rescue and emergency services available and the means (such as the equipment to be used and numbers to call) for summoning those services.
- The communication procedures used by authorized entrants and attendants to maintain contact during the entry.
- Equipment, such as personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment to be provided.

- Any other information whose inclusion is necessary, given the circumstances of the particular confined space, in order to ensure employee safety.
- Any additional permits, such as for hot work, issued to authorized work in the permit space.

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

The duration of the permit may not exceed the time required to complete the assigned task or job identified on the permit in accordance with the purpose of the entry.

Training

Confined space awareness training shall be provided for CCTC employees not required to enter permit required confined spaces as a part of their job duties, but who work in proximity to these areas. Awareness training shall consist of:

- Understanding what constitutes a confined space.
- Identifying potential hazards requiring permit entry procedures.

Confined space entry training shall be provided for employees required, in the course of completing their jobs duties, to enter any location defined as permit entry required confined space. Training shall be provided to each affected employee:

- Before the employee is first assigned duties under this program.
- Before there is a change in assigned duties.
- Whenever there is a change in permit space operations that presents a hazard about which an employee has not been previously trained.
- Whenever the supervising department has reason to believe either that there are deviations from permit space entry procedures or that there are inadequacies in the employee's knowledge or use of these procedures.

The training shall establish employee proficiency in the duties required by this program and shall include new or revised procedures, as necessary, for compliance with this program.

WFD Director shall certify that the training has been accomplished. The certification shall contain each employee's name, and the dates of training. The certification, refer to form CS-6, shall be available for inspection.

Duties of the Entry Supervisor

- Know the hazards that may be faced during entry, including the mode, signs or symptoms, and consequences of the exposure;
- Verify, by 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;
- Terminate the entry and cancel the permit as required when:

- The entry operation covered by the entry permit has been completed; or
- A condition that is not allowed under the entry permit arises in or near the permit space;
- Verify that rescue services are available and that the means for summoning them are operable.
- Remove unauthorized individuals who enter or who attempt to enter the permit space during entry operations.
- Determine, whenever responsibility for a permit space entry operation is transferred to a different entry supervisor and at intervals dictated by the hazards and operations performed within the space that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

Duties of the Authorized Entrant(s)

- Know the hazards that may be faced during entry, including the mode, signs or symptoms, and consequences of the exposure.
- Use equipment properly in accordance with training received.
- Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to alert the attendant to the need to evacuate the space as required.
- Alert the attendant whenever:
 - the entrant recognizes any warning signs or symptoms of exposure to a dangerous situation, or
 - The entrant detects a prohibited condition.
- Exit from the space as quickly as possible whenever:
 - An order to evacuate is given by the attendant or the entry supervisor,
 - The entrant recognizes any warning sign or symptom of exposure to a dangerous situation,
 - The entrant detects a prohibited condition, or
 - An evacuation alarm is activated.

Protective Equipment – Authorized entrant(s) shall:

- Implement non-entry rescue, retrieval systems or methods whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant.
- Use a chest or full body harness, with a retrieval line attached at the center of the entrants back near shoulder level, or above the entrant's head. Wrist-lets may be used in lieu of the chest or full body harness if it can be demonstrated that the use of a chest or full body harness is infeasible or creates a greater hazard and that the use wrist-lets is the safest and most effective alternative.
- Ensure the other end of the retrieval line is attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device shall be available to retrieve personnel from vertical type permit spaces more than 5 feet deep.
- Be provided with the necessary personal protective equipment.
- Use all personal protective equipment, such as retrieval lines, respirators, or clothing needed for safe entry and exit in accordance with training received.
- Know of the external barriers needed to protect entrants from external hazards and of the proper use of those barriers (e.g., traffic barriers).
- Wear full body harness during all entries requiring portable ventilation.

Self-Rescue – Authorized entrant(s) shall exit the Permit Space when:

- The attendant orders evacuation;
- An automatic monitoring equipment alarm is activated; or
- The authorized entrant(s) perceive they are in danger.

Duties of the Attendant(s)

- Know the hazards that may be faced during entry, including the mode, signs or symptoms, and consequences of the exposure.
- Be aware of possible behavioral effects of hazardous exposure in authorized entrants.
- Maintain a continuous accurate count of authorized entrants in the permit space and ensure that the means used to identify authorized entrants accurately identifies who is in the permit space.
- Remain outside the permit space during entry operations until relieved by another authorized attendant.
- Communicate with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space.
- Monitor activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions:
 - If the attendant detects a prohibited condition;
 - If the attendant detects the behavioral effects of hazards exposure in an authorized entrants; or
 - If the attendant cannot effectively and safely perform all the duties required under this section.
- Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards.
- Take the following actions when unauthorized persons approach or enter a permit space while entry is underway:
 - Warn unauthorized persons that they must stay away from the permit space;
 - Advise the unauthorized persons that they must exit immediately if they have entered the permit space; and
 - Inform the authorized entrants and entry supervisor if unauthorized persons have entered the permit space.
- Perform non-entry rescue as specified by the rescue procedure.
- Perform no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

Rescue and Emergency Services

- Sumter City Fire Department will be contacted via 911 for emergency rescues.

Additional Information

For additional information concerning this program contact the Director of Safety/Security.

III. NON-PERMIT REQUIRED CONFINED SPACES

Electrical Confined Space Entry Policy

The purpose of this policy is to identify and control hazards before initiating entry into a confined space as outline in 29 CFR 1910.269 (Electrical Power Generation, Transmission and Distribution). If conditions exist and/or hazards are not controlled in the application of this policy the permit-entry confined space policy must be used to ensure that adequate controls are used.

All electrical employees required to enter below grade unventilated locations, as a portion of their work responsibilities, shall receive formal training on confined space entry before performing such work.

Pre-entry procedures for entry into below grade locations:

- An evaluation shall be conducted to check for the excessive heat, pressure by touching and then carefully removing the manhole lid.
- Following removal of a manhole lid, the opening shall be promptly guarded with a railing, temporary cover or other barrier intended to prevent an accidental fall through the opening and to protect entrant from falling objects.
- Before entry the internal atmosphere shall be tested for the following:
- Oxygen content (**Safe Entry Range – 19.5% to 23.5%**)
 - Combustible gases or vapors – (**Safe Entry Range - < 10% Lower Explosive Limit [LEL]**)
 - If the testing identifies levels outside the safe entry ranges forced air ventilation may be used to bring the atmospheric levels back into the safe entry ranges before entry is initiated.
- Continuous atmospheric monitoring shall be conducted when conditions require forced air ventilation to be used before entry.

Attendants for manholes

- While work is being performed in a manhole containing energized electrical equipment, an employee with basic first aid and CPR training shall be immediately available to render emergency assistance.
- The attendant may enter a manhole for brief periods in the process of his/her job duties.
- For the purpose of inspection, house-keeping, taking readings or other similar work, an employee working alone may enter, for brief periods of time, a manhole where energized electrical equipment is in service, if it can be demonstrated that the employee will be protected from electrical hazards.

Telecommunication Confined Space Entry Policy

The purpose of this policy is to identify and control hazards before initiating entry into a confined space as outline in 29 CFR 1910.268(o) (Telecommunication). If conditions exist and/or hazards are not controlled in the application of this policy the permit-entry confined space policy must be used to ensure that adequate controls are used.

Guarding of manholes and street openings

- Upon removal of a manhole lid or hatch one of the following methods will be used to prevent an accidental fall through the opening:
 - Use of a portable railing to enclose the opening or;
 - Use of cone to demarcate the opening or;
 - Any other equally effective means.
- Entry opening located where safety hazards are created by traffic patterns (i.e., vehicle or pedestrian) require:
 - Placement of flags, cones or other traffic control devices placed conspicuously to alert oncoming traffic or;
 - Placement of a vehicle as a barrier in the direction of the oncoming traffic.

Pre-entry requirements for manholes and un-vented vaults

- Testing of the internal atmosphere for oxygen content (**Safe Entry Level – 19.5-23.5%**) and the presence of combustible gases or vapors (**Safe Entry Level - < 10% Lower Explosive Limit [LEL]**) shall be conducted before initiating entry
- If **unsafe conditions are identified: oxygen level (< 19.5% or > 23.5%)** or a **combustible atmosphere is present (> 10% LEL)** the atmospheric level must be brought back into safe entry levels with the use of portable forced air ventilation.
- A fuel tank or cylinder (e.g., propane) may not be in a manhole unless in immediate use.

A ladder shall be used to enter and exit all locations greater than 4 foot in depth.

An employee trained in basic first-aid shall be available at the work site during entries if any of the following conditions exist:

- Entry is required into a manhole or vault where joint utilities exist and consist of energized electrical power;
- Where the opening to the underground location cannot be adequately guarded to prevent an accidental fall through the opening or from foreign objects entering the location.
- Where adequate controls (e.g., lights, barricades, etc.) cannot be placed to provide employees a safe work environment from the hazards generated from traffic.

APPENDIX I

PERMIT CONFINED SPACE ENTRY FORMS

CENTRAL CAROLINA TECHNICAL COLLEGE Confined Space Entry Permit

Department/Shop: _____ Permit # _____
 Location: _____
 Description of work to be done: _____

ATMOSPHERIC AND ENGULEMENT HAZARDS

Check all expected hazards:

- Oxygen deficiency (< 19.5%)
- Fire Hazard (more than 23.5% oxygen or more than 10% of the LEL)
- Toxic gases, vapors, or dust (greater than PEL or TLV)
- Heat stress/Engulfment
- Other _____
- Hot Work Permit (to be attached – obtained from FES)

ENTRY TEAM DUTIES

Check and identify all that apply:

ENTRY SUPERVISOR	ENTRANT	ATTENDANT	NAME
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____

SAFETY CONTROLS AND COMMUNIATION PROCEDURES

EQUIPMENT REQUIRED FOR ENTRY:

- Fall protection equipment
- Air mover/ventilator
- GFCI
- Hearing Protection
- Eye Protection
- Hard Hat
- Other Personal Protective Equipment: _____

ISOLATION:

- Electrical equipment locked out and tagged
- Mechanical equipment locked out and tagged
- Entry ways are blocked open
- Isolation valves closed and locked
- Proper ventilation or purging completed
- Operations notified and understands clearly

COMMUNICATIONS:

- Access to phone
- Radio

TESTING RECORD

Atmospheric Testing: Continuous Periodic Complete information below

Date/Time			
Oxygen (19.5%-22%)			
Flam. (<10% LEL)			
H2S (,10 ppm)			
CO (<200 ppm)			
Other:			

Instrument Used: Man: _____ Model: _____ SN _____ Last Cal. _____
 Date: _____ Initials: _____

AUTHORIZATION/TERMINATION BY ENTRY SUPERVISOR

Authorization: I certify that all required precautions have been taken and the necessary entry equipment has been provided to safely work in this confined space

Print Name: _____ Signature: _____
 Mechanic Signature: _____ (Entrant) Mechanic Signature: _____ (Attendant)

Permit Initiated: _____ Duration: _____
 Date: _____ Time: _____

CENTRAL CAROLINA TECHNICAL COLLEGE

NON-PERMIT CONFINED SPACE CERTIFICATION

This document certifies that the _____ has been cleared for a change in status from a Permit Confined Space to a Non-Permit Confined Space provided that the below conditions are met.

- All entrants/attendants involved in any entry have completed the College's Confined Space Entry training.
- All hazards other than atmospheric (e.g., lockout/tag out) can be completed without entry.
- Any conditions making it unsafe to remove an entrance cover is eliminated before cover is removed.
- For any horizontal opening, promptly upon removal of the covering, the entrance is guarded by a railing or temporary cover/barrier to prevent accidental fall through the opening.
- Before entry into the space, atmospheric testing is completed with the College's Confined Space Meter. Testing shall be completed for the following:
 - 1) Oxygen Content > 19.5% and < 23.5%
 - 2) Flammable gases or vapors < 10% LEL
 - 3) Potential toxic air contaminants < 50 PPM CO
< 20 PPM H₂S
- If the above conditions are not met upon completion, forced air ventilation may be used provided it can be installed into the and levels within the ranges above are obtained.

Please attach at least 3 previous entry permits for the specific location.

Date: _____ Certification Completed

By: _____

CENTRAL CAROLINA TECHNICAL COLLEGE

PERMIT CONFINED SPACE ENTRY CONTRACTOR DEBRIEFING

Company: _____ Entry Location: _____
Contractor: _____ Date(s) of _____
Entry: _____

Was entry coordinated by Company employees?

Yes (If yes attach copy of entry permit)

No

Reason for entry: _____

Additional hazards identified: _____

Additional hazards generated during entry: _____

Contractor's Representative:

(Please Print) (Signature) **Date:** _____

Company's Representative:

(Please Print) (Signature) **Date:** _____

CENTRAL CAROLINA TECHNICAL COLLEGE

CONFINED SPACE METER CALIBRATION FORM

Manufacturer: _____	Model: _____	Date: _____
Serial Number: _____	Date of Last Calibration: _____	
Department/Area: _____	Location: _____	
Contact Person: _____	Phone: _____	

SENSORS TESTED

	Ambient	Cal. Span Set to zero Y/N	Reading
Oxygen:	_____	_____	_____
Lower Explosive Limit:	_____	_____	_____
Carbon Monoxide:	_____	_____	_____
Hydrogen Sulfide:	_____	_____	_____
Other: _____	_____	_____	_____
Completed by: _____	Signature: _____		

CENTRAL CAROLINA TECHNICAL COLLEGE

THIS CERTIFIES

Attended Permit Entry Confined Space Training

(Training Date)

Presented by Work Force Development
and is hereby recognized as an authorized
Attendant, Entrant and Entry Supervisor.

Subjects Included:

Recognition of Entry Hazards

Recognition of Symptoms of exposure

Use of Safe Entry Equipment and Procedures
Emergency Procedures

Date: _____

President-Central Carolina Technical College

APPENDIX II

Applicable Standards

Permit-Required Confined Space

29 CFR 1910.146

Electrical Power Generation, Transmission and Distribution

29 CFR 1910.269

Telecommunications

29 CFR 1910.268

Permit Required Confine Space

OSHA 29 CFR 1910.146

1910.146(a) Scope and application. This section contains requirements for practices and procedures to protect employees in general industry from the hazards of entry into permit-required confined spaces. This section does not apply to agriculture, to construction, or to shipyard employment (Parts 1928, 1926, and 1915 of this chapter, respectively).

1910.146(b) Definitions. Refer to the definitions section of this program (page3) for the OSHA definitions.

1910.146(c) General Requirements.

1910.146(c)(1) The employer shall evaluate the workplace to determine if any spaces are permit-required confined spaces.

NOTE: Proper application of the decision flow chart in Appendix A to section 1910.146 would facilitate compliance with this requirement.

1910.146(c)(2) If the workplace contains permit spaces, the employer shall inform exposed employees, by posting danger signs or by any other equally effective means, of the existence and location of and the danger posed by the permit spaces.

NOTE: A sign reading “DANGER – PERMIT-REQUIRED CONDINED SPACE, DO NOT ENTER” or using other similar language would satisfy the requirement for a sign.

1910.146(c)(3) If the employer decides that its employees will not enter permit spaces, the employer shall take effective measures to prevent its employees from entering the permit spaces and shall comply with paragraphs (c)(1), (c)(2), (c)(6), and (c)(8) of this section.

1910.146(c)(4) If the employer decides that its employees will enter permit spaces, the employer shall develop and implement a written permit space program that complies with this section. The written program shall be available for inspection by employees and their authorized representatives.

1910.146(c)(5) An employer may use the alternate procedures specified in paragraph (c)(5)(ii) of this section for entering a permit space under the conditions set forth in paragraph (c)(5)(i) of this section.

1910.146(c)(5)(i) An employer whose employees enter a permit space need not comply with paragraphs (d) through (f) and (h) through (k) of this section, provided that:

1910.146(c)(5)(i)(A) The employer can demonstrate that the only hazard posed by the permit space is an actual or potential hazardous atmosphere;

1910.146(c)(5)(i)(B) The employer can demonstrate that continuous forced air ventilation alone is sufficient to maintain that permit space safe for entry;

1910.146(c)(5)(i)(C) The employer develops monitoring and inspection data that supports the demonstrations required by paragraphs (c)(5)(i)(A) and (c)(5)(i)(B) of this section;

1910.146(c)(5)(i)(D) If an initial entry of the permit space is necessary to obtain the data required by paragraph (c)(5)(i)(C) of this section, the entry is performed in compliance with paragraphs (d) through (k) of this section;

1910.146(c)(5)(i)(E) The determinations and supporting data required by paragraphs (c)(5)(i)(A), (c)(5)(i)(B), and (c)(5)(i)(C) of this section are documented by the employer and are made available to each employee who enters the permit space under the terms of paragraph (c)(5) of this section or to that employee's authorized representative; and

1910.146(c)(5)(i)(F) Entry into the permit space under the terms of paragraph (c)(5)(i) of this section is performed in accordance with the requirements of paragraph (c)(5)(ii) of this section.

NOTE: See paragraph (c)(7) of this section for reclassification of a permit space after all hazards within the space have been eliminated.

1910.146(c)(5)(ii) The following requirements apply to entry into permit spaces that met the conditions set forth in paragraph (c)(5)(i) of this section.

1910.146(c)(5)(ii)(A) Any conditions making it unsafe to remove an entrance cover shall be eliminated before the cover is removed.

1910.146(c)(5)(ii)(B) When entrance covers are removed, the opening shall be promptly guarded by a railing, temporary cover, or other temporary barrier that will prevent an accidental fall through the opening and that will protect each employee working in the space from foreign objects entering the space.

1910.146(c)(5)(ii)(C) Before an employee enters the space, the internal atmosphere shall be tested, with a calibrated direct-reading instrument, for oxygen content, for flammable gases and vapors, and for potential toxic air contaminants, in that order. Any employee who enters the space, or that employee's authorized representative, shall be provided an opportunity to observe the pre-entry testing required by this paragraph.

1910.146(c)(5)(ii)(C)(1) Oxygen content,

1910.146(c)(5)(ii)(C)(2) Flammable gases and vapors, and

1910.146(c)(5)(ii)(C)(3) Potential toxic air contaminants.

1910.146(c)(5)(ii)(D) there may be no hazardous atmosphere within the space whenever any employee is inside the space.

1910.146(c)(5)(ii)(E) Continuous forced air ventilation shall be used, as follows:

1910.146(c)(5)(ii)(E)(1) An employee may not enter the space until the forced air ventilation has eliminated any hazardous atmosphere;

1910.146(c)(5)(ii)(E)(2) The forced air ventilation shall 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;

1910.146(c)(5)(ii)(E)(3) The air supply for the forced air ventilation shall be from a clean source and may not increase the hazards in the space.

1910.146(c)(5)(ii)(F) **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.** Any employee who enters the space, or that employee's authorized representative, shall be provided with an opportunity to observe the periodic testing required by this paragraph.

1910.146(c)(5)(ii)(G) If a hazardous atmosphere is detected during entry:

1910.146(c)(5)(ii)(G)(1) Each employee shall leave the space immediately;

1910.146(c)(5)(ii)(G)(2) The space shall be evaluated to determine how the hazardous atmosphere developed; and

1910.146(c)(5)(ii)(G)(3) Measures shall be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place.

1910.146(c)(5)(ii)(H) The employer shall verify that the space is safe for entry and that the pre-entry measures required by paragraph (c)(5)(ii) of this section have been taken, through a written certification that contains the date, the location of the space, and the signature of the person providing the certification. The certification shall be made before entry and shall be made available to each employee entering the space or to that employee's authorized representative.

1910.146(c)(6) When there are changes in the use or configuration of a non-permit confined space that might increase the hazards to entrants, the employer shall reevaluate that space and, if necessary, reclassify it as a permit-required confined space.

1910.146(c)(7) A space classified by the employer as a permit-required confined space may be reclassified as a non-permit confined space under the following procedures:

1910.146(c)(7)(i) If the permit space poses no actual or potential atmospheric hazards and if all hazards within the space are eliminated without entry into the space, the permit space may be reclassified as a non-permit confined space for as long as the non-atmospheric hazards remain eliminated.

1910.146(c)(7)(ii) If it is necessary to enter the permit space to eliminate hazards, such entry shall be performed under paragraphs (d) through (k) of this section. If testing and inspection during that entry demonstrate that the hazards within the permit space have been eliminated, the permit space may be reclassified as a non-permit confined space for as long as the hazards remain eliminated.

NOTE: Control of atmospheric hazards through forced air ventilation does not constitute elimination of the hazards. Paragraph (c)(5) covers permit space entry where the employer can demonstrate that forced air ventilation alone will control all hazards in the space.

1910.146(c)(7)(iii) The employer shall document the basis for determining that all hazards in a permit space have been eliminated, through a certification that contains the date, the location of the space, and the signature of the person making the determination. the certification shall be made available to each employee entering the spacer or to that employee's authorized representative.

1910.146(c)(7)(iv) If hazards arise within a permit space that has been declassified to a non-permit space under paragraph (c)(7) of this section, each employee in the space shall exit the space. The employer shall then reevaluate the space and determine whether it must be reclassified as a permit space, in accordance with other applicable provisions of this section.

1910.146(c)(8) When an employer (host employer) arranges to have employees of another employer (contractor) perform work that involves permit space entry, the host employer shall:

1910.146(c)(8)(i) Inform the contractor that the workplace contains permit spaces and that permit space entry is allowed only through compliance with a permit space program meeting the requirements of this section;

1910.146(c)(8)(ii) Apprise the contractor of the elements, including the hazards identified and the host employer's experience with the space, that makes the space in question a permit space;

1910.146(c)(8)(iii) Apprise the contractor of any precautions or procedures that the host employer has implemented for the protection of employees in or near permit spaces where contractor personnel will be working;

1910.146(c)(8)(iv) Coordinate entry operations with the contractor, when both host employer personnel and contractor personnel will be working in or near permit spaces, as required by paragraph (d)(11) of this section; and

1910.146(c)(8)(v) Debrief the contractor at the conclusion of the entry operations regarding the permit space program followed and regarding any hazards confronted or created in permit spaces during entry operations.

1910.146(c)(9) In addition to complying with the permit space requirements that apply to all employers, each contractor who is retained to perform permit space entry operations shall:

1910.146(c)(9)(i) Obtain any available information regarding permit space hazards and entry operations from the host employer;

1910.146(c)(9)(ii) Coordinate entry operations with the host employer, when both host employer personnel and contractor personnel will be working in or near permit spaces, as required by paragraph (d)(11) of this section; and

1910.146(c)(9)(iii) Inform the host employer of the permit space program that the contractor will follow and of any hazards confronted or created in permit spaces, either through a debriefing or during the entry operation.

1910.146(d) Permit-required confined space program (permit space program). Under the permit space program required by paragraph (c)(4) of this section, the employer shall:

1910.146(d)(1) Implement the measures necessary to prevent unauthorized entry;

1910.146(d)(2) Identify and evaluate the hazards of permit spaces before employees enter them;

1910.146(d)(3) Develop and implement the means, procedures, and practices necessary for safe permit space entry operations, including, but not limited to, the following:

1910.146(d)(3)(i) Specifying acceptable entry conditions;

1910.146(d)(3)(ii) Providing each authorized entrant or that employee's authorized representative with the opportunity to observe any monitoring or testing of permit spaces;

1910.146(d)(3)(iii) Isolating the permit space;

1910.146(d)(3)(iv) Purging, inerting, flushing, or ventilating the permit space as necessary to eliminate or control atmospheric hazards;

1910.146(d)(3)(v) Providing pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards; and

1910.146(d)(3)(vi) Verifying that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry.

1910.146(d)(4) Provide the following equipment (specified in paragraphs (d)(4)(i) through (d)(4)(ix) of this section) at no cost to employees, maintain that equipment properly, and ensure that employees use that equipment properly;

1910.146(d)(4)(i) testing and monitoring equipment needed to comply with paragraph (d)(5) of this section;

1910.146(d)(4)(ii) Ventilating equipment needed to obtain acceptable entry conditions;

1910.146(d)(4)(iii) Communications equipment necessary for compliance with paragraphs (h)(3) and (i)(5) of this section;

1910.146(d)(4)(iv) Personal protective equipment insofar as feasible engineering and work proactive controls do not adequately protect employees;

1910.146(d)(4)(v) Lighting equipment needed to enable employees to see well enough to work safely and to exit the space quickly in an emergency;

1910.146(d)(4)(vi) Barriers and shields as required by paragraph (d)(3)(iv) of this section;

1910.146(d)(4)(vii) Equipment, such as ladders, needed for safe ingress and egress by authorized entrants;

1910.146(d)(4)(viii) Rescue and emergency equipment needed to comply with paragraph (d)(9) of this section, except to the extent that the equipment is provided by rescue services; and

1910.146(d)(4)(ix) Any other equipment necessary for safe entry into and rescue from permit spaces.

1910.146(d)(5) Evaluate permit space conditions as follows when entry operations are conducted:

1910.146(d)(5)(i) Test conditions in the permit space to determine if acceptable entry conditions exist before entry is authorized to begin, except that, if isolation of the space is infeasible because the space is large or is part of a continuous system (such as a sewer), pre-entry testing shall be performed to the extent feasible before entry is authorized and, if entry is authorized, entry conditions shall be continuously monitored in the areas where authorized entrants are working;

1910.146(d)(5)(ii) Test or monitor the permit space as necessary to determine if acceptable entry conditions are being maintained during the course of entry operations; and

1910.146(d)(5)(iii) When testing for atmospheric hazards, test first for oxygen, then for combustible gases and vapors, and then for toxic gases and vapors.

1910.146(d)(5)(iv) Provide each authorized entrant or that employee's authorized representative an opportunity to observe the pre-entry and any subsequent testing or monitoring of permit spaces;

1910.146(d)(5)(v) Reevaluate the permit space in the presence of any authorized entrant or that employee's authorized representative who requests that the employer conduct such reevaluation because the entrant or representative has reason to believe that the evaluation of that space may not have been adequate;

1910.146(d)(5)(vi) Immediately provide each authorized entrant or that employee's authorized representative with the results of any testing conducted in accord with paragraph (d) of this section.

NOTE: Atmospheric testing conducted in accordance with Appendix B to section 1910.146 would be considered as satisfying the requirements of this paragraph. For permit space operations in sewer, atmospheric testing conducted in accordance with Appendix B, as supplemented by Appendix E to section 1910.146, would be considered as satisfying the requirements of this paragraph.

1910.146(d)(6) Provide at least one attendant outside the permit space into which entry is authorized for the duration of entry operations;

NOTE: Attendants may be assigned to monitor more than one permit space provided the duties described in paragraph (i) of this section can be effectively performed for each permit space that is monitored. Likewise, attendants may be stationed at any location outside the permit space to be monitored as long as the duties described in paragraph (i) of this section can be effectively performed for each permit space that is monitored.

1910.146(d)(7) If multiple spaces are to be monitored by a single attendant, include in the permit program the means and procedures to enable the attendant to respond to an emergency affecting

one or more of the permit spaces being monitored without distraction from the attendant's responsibilities under paragraph (i) of this section;

1910.146(d)(8) Designate the persons who are to have active roles (as, for example, authorized entrants, attendants, entry supervisors, or persons who test or monitor the atmosphere in a permit space) in entry operations, identify the duties of each such employee, and provide each such employee with the training required by paragraph (g) of this section;

1910.146(d)(9) Develop and implement procedures for summoning rescue and emergency services, for rescuing entrants from permit spaces, for providing necessary emergency services to rescued employees, and for preventing unauthorized personnel from attempting a rescue;

1910.146(d)(10) Develop and implement a system for the preparation, issuance, use, and cancellation of entry permits as required by this section;

1910.146(d)(11) Develop and implement procedures to coordinate entry operations when employees of more than one employer are working simultaneously as authorized entrants in a permit space, so that employees of one employer do not endanger the employees of any other employer;

1910.146(d)(12) Develop and implement procedure (such as closing off a permit space and canceling the permit) necessary for concluding the entry after entry operation have been completed;

1910.146(d)(13) Review entry operations when the employer has reason to believe that the measures taken under the permit space program may not protect employees and revise the program to correct deficiencies found to exist before subsequent entries are authorized; and

NOTE: Examples of circumstances requiring the review of the permit space program are: any unauthorized entry of a permit space, the detection of a permit space hazard not covered by the permit, the detection of a condition prohibited by the permit, the occurrence of an injury or near-miss during entry, a change in the use or configuration of a permit space, and employee complaints about the effectiveness of the program.

1910.146(d)(14) Review the permit space program, using the canceled permits retained under paragraph (e)(6) of this section within 1 year after each entry and revise the program as necessary, to ensure that employees participating in entry operations are protected from permit space hazards.

NOTE: Employers may perform a single annual review covering all entries performed during a 12-month period. If no entry is performed during a 12-month period, no review is necessary.

Appendix C to section 1910.146 presents examples of permit space programs that are considered to comply with the requirements of paragraph (d) of this section.

1910.146(e) Permit System

1910.146(e)(1) Before entry is authorized, the employer shall document the completion of measures required by paragraph (d)(3) of this section by preparing an entry permit.

NOTE: Appendix D to section 1910.46 presents examples of permits whose elements are considered to comply with the requirements of this section.

1910.146(e)(2) Before entry begins, the entry supervisor identified on the permit shall sign the entry permit to authorize entry.

1910.146(e)(3) The completed permit shall be made available at the time of entry to all authorized entrants or their authorized representative, by posting it at the entry portal or by any other equally effective means, so that the entrants can confirm that pre-entry preparations have been completed.

1910.146(e)(4) The duration of the permit may not exceed the time required to complete the assigned task or job identified on the permit in accordance with paragraph (f)(2) of this section.

1910.146(e)(5) The entry supervisor shall terminate entry and cancel the entry permit when:

1910.146(e)(5)(i) The entry operations covered by the entry permit have been completed; or

1910.146(e)(5)(ii) A condition that is not allowed under the entry permit arises in or near the permit space.

1910.146(e)(6) The employer shall retain each canceled entry permit for at least 1 year to facilitate the review of the permit-required confined space program required by paragraph (d)(14) of this section. Any problems encountered during an entry operation shall be noted on the pertinent permit so that appropriate revisions to the permit space program can be made.

1910.146(f) Entry Permit. The entry permit that documents compliance with this section and authorizes entry to a permit space shall identify:

1910.146(f)(1) The permit space to be entered;

1910.146(f)(2) The purpose of the entry;

1910.146(f)(3) The date and the authorized duration of the entry permit;

1910.146(f)(4) the authorized entrants within the permit space, by name or by such other means (for example, through the use of rosters or tracking systems) as will enable the attendant to determine quickly and accurately, for the duration of the permit, which authorized entrants are inside the permit space;

NOTE: This requirement may be met by inserting a reference on the entry permit as to the means used, such as a roster or tracking system, to keep track of the authorized entrants within the permit space.

1910.146(f)(5) The personnel, by name, currently serving as attendants;

1910.146(f)(6) The individual, by name currently serving as entry supervisor, with a space for the signature or initials of the entry supervisor who originally authorized entry;

1910.146(f)(7) The hazards of the permit space to be entered;

1910.146(f)(8) The measures used to isolate the permit space and to eliminate or control permit space hazards before entry;

NOTE: Those measures can include the lockout or tagging of equipment and procedures for purging, inerting, ventilating, and flushing permit spaces.

1910.146(f)(9) The acceptable entry conditions;

1910.146(f)(10) The results of initial and periodic tests performed under paragraph (d)(5) of this section, accompanied by the names or initials of the testers and by an indication of when the tests were performed;

1910.146(f)(11) The rescue and emergency services that can be summoned and the means (such as the equipment to use and the numbers to call) for summoning those services;

1910.146(f)(12) The communication procedures used by authorized entrants and attendants to maintain contact during the entry;

1910.146(f)(13) Equipment, such as personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment, to be provided for compliance with this section;

1910.146(f)(14) Any other information whose inclusion is necessary, given the circumstances of the particular confined space, in order to ensure employee safety; and (15) Any additional permits, such as for hot work, that have been issued to authorize work in the permit space.

1910.146(g) Training

1910.146(g)(1) The employer shall provide training so that all employees whose work is regulated by this section acquire the understanding, knowledge, and skills necessary for the safe performance of the duties assigned under this section.

1910.146(g)(2) Training shall be provided to each affected employee:

1910.146(g)(2)(i) Before the employee is first assigned duties under this section;

1910.146(g)(2)(ii) Before there is a change in assigned duties;

1910.146(g)(2)(iii) Whenever there is a change in permit space operations that presents a hazard about which an employee has not previously been trained;

1910.146(g)(2)(iv) Whenever the employer has reason to believe either that there are deviations from the permit space entry procedures required by paragraph (d)(3) of this section or that there are inadequacies in the employee's knowledge or use of these procedures.

1910.146(g)(3) The training shall establish employee proficiency in the duties required by this section and shall introduce new or revised procedures, as necessary, for compliance with this section.

1910.146(g)(4) The employer shall certify that the training required by paragraphs (g)(1) through (g)(3) of this section has been accomplished. The certification shall contain each employee's name, the signatures or initials of the trainers, and the dates of training. The certification shall be available for inspection by employees and their authorized representatives.

1910.146(h) Duties of authorized entrants. The employer shall ensure that all authorized entrants:

1910.146(h)(1) Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

1910.146(h)(2) Properly use equipment as required by paragraph (d)(4) of this section;

1910.146(h)(3) Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space as required by paragraph (i)(6) of this section;

1910.146(h)(4) alert the attendant whenever:

1910.146(h)(4)(i) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or

1910.146(h)(4)(ii) The entrant detects a prohibited condition; and

1910.146(h)(5) Exit from the permit space as quickly as possible whenever:

1910.146(h)(5)(i) An order to evacuate is given by the attendant or the entry supervisor,

1910.146(h)(5)(ii) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation,

1910.146(h)(5)(iii) The entrant detects a prohibited condition, or

1910.146(h)(5)(iv) An evacuation alarm is activated.

1910.146(i) Duties of Attendants. The employer shall ensure that each attendant:

1910.146(i)(1) Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

1910.146(i)(2) Is aware of possible behavioral effects of hazard exposure in authorized entrants;

1910.146(i)(3) Continuously maintains an accurate count of authorized entrants in the permit space and ensures that the means used to identify authorized entrants under paragraph (f)(4) of this section accurately identifies who is in the permit space;

1910.146(i)(4) remains outside the permit space during entry operations until relieved by another attendant;

NOTE: When the employer's permit entry program allows attendant entry for rescue, attendants may enter a permit space to attempt a rescue if they have been trained and equipped for rescue operations as required by paragraph (k)(1) of this section and if they have been relieved as required by paragraph (i)(4) of this section.

1910.146(i)(5) Communicates with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space under paragraph (i)(6) of this section;

1910.146(i)(6) Monitors activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions;

1910.146(i)(6)(i) If the attendant detects a prohibited condition;

1910.146(i)(6)(ii) If the attendant detects the behavioral effects of hazard exposure in an authorized entrant;

1910.146(i)(6)(iii) If the attendant detects a situation outside the space that could endanger the authorized entrants; or

1910.146(i)(6)(iv) If the attendant cannot effectively and safely perform all the duties required under paragraph (i) of this section;

1910.146(i)(7) Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from the permit space hazards;

1910.146(i)(8) Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway;

1910.146(i)(8)(i) Warn the unauthorized persons that they must stay away from the permit space;

1910.146(i)(8)(ii) Advise the unauthorized persons that they must exit immediately if they have entered the permit space; and

1910.146(i)(8)(iii) Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space;

1910.146(i)(9) Performs non-entry rescues as specified by the employer's rescue procedure; and

1910.146(i)(10) Performs no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

1910.146(j) Duties of entry supervisors. The employer shall ensure that each entry supervisor:

1910.146(j)(1) Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

1910.146(j)(2) Verifies, by 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;

1910.146(j)(3) Terminates the entry and cancels the permit as required by paragraph (e)(5) of this section;

1910.146(j)(4) Verifies that rescue services are available and that the means for summoning them are operable;

1910.146(j)(5) Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operation; and

1910.146(j)(6) Determines, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

1910.146(k) Rescue and Emergency Services

1910.146(k)(1) An employer who designates rescue and emergency services, pursuant to paragraph (d)(9) of this section, shall:

1910.146(k)(1)(i) Evaluate a prospective rescuer's ability to respond to a rescue summons in a timely manner, considering the hazard(s) identified;

Note to paragraph (k)(1)(i): What will be considered timely will vary according to the specific hazards involved in each entry. For example, §1910.134, Respiratory Protection, requires that employers provide a standby person or persons capable of immediate action to rescue employee(s) wearing respiratory protection while in work areas defined as IDLH atmospheres.

1910.146(k)(1)(ii) Evaluate a prospective rescue service's ability, in terms of proficiency with rescue-related tasks and equipment, to function appropriately while rescuing entrants from the particular permit space or types of permit spaces identified;

1910.146(k)(1)(iii) Select a rescue team or service from those evaluated that:

1910.146(k)(1)(iii)(A) Has the capability to reach the victim(s) within a time frame that is appropriate for the permit space hazard(s) identified;

1910.146(k)(1)(iii)(B) Is equipped for and proficient in performing the needed rescue services;

1910.146(k)(1)(iv) Inform each rescue team or service of the hazards they may confront when called on to perform rescue at the site; and

1910.146(k)(1)(v) Provide the rescue team or service selected with access to all permit spaces from which rescue may be necessary so that the rescue service can develop appropriate rescue plans and practice rescue operations.

Note to paragraph (k)(1): Non-mandatory Appendix F contains examples of criteria which employers can use in evaluating prospective rescuers as required by paragraph (k)(1) of this section.

1910.146(k)(2) An employer whose employees have been designated to provide permit space rescue and emergency services shall take the following measures:

1910.146(k)(2)(i) Provide affected employees with the personal protective equipment (PPE) needed to conduct permit space rescues safely and train affected employees so they are proficient in the use of that PPE, at no cost to those employees;

1910.146(k)(2)(ii) Train affected employees to perform assigned rescue duties. The employer must ensure that such employees successfully complete the training required to establish proficiency as an authorized entrant, as provided by paragraphs (g) and (h) of this section;

1910.146(k)(2)(iii) Train affected employees in basic first-aid and cardiopulmonary resuscitation (CPR). The employer shall ensure that at least one member of the rescue team or service holding a current certification in first aid and CPR is available; and

1910.146(k)(2)(iv) Ensure that affected employees practice making permit space rescues at least once every 12 months, by means of simulated rescue operations in which they remove dummies, manikins, or actual persons from the actual permit spaces or from representative permit spaces. Representative permit spaces shall, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which rescue is to be performed.

1910.146(k)(3) To facilitate non-entry rescue, retrieval systems or methods shall be used whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. Retrieval systems shall meet the following requirements.

1910.146(k)(3)(i) Each authorized entrant shall use a chest or full body harness, with a retrieval line attached at the center of the entrant's back near shoulder level, above the entrant's head, or at another point which the employer can establish presents a profile small enough for the successful removal of the entrant. Wristlets may be used in lieu of the chest or full body harness if the employer can demonstrate that the use of a chest or full body harness is infeasible or creates a greater hazard and that the use of wristlets is the safest and most effective alternative.

1910.146(k)(3)(ii) The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device shall be available to retrieve personnel from vertical type permit spaces more than 5 feet (1.52 m) deep.

1910.146(k)(4) If an injured entrant is exposed to a substance for which a Material Safety Data Sheet (MSDS) or other similar written information is required to be kept at the worksite, that MSDS or written information shall be made available to the medical facility treating the exposed entrant.

1910.146 – Employee Participation.

1910.146(I)(1) Employers shall consult with affected employees and their authorized representatives on the development and implementation of all aspects of the permit space program required by paragraph (c) of this section.

1910.146(I)(2) Employers shall make available to affected employees and their authorized representatives all information required to be developed by this section.

Electrical Power Generation, Transmission and Distribution

CONFINED SPACE ENTRY REQUIREMENTS

29CFR 1910.269 E(1) – E(14) AND T(1) – T(8)

(e) “Enclosed Spaces.” This paragraph covers enclosed spaces that may be entered by employees. It does not apply to vented vaults if a determination is made that the ventilation system is operating to protect employees before they enter the space. This paragraph applies to routine entry into enclosed spaces in lieu of the permit-space entry requirements contained in paragraphs (d) through (k) of 1910.146 of this Part. If, after the precautions given in paragraphs (e) and (t) of this section are taken, the hazards remaining in the enclosed space endanger the life of an entrant or could interfere with escape from the space, then entry into the enclosed space shall meet the permit-space entry requirements of paragraphs (d) through (k) of 1910.146 of this Part.

(t)(1) “Access.” A ladder or other climbing device shall be used to enter and exit a manhole or subsurface vault exceeding 4 feet (122 cm) in depth. No employee may climb into or out of a manhole or vault by stepping on cables or hangers.

(t)(2) “Lowering equipment into manholes.” Equipment used to lower materials and tools into manholes or vaults shall be capable of supporting the weight to be lowered and shall be checked for defects before use. Before tools or material are lowered into the opening for a manhole or vault, each employee working in the manhole or vault shall be clear of the area directly under the opening.

(t)(3) “Attendants for manholes.”

(t)(3)(i) While work is being performed in a manhole containing energized electric equipment, an employee with first aid and CPR training meeting paragraph (b)(1) of this section shall be available on the surface in the immediate vicinity to render emergency assistance.

(t)(3)(ii) Occasionally, the employee on the surface may briefly enter a manhole to provide assistance, other than emergency.

Note 1: An attendant may also be required under paragraph (e)(7) of this section. One person may serve to fulfill both requirements. However, attendants required under paragraph (e)(7) of this section are not permitted to enter the manhole.

Note 2: Employees entering manholes containing unguarded, un-insulated energized lines or parts of electric equipment operating at 50 volts or more are required to be qualified under paragraph (l)(1) of this section.

(t)(3)(iii) For the purpose of inspection, housekeeping, taking readings, or similar work, and employee working alone may enter, for brief periods of time, a manhole where energized cables or equipment are in service, if the employer can demonstrate that the employee will be protected from all electrical hazards.

(t)(3)(iv) Reliable communications, through two-way radios or other equivalent means, shall be maintained among all employees involved in the job.

(t)(4) “Duct Rods.” If duct rods are used, they shall be installed in the direction presenting the least hazard to employees. An employee shall be stationed at the far end of the duct line being rodded to ensure that the required minimum approach distances are maintained.

(t)(5) “Multiple Cables.” When multiple cables are present in a work area, the cable to be worked shall be identified by electrical means, unless its identity is obvious by reason of distinctive appearance or location or by other readily apparent means of identification. Cables other than the one being worked shall be protected from damage.

(t)(6) “Moving Cables.” Energized cables that are to be moved shall be inspected for defects.

(t)(7) “Defective Cables.” Where a cable in a manhole has one or more abnormalities that could lead to or be an indication of an impending fault, the defective cable shall be de-energized before any employee may work in the manhole, except when service load conditions and a lack of feasible alternatives require that the cable remain energized. In that case, employees may enter the manhole provided they are protected from the possible effects of a failure by shields or other devices that are capable of containing the adverse effects of a fault in the joint.

Note: Entries into enclosed spaces conducted in accordance with the permit-space entry requirements of paragraphs (d) through (k) of 1910.146 of this Part are considered as complying with paragraph (e) of this section.

(t)(8) “Sheath Continuity.” When work is performed on buried cable or on cable in manholes, metallic sheath continuity shall be maintained or the cable sheath shall be treated as energized.

Note: Entries into enclosed spaces conducted in accordance with the permit-space entry requirements of paragraphs (d) through (k) of 1910.146 of this Part are considered as complying with paragraph (e) of this section.

(e)(1) “Safe Work Practices.” The employer shall ensure the use of safe work practices for entry into and work in enclosed spaces and for rescue of employees from such spaces.

(e)(2) “Training.” Employees who enter enclosed spaces or who serve as attendants shall be trained in the hazards of enclosed space entry, in enclosed space entry procedures, and in enclosed space rescue procedures.

(e)(3) “Rescue Equipment.” Employers shall provide equipment to ensure the prompt and safe rescue of employees from the enclosed space.

(e)(4) “Evaluation of Potential Hazards.” Before any entrance cover to an enclosed space is removed, the employer shall determine whether it is safe to do so by checking for the presence of any atmospheric pressure or temperature differences and by evaluating whether there might be a hazardous atmosphere in the space. Any conditions making it unsafe to remove the cover shall be eliminated before the cover is removed.

Note: The evaluation called for in this paragraph may take the form of a check of the conditions expected to be in the enclosed space. For example, the cover could be checked to see if it is hot

and, if it is fastened in place, could be loosened gradually to release any residual pressure. a determination must also be made of whether conditions at the site could cause a hazardous atmosphere, such as an oxygen deficient or flammable atmosphere, to develop within the space.

(e)(5) “Removal of Covers.” When covers are removed from enclosed spaces, the opening shall be promptly guarded by a railing, temporary cover, or other barrier intended to prevent an accidental fall through the opening and to protect employees working in the space from objects entering the space.

(e)(6) “Hazardous Atmosphere.” Employees may not enter any enclosed space while it contains a hazardous atmosphere, unless the entry conforms to the generic permit-required confined spaces standard in 1910.146 of this Part.

Note: The term “entry” is defined in 1910.146(b) of this Part.

(e)(7) “Attendants.” While work is being performed in the enclosed space, a person with first aid training meeting paragraph (b) of this section shall be immediately available outside the enclosed space to render emergency assistance if there is reason to believe that a hazard may exist in the space or if a hazard exists because of traffic patterns in the area of the opening used for entry. That person is not precluded from performing other duties outside the enclosed space if these duties do not distract the attendant from monitoring employees within the space.

Note: See paragraph (t)(3) of this section for additional requirements on attendants for work in manholes.

(e)(8) “Calibration of Test Instruments.” Test instruments used to monitor atmospheres in enclosed spaces shall be kept in calibration, with a minimum accuracy of ± 10 percent.

(e)(9) “Testing for Oxygen Deficiency.” Before an employee enters an enclosed space, the internal atmosphere shall be tested for oxygen deficiency with a direct-reading meter or similar instrument, capable of collection and immediate analysis of data samples without the need for off-site evaluation. If continuous forced air ventilation is provided, testing is not required provided that the procedures used ensure that employees are not exposed to the hazards posed by oxygen deficiency.

(e)(10) “Testing for Flammable Gases and Vapors.” Before an employee enters an enclosed space, the internal atmosphere shall be tested for flammable gases and vapors with a direct-reading meter or similar instrument capable of collection and immediate analysis of data samples without the need for off-site evaluation. This test shall be performed after the oxygen testing and ventilation required by paragraph (e)(9) of this section demonstrate that there is sufficient oxygen to ensure the accuracy of the test for flammability.

(e)(11) “Ventilation and Monitoring.” If flammable gases or vapors are detected or if an oxygen deficiency is found, forced air ventilation shall be used to maintain oxygen at a safe level and to prevent a hazardous concentration of flammable gases and vapors from accumulating. a continuous monitoring program to ensure that no increase in flammable gas or vapor concentration occurs may be followed in lieu of ventilation, if flammable gases or vapors are detected at safe levels.

Note: See the definition of hazardous atmosphere for guidance in determining whether or not a given concentration of a substance is considered to be hazardous.

(e)(12) “Specific Ventilation Requirements.” If continuous forced air ventilation is used, it shall begin before entry is made and shall be maintained long enough to ensure that a safe atmosphere exists before employees are allowed to enter the work area. The forced air ventilation shall be so directed as to ventilate the immediate area where employees are present within the enclosed space and shall continue until all employees leave the enclosed space.

(e)(13) “Air Supply.” The air supply for the continuous forced air ventilation shall be from a clean source and may not increase the hazards in the enclosed space.

(e)(14) “Open Flames.” If open flames are used in enclosed spaces, a test for flammable gases and vapors shall be made immediately before the open flame device is used and at least once per hour while the device is used in the space. Testing shall be conducted more frequently if conditions present in the enclosed space indicate that once per hour is insufficient to detect hazardous accumulations of flammable gases or vapors.

Note: See the definition of hazardous atmosphere for guidance in determining whether or not a given concentration of a substance is considered to be hazardous.

Telecommunications Standard

29CFR 1910.268 O(1) – O(5)

o) Underground Lines. The provisions of this paragraph apply to the guarding of manholes and street openings, and to the ventilation and testing for gas in manholes and un-vented vaults, where telecommunications field work is performed on or with underground lines.

(o)(1) Guarding Manholes and Street Openings.

(o)(1)(i) When covers of manholes or vaults are removed, the opening shall be promptly guarded by a railing, temporary cover, or other suitable temporary barrier, which is appropriate to prevent an accidental fall through the opening and to protect employees working in the manhole from foreign objects entering the manhole.

(o)(1)(ii) While work is being performed in the manhole, a person with basic first aid training shall be immediately available to render assistance if there is cause for believing that a safety hazard exists, and if the requirements contained in paragraphs (d)(1) and (o)(1)(i) of this section do not adequately protect the employee(s). Examples of manhole worksite hazards, which shall be considered to constitute a safety hazard, include, but are not limited to:

(o)(1)(ii)(A) Manhole worksites where safety hazards are created by traffic patterns that cannot be corrected by provisions of paragraph (d)(1) of this section.

(d)(1) Before work is begun in the vicinity of vehicular or pedestrian traffic, which may endanger employees, warning signs, and/or flags or other traffic control devices shall be placed conspicuously to alert and channel approaching traffic. Where further protection is needed, barriers shall be utilized. At night, warning lights shall be prominently displayed, and excavated areas shall be enclosed with protective barricades.

(o)(1)(ii)(B) Manhole worksites that are subject to unusual water hazards that cannot be abated by conventional means.

(o)(1)(ii)(C) Manhole worksites that are occupied jointly with power utilities as described in paragraph (o)(3) of this section.

(o)(2) Requirements Prior to Entering Manholes and Un-vented Vaults.

(o)(2)(i) Before an employee enters a manhole, the following steps shall be taken:

(o)(2)(i)(A) The internal atmosphere shall be tested for combustible gas and, except when continuous forced ventilation is provided, the atmosphere shall also be tested for oxygen deficiency.

(o)(2)(i)(B) When unsafe conditions are detected by testing or other means, the work area shall be ventilated and otherwise made safe before entry.

(o)(2)(ii) An adequate continuous supply of air shall be provided while work is performed in manholes under any of the following conditions:

(o)(2)(ii)(A) Where combustible or explosive gas vapors have been initially detected and subsequently reduced to a safe level by ventilation,

(o)(2)(ii)(B) Where organic solvents are used in the work procedure,

(o)(2)(ii)(C) Where open flame torches are used in the work procedure,

(o)(2)(ii)(D) Where the manhole is located in that portion of a public right of way open to vehicular traffic and/or exposed to a seepage of gas or gases, or

(o)(2)(ii)(E) Where a toxic gas or oxygen deficiency is found.

(o)(2)(iii)(A) The requirements of paragraphs (o)(2)(i) and (ii) of this section do not apply to work in central office cable vaults that are adequately ventilated.

(o)(2)(iii)(B) The requirements of paragraphs (o)(2)(i) and (ii) of this section apply to work in un-vented vaults.

(o)(3) Joint Power and Telecommunication Manholes. While work is being performed in a manhole occupied jointly by an electric utility and a telecommunication utility, an employee with basic first aid training shall be available in the immediate vicinity to render emergency assistance as may be required. the employee whose presence is required in the immediate vicinity for the purposes of rendering emergency assistance is not to be precluded from occasionally entering a manhole to provide assistance other than in an emergency. The requirement of this paragraph (o)(3) does not preclude a qualified employee, working alone, from entering for brief periods of time, a manhole where energized cables or equipment are in service, for the purpose of inspection, housekeeping, taking readings, or similar work if such work can be performed safely.

(o)(4) Ladders. Ladders shall be used to enter and exit manholes exceeding 4 feet in depth.

(o)(5) Flames. When open flames are used in manholes, the following precautions shall be taken to protect against the accumulation of combustible gas:

(o)(5)(i) A test for combustible gas shall be made immediately before using the open flame device, and at least once per hour while using the device; and

(o)(5)(ii) A fuel tank (e.g., acetylene) may not be in the manhole unless in actual use. Employees will not operate or attempt to repair, clean or adjust equipment unless it is part of the employees' assigned duties and the employee has been properly trained.