

# COMPREHENSIVE SAFETY MANAGEMENT PLAN

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## Safety Quiz

- 1) Do you work with hazardous chemicals in your lab?
- 2) Does your lab have a written Chemical Hygiene Plan?
- 3) Does your lab have a Hazard Communication Plan (HAZCOM) plan?
- 4) Does your lab have a Control of Hazardous Energy plan?
- 5) Do you have a formal (documented) safety training program?
- 6) If you have 10 employees or more do you have a written evacuation plan? If less than 10, do you communicate the plan verbally to all new employees?
- 7) Are your SDS's in a central location and easily assessable?
- 8) Do you perform eye wash training every year?
- 9) Do you have a spill kit?
- 10) Do you have a SDS for Hg if you use Hg thermometers?

Bonus – What's another name for the control of hazardous energy plan?



# KEY ELEMENTS OF A COMPREHENSIVE SAFETY MANAGEMENT PLAN

*For the Environmental Laboratory*

*Laura Shealy Davis and Elizabeth Thompson*

*Shealy Consulting LLC*



# OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

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Under the General Duty Clause Requires:

**“Each employer** shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees.”

**“Each employer** shall comply with occupational safety and health standards promulgated under this act.”

**“Each employee** shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.”

# WHAT ABOUT PUBLIC EMPLOYEES IN SC?

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- The South Carolina OSH Program exercises jurisdiction over all private and public sector employers and employees within the State except private sector maritime activities; employment on military bases; and private sector employment at Area D of the Savannah River Site (power generation and transmission facilities operated by South Carolina Electric and Gas) and at the Three Rivers Solid Waste Authority; Federal government employers and employees; and the U.S. Postal Service (USPS), including USPS employees, and contract employees and contractor-operated facilities engaged in USPS mail operations. See 29 CFR 1952.95.

# OSHA STANDARDS

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- 29 CFR 1910.1450 The Occupational Exposure to Hazardous Chemicals in Laboratories (The OSHA Laboratory Standard)
- 29 CFR 1910.1200: The Hazard Communication Standard
- 29 CFR 1910.1030: The Bloodborne Pathogen Standard
- 29 CFR 1910.132: The Personal Protective Equipment Standard
- 29 CFR 1910.133 The Eye and Face Protection Standard
- 29 CFR 1910.134 The Respiratory Protection Standard
- 29 CFR 1910.134 The Hand Protection Standard
- 29 CFR 1910.147 The Control of Hazardous Energy Standard (aka The Lockout/Tagout Standard)

# THE OSHA LABORATORY STANDARD

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## ■ Definitions

“Hazardous Chemical” means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees.

*“All substances are poisons; there is none which is not a poison.  
The right dose differentiates a poison from a remedy.”*

-Paracelsus (1493-1541)

# THE OSHA LABORATORY STANDARD

- A *chemical hazard* is a chemical for which there is evidence that health effects may occur if employees are overexposed. A *health hazard* may be a
  - Carcinogen
  - Toxic or highly toxic agent
  - Reproductive toxin
  - Irritant
  - Corrosive
  - Sensitizer
  - Hepatotoxin
  - Neurotoxin
  - Hemototoxin
  - Agent which damages the
    - lungs
    - skin
    - Eyes
    - mucous membranes



# THE OSHA LABORATORY STANDARD

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## ■ Definitions

“Physical Hazard” means a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive), or water-reactive.



# THE OSHA LABORATORY STANDARD

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**Examples of “hazardous chemicals ” in the Water/Wastewater Lab:**

**Acid**

**Acetone**

**Ammonium hydroxide (cleaning DO probes)**

**Caustic (NaOH)**

**pH standards**

**Low DO Standard (Cobalt Chloride)**

**Potassium Permanganate**

# LABORATORY HAZARDS

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# LABORATORY HAZARDS



Pinholes compromise the permeability of the glove



Fumes from volatile solvents can be breathed in



Working with potentially contaminated gloves



A cut from contaminated glass provides direct chemical contact

# THE TOP 10 MOST FREQUENTLY CITED VIOLATIONS IN 2013

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- Fall protection, construction ([29 CFR 1926.501](#)) [[related OSHA Safety and Health Topics page](#)]
- Hazard communication standard, general industry ([29 CFR 1910.1200](#)) [[related OSHA Safety and Health Topics page](#)]
- Scaffolding, general requirements, construction ([29 CFR 1926.451](#)) [[related OSHA Safety and Health Topics page](#)]
- Respiratory protection, general industry ([29 CFR 1910.134](#)) [[related OSHA Safety and Health Topics page](#)]
- Electrical, wiring methods, components and equipment, general industry ([29 CFR 1910.305](#)) [[related OSHA Safety and Health Topics page](#)]
- Powered industrial trucks, general industry ([29 CFR 1910.178](#)) [[related OSHA Safety and Health Topics page](#)]
- Ladders, construction ([29 CFR 1926.1053](#)) [[related OSHA Safety and Health Topics page](#)]
- Control of hazardous energy (lockout/tagout), general industry ([29 CFR 1910.147](#)) [[related OSHA Safety and Health Topics page](#)]
- Electrical systems design, general requirements, general industry ([29 CFR 1910.303](#)) [[related OSHA Safety and Health Topics page](#)]
- Machinery and Machine Guarding, general requirements ([29 CFR 1910.212](#)) [[related OSHA Safety and Health Topics page](#)]

# THE OSHA LABORATORY STANDARD

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## MAJOR ELEMENTS:

Chemical Hygiene Plan (CHP)

Employee Safety Training

Hazard Identification/Communication

Exposure monitoring

Medical Consultations/Examinations

# THE OSHA LABORATORY STANDARD

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## **Purpose of OSHA's Chemical Hygiene Plan Requirements**

A chemical hygiene safety plan is a written manual that lists the rules that laboratory staff must follow to ensure workplace safety.

OSHA regulates chemicals known to be a health hazard when humans are exposed to them. The safety requirements that must be included in a chemical hygiene safety plan are contained in OSHA regulations.

Your CHP manual should be clearly written and easy to follow

# THE OSHA LABORATORY STANDARD

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## **Purpose of OSHA's Safety Training Requirements**

Safety training and enforcement of safety procedures in the laboratory must be documented by the supervisor. OSHA expects that employees receive all the necessary training to be able to handle their jobs correctly, efficiently, and safely.

There must be a written process (a manual like a CSMP or SOP) for this.

# THE OSHA LABORATORY STANDARD

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## **Purpose of OSHA's Hazard Communication Standard**

“The HCS provides people the right-to-know the hazards and identities of the chemicals they are exposed to in the workplace. When employees have this information, they may effectively participate in their employers' protective programs and take steps to protect themselves. In addition, the standard gives employers the information they need to design and implement an effective protective program for employees potentially exposed to hazardous chemicals. Together these actions will result in a reduction of chemical source illnesses and injuries in American workplaces.”

From US Department of Labor website



# COMPREHENSIVE SAFETY MANAGEMENT PLAN

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An effective CSMP includes many elements:

- Management commitment and employee involvement
- Worksite analysis
- Hazard prevention and control
- Safety and health training
- Should Include a chemical hygiene plan
- Hazard Communication Plan

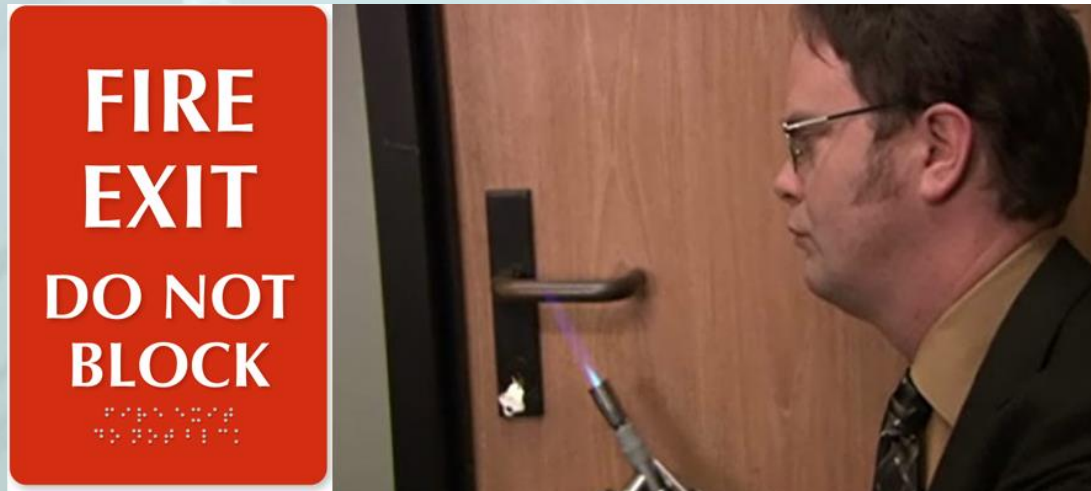
# COMPREHENSIVE SAFETY MANAGEMENT PLAN

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## Management Commitment and Employee Involvement

Management commitment provides motivation and resources

Employee involvement allows workers to develop commitment to safety and health



# COMPREHENSIVE SAFETY MANAGEMENT PLAN

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## Employee Involvement

Encourage employees to get involved in the program and in decisions that affect their safety and health



Communicate responsibility for all program aspects

# COMPREHENSIVE SAFETY MANAGEMENT PLAN

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## RESPONSIBILITY

- Parties responsible for the safety and health program must have authority and resources
- Managers, supervisors, and employees must be held accountable for meeting their responsibilities
- Program operations must be reviewed at least annually, to evaluate, identify deficiencies, and revise, as needed

# COMPREHENSIVE SAFETY MANAGEMENT PLAN

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## WORKSITE ANALYSIS

- Examine the worksite and identify:
  - existing hazards
  - conditions and operations that might create hazards
- Management must actively analyze the work and the worksite to *anticipate* and prevent harmful occurrences

# COMPREHENSIVE SAFETY MANAGEMENT PLAN

## OBVIOUS UNSAFE PRACTICES



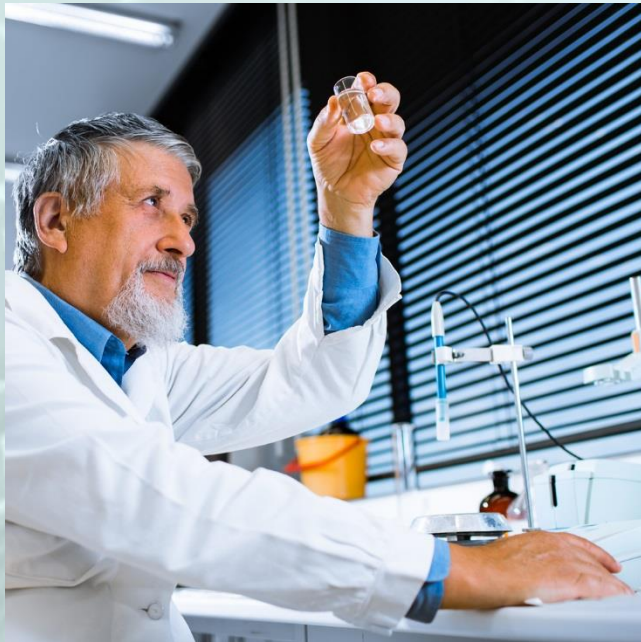
# COMPREHENSIVE SAFETY MANAGEMENT PLAN

## OBVIOUS UNSAFE PRACTICES



# COMPREHENSIVE SAFETY MANAGEMENT PLAN

## UNSAFE PRACTICES





# COMPREHENSIVE SAFETY MANAGEMENT PLAN

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## OTHER UNSAFE PRACTICES

- **Throwing glass in garbage bin**
- **Adding water to acid**

# COMPREHENSIVE SAFETY MANAGEMENT PLAN

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## WORKSITE ANALYSIS

- Conduct regular (usually weekly) site inspections
- Establish daily work area inspection procedures
- Develop and use a checklist
- Provide a reliable system for employees, without fear of reprisal, to notify management about apparent hazardous conditions and to receive timely and appropriate responses

# COMPREHENSIVE SAFETY MANAGEMENT PLAN

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## HAZARD PREVENTION AND CONTROL

- Start by determining that a hazard or potential hazard exists
- Where feasible, prevent hazards
- If the hazard cannot be eliminated, use hazard controls
- Eliminate or control hazards in a timely manner
- If a new hazard is introduced (autoclave purchased or new chemical added) conduct safety training

# COMPREHENSIVE SAFETY MANAGEMENT PLAN

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## HAZARD PREVENTION AND CONTROL

### Personal Protective Equipment (PPE)

- Laboratory Dress Code
- Face and Eye Protection
  - Safety Glasses
  - Prescription Glasses
  - Goggles
  - Faceshield



# COMPREHENSIVE SAFETY MANAGEMENT PLAN

## HAZARD PREVENTION AND CONTROL

### Glove Selection:

- Use proper gloves for physical hazards:
  - Friction (work/sharps/broken glass)
  - Thermal (cryogenics/heat)
- Handling chemicals
  - Latex
  - Nitrile
  - Vinyl
  - Butyl
- Based on chemical:
  - Use compatibility chart



# COMPREHENSIVE SAFETY MANAGEMENT PLAN

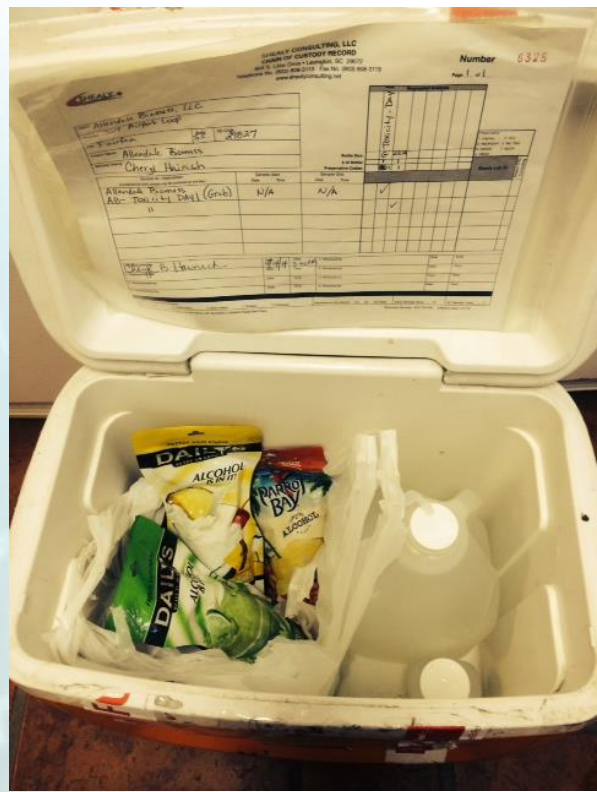
## CONTROLLING THE HAZARDS

Personal protective equipment

Safe work practices communicated  
(HAZCOM)

Training and positive reinforcement

Correction of unsafe practices



# COMPREHENSIVE SAFETY MANAGEMENT PLAN

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## HAZARD PREVENTION PLANNING

- Maintain the facility and equipment
- Emergency planning
  - Training and drills, as needed
- Medical program
  - First aid on site
  - Physician and emergency care nearby

# COMPREHENSIVE SAFETY MANAGEMENT PLAN

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## SAFETY AND HEALTH TRAINING

Address the safety and health responsibilities of all personnel

Incorporate it into other training and job performance/practice

Employees must understand the hazards they may be exposed to and how to prevent harm to themselves and others from hazard exposure

Orientation training must be given to site and contract workers





# COMPREHENSIVE SAFETY MANAGEMENT PLAN

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## SUPERVISOR RESPONSIBILITIES

- Analyze work to identify potential hazards in area of responsibility
- Maintain physical protections in work areas
- Reinforce employee training through performance feedback and, if needed, enforcement of safe work practices



# SHEALY CONSULTING'S COMPREHENSIVE SAFETY MANAGEMENT PLAN

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# SHEALY CONSULTING'S COMPREHENSIVE SAFETY MANAGEMENT PLAN

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2. RESPONSIBILITIES

3. LABORATORY FACILITY

9. SAFETY INSPECTIONS

# COMPREHENSIVE SAFETY MANAGEMENT PLAN

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## 1. RESPONSIBILITIES

### 1.1 The Technical Director's responsibilities include:

- 1.1.1 Approving this plan,
- 1.1.2 Providing continuing support for the ongoing implementation of this plan,
- 1.1.3 Knowing the legal requirements concerning regulated substances,
- 1.1.4 Providing all equipment required for the implementation of this plan.

### 1.2 The Safety Officer's responsibilities include:

- 1.2.1 Ensuring that the employees receive hands-on training for the following topics,
  - 1.2.1.1 Use of the eyewash station,
  - 1.2.1.2 Use of the fire extinguishers,
  - 1.2.1.3 Use of spill kits,
  - 1.2.1.4 Use of the First Aid kit,
  - 1.2.1.5 Use of the blood borne pathogen kit,
  - 1.2.1.6 Disposal of broken glassware,
  - 1.2.1.7 Safety procedures,
  - 1.2.1.8 Emergency procedures.
- 1.2.2 Communicating safety concerns with the Technical Director,
- 1.2.3 Conducting inspections to document and fix hazardous conditions,
- 1.2.4 Ensuring that all PPE is accessible and in working order,
- 1.2.5 Reviewing the CSMP annually and suggesting improvements.
- 1.2.6 Documenting accidents and incidents.

### 1.3 All Employees:

- 1.3.1 Reading and understanding this plan,
- 1.3.2 Using required PPE,
- 1.3.3 Planning and conducting work in accordance with the information and procedures outlined in this plan and in procedural SOPs,
- 1.3.4 Cleaning all spills in accordance with this CSMP,
- 1.3.5 Storing and disposing of waste materials in accordance with this CSMP,
- 1.3.6 Maintaining a clean and sanitary work area,
- 1.3.7 Communicating safety concerns and issues with the Safety Officer and/or Technical Director.

# COMPREHENSIVE SAFETY MANAGEMENT PLAN

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## 3. LABORATORY FACILITY

- 3.1. The offices and laboratory of Shealy Consulting, LLC, are located at 603 South Lake Drive, Lexington, SC, 29072. A diagram of the facility is provided in Appendix A.
- 3.2. The facility includes at a minimum the following health and safety equipment:
  - 3.2.1. Mobile laboratory for the isolation of projects conducted using untreated wastewater and sludge,
  - 3.2.2. Large fume hood for safe chemical handling and the receipt of samples from radiological sites,
  - 3.2.3. Sink ventilation hood for the safe use of acid and acetone to rinse glassware,
  - 3.2.4. Chemical storage cabinets under the fume hood for the separation of non-compatible acids and solvents,
  - 3.2.5. Filtered air system,
  - 3.2.6. Built-in emergency eyewash station,
  - 3.2.7. Five mounted fire extinguishers in the main building and one in the mobile laboratory,
  - 3.2.8. Antibacterial hand sanitizer dispensers throughout the laboratory,
  - 3.2.9. Ultraviolet filtration unit for disinfecting wastewater prior to testing, if needed,
  - 3.2.10. Two mounted First Aid kits in the main building, and one in the mobile laboratory,
  - 3.2.11. Two blood borne pathogen kits in the main building,
  - 3.2.12. One CPR rescue kit,
  - 3.2.13. Posted emergency phone numbers in each laboratory.

# COMPREHENSIVE SAFETY MANAGEMENT PLAN

Shealy Consulting, LLC  
 Document number: SCF-LS-032  
 Revision Number: 0

Page 1 of 1  
 Replaces Date: N/A  
 Effective Date: 04/01/10

### Laboratory Emergency Plan

In the event of an emergency, contact Shealy LLC personnel listed below:

1. Laura Shealy (803)609-7590
2. Angie Norman (803)360-8616
3. Beth Thompson (803)447-8471

**Emergency Phone Numbers:**

- Police: 9-1-1 or 794-0456
- Fire: 9-1-1
- Hospital (Lexington Medical Center): 791-2350

When contacting emergency personnel, give the following information:

- Your name
- Your location (603 South Lake Drive, Lexington, SC 29072)
- Brief description of situation

**Nearby Medical Facilities:**

**1. Lexington Doctors Care**

Phone: (803) 359-5533  
 Address: 247 Columbia Avenue  
 Lexington, SC 29072

Hours: Monday-Friday 8am-10pm  
 Saturday - Sunday 9am - 7pm

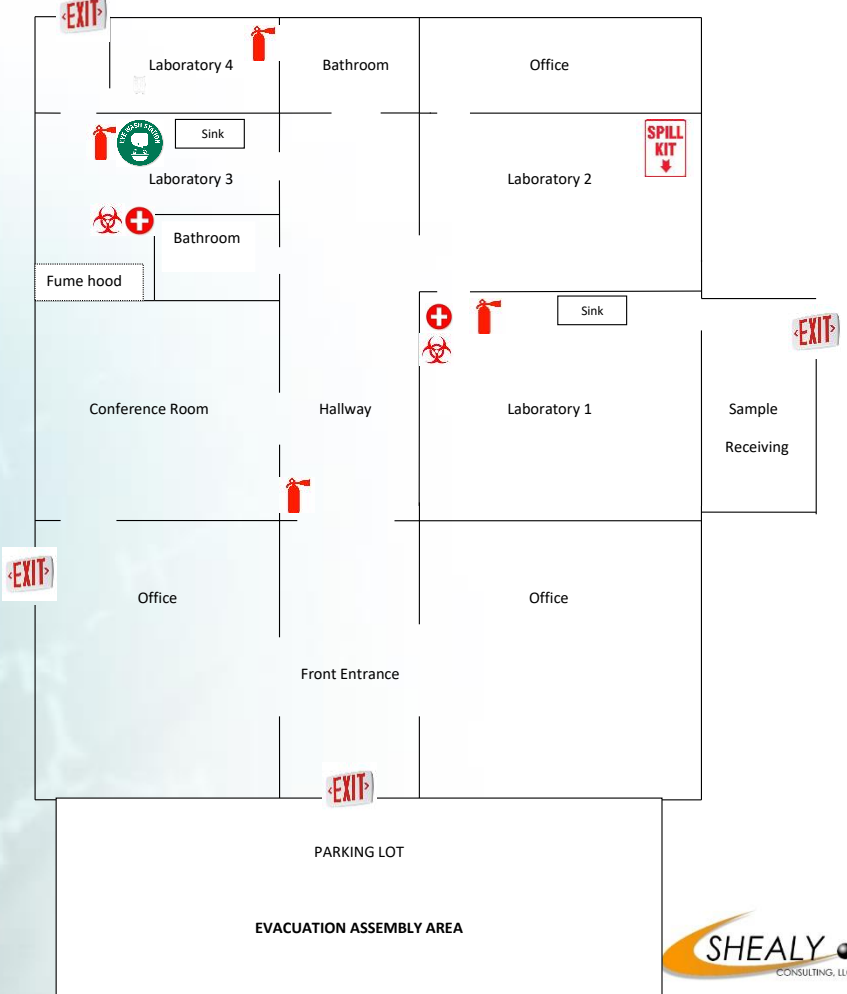
Directions: Turn right onto South Lake Drive (Hwy 6)  
 Turn left onto Main Street (Hwy 1)  
 Go across intersection of Hwy 1 and Hwy 378 (you will be on Old Chapin Rd)  
 Turn right immediately behind Rush's, into the shopping center. Doctors Care is on the end of the shopping center.

**2. Lexington Medical Center**

Phone: (803)791-2350

Directions: Turn left onto South Lake Drive  
 Merge onto I-20 EAST  
 Take US-378 EAST via EXIT 61.  
 Hospital will be on left before you reach I-26.

SHEALY CONSULTING LLC FACILITY LAYOUT WITH EMERGENCY EQUIPMENT LOCATIONS



# COMPREHENSIVE SAFETY MANAGEMENT PLAN

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## 9. SAFETY INSPECTIONS

- 9.1 Each month, the Quality Manager or appointed trained personnel perform safety evaluations of all laboratory and office areas. The Monthly Safety Inspection logbook includes the following forms:
- 9.1.1 Monthly Inspection Form (SCF -HS-401)
  - 9.1.2 Eyewash Inspection Form (SCF -HS-402)
  - 9.1.3 Fire Extinguisher Inspection Form (SCF -HS-403)
  - 9.1.4 Chemical Spill Kit Inspection Form (SCF -HS-404)
  - 9.1.5 First Aid Kit Inspection Form (SCF -HS-405)
- 9.2 By using the Monthly Safety Inspection logbook, the following areas are covered:
- 9.2.1 Eyewash: The eyewash station is checked for accessibility, and the eyewash is allowed to flush for 5 minutes.
  - 9.2.2 Fire Extinguishers: All fire extinguishers are checked for accessibility and to ensure that the charge is full.
  - 9.2.3 Chemical Spill Kits: The spill kits are checked for all required contents. Expired contents are replaced.
  - 9.2.4 First Aid Kits: The first aid kits are checked for all required contents. Expired contents are replaced.
  - 9.2.5 Safety Glasses: The supply of safety glasses is checked. Personnel are observed throughout the month to ensure safety glasses are being worn in the laboratory areas.
  - 9.2.6 Face Shield: The face shield is checked for damage and to ensure availability.
  - 9.2.7 Material Safety Data Sheets: The MSDS are checked for availability and to ensure that they are being maintained.
  - 9.2.8 Electrical: Electrical cords, plugs, and outlets are checked to ensure that they are not damaged and pose no threat to health and safety.
  - 9.2.9 Housekeeping: All laboratory areas are reviewed for any safety equipment obstructions, unsafe or unsanitary work areas, labeled chemical/waste containers, etc.

# COMPREHENSIVE SAFETY MANAGEMENT PLAN

## Safety Checklist

Monthly Safety Inspection Form  
 Month: \_\_\_\_\_ Year: \_\_\_\_\_

Area Evaluated	Date / Initials	Comments
Fire Extinguisher Form Completed		
Chemical Spill Kit Form Completed		
First Aid Kit Form Completed		
Eyewash Inspection Form Completed		
Personal Protection Equipment <ul style="list-style-type: none"> <li>• Safety Glasses, Lab Coats, and Gloves Available.</li> <li>• Do gloves need to be ordered?</li> </ul>		
MSDS <ul style="list-style-type: none"> <li>• Do any MSDS forms need to be put in book?</li> </ul>		
DI Water Light <ul style="list-style-type: none"> <li>• Light on Central System should be green when water is running.</li> </ul>		
Electrical Hazards		
Fire Hazards		
Emergency Lights		
Clutter/Spill Hazards		
Other		



# COMPREHENSIVE SAFETY MANAGEMENT PLAN

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## Safety Checklist

### Eyewash Inspection Form

No.	Location	Type	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1		E												
Initials														
Date														

E = Eyewash

The eyewash station is left running for 5 continuous minutes for inspection.