The University of Texas Health Science Center at Houston

Occupational Safety Manual

Environmental Health & Safety
Occupational Safety & Fire Prevention Program

Last updated: March 2023

PREFACE

The University of Texas Health Science Center at Houston (UTHealth Houston Houston) is committed to providing a safe and healthy working and learning environment for all faculty, students, employees, visitors and contract employees. Environmental Health & Safety's mission is to work in conjunction with the UTHealth Houston Houston community and ensure that education, research, and health-care related activities take place in conditions that are optimally safe and healthy for students, faculty, staff, visitors, surrounding community, and general public.

The objective of the Occupational Safety & Fire Protection Program is to help provide a safe and healthy environment for learning and working for all of UTHealth Houston Houston. EHS performs routine surveillance of all UTHealth Houston Houston buildings and grounds to anticipate, recognize, evaluate and control hazards and to ensure compliance with fire and life safety code requirements. Through scheduled testing and proactive evaluation, we aim to minimize the incidence of accidents and injuries across our campus. Simply put, we exist to help people go home as healthy and safe as when they arrive on our campus each day.

The purpose of this manual is to provide employees and students with general guidelines, information, and expectations about occupational safety on our campus. The information contained herein complements the health and safety related institutional HOOP policies, and is supported by the UTHealth Houston Houston Safety Council. This manual should be referenced frequently as updates are routinely added to this document. It is not intended to be an exhaustive reference, rather a guide for all UTHealth Houston Houston personnel to become familiar with and conduct their operations accordingly. Further advice concerning occupational hazards associated with specific work assignments, activities or processes and the development of new or unfamiliar activities should be obtained through consultation with your supervisor or by contacting Environmental Health and Safety.

If you have any questions or concerns about the information contained within this manual or would like to receive consultation on any health and safety matters at UTHealth Houston Houston, please contact EHS at 713-500-8100.

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1.0 Introduction to the Occupational Safety Manual

1.1 Scope

The guidance and information provided in this manual are applicable to all areas of the university, inclusive of UTHealth Houston and UTPhysicians locations and operations, and represent only general minimum standards. The information contained here within is based on current best practices, guidelines, policies or regulations related to occupational safety as it relates to our campus. This information does not substitute for special operation manuals or procedures used in certain buildings, laboratories, or clinics to meet specific situations or requirements. This manual serves as a basis to which supervisors may apply additional safety measures relevant to their work areas or operations.

Contractors to the university should follow contractual agreements made with UTHealth Houston Houston for the work they are engaged to perform, which may go above and beyond the information specified in this manual in regards to health and safety in construction activities.

1.2 Development, Maintenance, and Revision Process

All materials in this manual have been developed and maintained under the supervision of Environmental Health and Safety (EHS), specifically the Occupational Safety & Fire Prevention Program, which is responsible for reporting information on health and safety across campus to the UTHealth Houston Houston Safety Council at convened meetings that are held every other month (6 times per year).

As regulations and guidelines promulgated or amended by the Occupational Safety and Health Administration (OSHA), the Environmental Protection Agency (EPA), the National Fire Protection Association (NFPA), the National Institute of Occupational Safety and Health (NIOSH), and other organizations, the online version of this manual will be updated.

Please contact EHS at 713-500-8100 if you have any questions or concerns about the information contained within this manual, or if additional information is requested to be included in this manual.

1.3 Safety and Health-related HOOP Policies

HOOP 80. Space Lease – references UT System policy 135 requiring a life safety survey for all space UTHealth Houston leases

HOOP 85. Controlled Access Status for Emergency, Disaster or Severe Weather – describes policies and procedures for controlled access on campus

HOOP 86. Medical Emergencies, Minor Injuries/Illnesses – describes the process for handling and reporting medical emergencies, injuries, and illnesses on campus

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HOOP 164. Minors on Campus – ensures the safety of minors and compliance with laws relating to minors participating in Youth Programs

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HOOP 205. Automobile Insurance Coverage for Employees and Requirements for the Use of University Owned or Operated Vehicles – describes auto insurance requirements and requirements for use of vehicles owned and operated by UTHealth Houston Houston

2.0 Occupational Safety Program Management

2.1 Program Elements

The following program elements are applicable to all university operations and activities. These elements are directed toward the prevention of accidents and health hazards present in the performance of work activities in the laboratory, clinic, classrooms, and all support areas such as mechanical rooms and construction areas on our campus.

A. Prevention

EHS will emphasize strategies that preclude or prevent any occurrence that would have an adverse effect on faculty, staff, students, contractors, visitors, and people in the neighboring community.

B. Surveillance

EHS will provide for the systematic inspection of facilities, the collection, analysis, interpretation, and evaluation of safety and health data essential to the planning and implementation of EHS programs.

C. Protection and Control

A system for the control of hazards will be maintained and will follow the NIOSH recommended hierarchy of controls starting with elimination of hazards, substitution of hazards for non-hazardous materials or activities, engineering controls, administrative procedures, and the use of personal protective equipment.

D. Emergency Preparedness and Response

The EHS process will seek to identify circumstances which require advance preparation and immediate action. The UTHealth Houston Houston Emergency Management Plan (EMP) has been developed and maintains contingency plans and procedures to address foreseen circumstances, and communicate (to those potentially affected and to those who must respond) plans of action for responding to fire, medical emergencies, first aid, radiation, chemical, biohazard, adverse weather, and other incidents that may require advance preparation and timely response. Both UTPhysicians and HCPC/Dunn maintain their own EMPs which augment the institutional EMP.

E. Education, Promotion, and Training

Health and safety awareness will be promoted among managers, supervisors, employees and contractors through orientation training and regularly scheduled safety education and training sessions. For example, laboratory and clinical safety training is provided for all laboratory and clinic staff, respectively. Facilities and Auxiliary Enterprises trade staff are provided with occupational safety training on a routine basis. Many other safety training opportunities exist. Contact EHS at 713 500 8100 or visit https://www.uth.edu/safety/index.htm for more information on available safety training or to schedule a specialized training for your area or group.

F. Notification and Communication

All individuals, including employees, students, and medical residents will be notified of workplace hazards conditions by their supervisor or by EHS for their immediate work area or work related tasks. Issues impacting safety across campus will be communicated by EHS via the Office of Public Affairs.

G. Confidentiality

Safety concerns may be submitted directly to EHS at any time. Confidentiality will be maintained at all times when appropriate and necessary. Anonymous reporting of safety concerns is possible through the UTHealth Houston Compliance Hotline, which can be found here: https://www.uth.edu/compliance/reporting-issues/how-to-report-issues.htm EHS also maintains a "submit a safety concern" email address on it's website where anyone can send their concern via email to osfp.safety@uth.tmc.edu.

If any medical attention or treatment is required for an occupational injury or exposure, EHS will work directly with the Occupational Health Program within UT Health Services to ensure confidentiality of medical information. Confidentiality of medical information will be maintained through any incident investigation or WCI claim process.

H. Program Evaluation

An annual evaluation of the overall occupational safety program will be conducted by EHS to determine if policies and procedures remain relevant and appropriate, and if they continue to meet or exceed health and safety standards. An annual risk assessment review is conducted with the Office of Institutional Compliance each year to review all health and safety risks on campus, which includes occupational safety risks.

2.2 Response to Non-Compliance

In an ongoing commitment to assure a healthy and safe working and learning environment, EHS conducts routine facility safety surveys. If non-compliance is identified, the following procedures are used by EHS to ensure compliance with UTHealth Houston policies and applicable local, state, and federal laws and regulations.

(Note: Disciplinary actions for contractors are addressed in the Contractor Safety chapter).

Verbal Notification:

If during a routine safety survey, a safety hazard is observed, a verbal notification will be provided along with a recommendation for improvement or corrective action. If the condition is determined to be one of imminent danger to life or health, the operation will be stopped and EHS will work directly with the individuals or groups involved to determine a plan to resume the operation or activity in a healthy and safe manner.

Step One:

Following the safety survey, a written summary of the findings and recommendations, including corrections completed during the survey or to be completed as an action item, will be sent to the supervisor responsible for the area. The supervisor or their designee will be required to take corrective action within 30 days.

Step Two:

After 30 days, if a second observation reveals that the same discrepancy exists, written notification of this situation will be sent to both the supervisor of the area and the department chair or department leader. A written response, including specific steps taken to ensure correction of the discrepancy, will be sent to EHS.

Step Three:

If the hazard remains without resolution after this time, both the supervisor of the area and Director of EHS will be given a written account of the situation. If necessary, the entire case history of the event will be presented to the UTHealth Houston Safety Council for review and deliberation.

2.3 Assignment of Responsibility

A. Director, EHS

The Director of EHS is responsible for:

- Identifying the applicable standards, guidelines, and recommendations necessary for a safe and healthful work place;
- Establishing and annually reviewing policy and procedure manuals;
- Providing safety and health training and education;
- Coordinating with the Occupational Health Program within UT Health Services for employee onboarding, annual employee medical screening for high risk positions, case management, modified duty, and return to work;
- Providing consultation for safety and health emergencies;
- Maintaining comprehensive records of hazards at the operational level and sharing this information with the appropriate supervisor and UTHealth Houston Safety Council;
- Requesting program reviews and audits for methods of continuous improvement.

B. Supervisors & Project Management

Supervisors at all levels throughout the university are responsible for maintaining a safe and healthful workplace by:

- Complying with all applicable safety and health standards, rules, and regulations pertaining to the activities immediately under their jurisdiction;
- Ensuring that employees are instructed and/or trained in safe practices and methods of job performance pertaining to their assignments;
- Ensuring that sick and/or injured employees performing official duties receive appropriate first aid

and/or medical attention;

- Investigating and reporting each incident and/or injury using the Supervisor's First Report of Injury form;
- Implementing corrective actions for unsafe or unhealthful working conditions or behaviors determined to exist and promptly advising appropriate management when such conditions require corrective actions beyond their authority;
- Conducting regular surveys of their operations to ensure compliance with safety standards, codes, and regulations applicable to the work area under their supervision;
- Ensuring that employees under their supervision are aware of workplace hazards and their responsibilities to work in a healthy and safe manner.

C. Employees

Employees at all levels throughout the university are responsible for:

- Complying with all health and safety standards, rules, and regulations including UTHealth Houston policies;
- Obtaining safety training that is applicable to their work tasks or area;
- Promptly advising their supervisor regarding all work related incidents resulting in personal injury, illness and/or property damage;
- Promptly reporting to their supervisors any unsafe or unhealthful conditions in the work environment;
- Taking all necessary and appropriate safety precautions to protect themselves, other personnel and the environment. Safety is everyone's responsibility. In fact, all employees at UTHealth Houston are evaluated on safety during their annual performance reviews.

2.4 Safety Council

A. Charge

The Safety Council reports to the UTHealth Houston Executive Leadership Council which is chaired by the UTHealth Houston President to provide guidance and recommendations on safety, health and security matters. The Safety Council's charge is to:

- Identify safety needs for the institution and develop plans to implement activities or corrective actions that ensure that those needs are met.
- Prescribe the collection of appropriate indicator data to measure outcomes of various UTHealth Houston safety efforts.
- Discuss and resolve issues where gaps in safety or emergency preparedness may arise or persist.
- Provide reports, advice and recommendations to the Executive Leadership Council for consideration and action.

B. Membership

Safety Council membership consists of representatives from across the UTHealth Houston schools and administrative units, inclusive of but not limited to: Animal Care, Facilities Planning & Engineering, Auxiliary Enterprises, Harris County Psychiatric Center / Dunn Behavioral Sciences Center, Legal Affairs, Student Health, Employee Health, Institutional Compliance, Employee Assistance Program, UT Police, and a SIC student representative.

Membership is set up as a staggered three-year term with one term expiring each year.

Ex Officio Members include the chairs of the Chemical Safety Committee, the Institutional Biosafety Committee, the Radiation Safety Committee, the Chief Operating Officer designated representative, the Chief Compliance Officer, and leadership of Environmental Health and Safety.

3.0 General Health and Safety

3.1 Prevention and Control of Workplace Hazards

It is the goal of the UTHealth Houston to comply with all applicable regulations from the Occupational Safety and Health Administration (OSHA) and professional organizations such as national Fire Protection Association (NFPA) to provide our faculty, students, employees and visitors with a safe and healthful working and learning environment. All recognized safety and health hazards shall be eliminated or controlled as quickly as possible, with all resources necessary, based upon the degree of risk posed by the hazards.

A. Principles of Hazard Control

1. Engineering Controls

- *Substitution.* The risk of injury or illness may be reduced by replacement of an existing process, material, or equipment with a similar item having more limited hazard potential. Care must be exercised in any substitution to ensure that the substitute materials are technically acceptable and to avoid introducing new or unforeseen hazards.
- *Isolation.* Hazards are controlled by isolation whenever an appropriate barrier is placed between the hazard and an individual who may be affected by the hazard. This isolation can be in the form of physical barriers, time separation, or distance. Examples include machine guards, electrical insulation, glove boxes, acoustical containment, and remote controlled equipment.
- *Ventilation.* The control of a potentially hazardous airborne substance by ventilation can be accomplished by one or two methods: using local exhaust by capturing and removing the substance at its source, or if that is not feasible, diluting the concentration of the substance by mixing with uncontaminated air (also called dilution ventilation).

2. Administrative Control. This method of hazard mitigation depends on effective operating practices that reduce the exposure of individuals to chemical or physical hazards. These practices may take the form of limited access to high hazard areas, preventive maintenance programs to reduce the potential for leakage of hazardous substances, or adjusted work schedules, which involve a regimen of work in high hazard and low hazard areas.

3. *Personal Protective Equipment. (PPE)* This method of hazard control is least preferred because personal protective devices may reduce a worker's productivity, or PPE can be used inappropriately and has its limitations, while affording less effective protection against the recognized hazard than other methods of control. Nevertheless, there are instances where adequate levels of risk reduction cannot be achieved through other methods, and personal protective devices must be used, either alone or in conjunction with other protective measures.

B. Application of Hazard Control Principles

Hazardous conditions in the workplace may be prevented through appropriate actions when facilities are designed, when operating procedures are developed, and when equipment is purchased.

1. *Design Reviews*. Occupational health and safety issues shall be considered, designed, and engineered into all facilities, which are acquired or constructed. To ensure that appropriate hazard control techniques are applied, EHS shall participate in the review of plans and specifications for construction and renovation projects.

2. *Operating Procedures.* Standard operating procedures or similar directives developed by the supervisor that are issued to direct the manner in which work is performed shall include appropriate health and safety requirements.

3. *Purchasing Procedures.* Many hazards can be avoided by incorporating appropriate specifications for purchased equipment/material and contracted efforts that involve work at UTHealth Houston facilities. UTHealth Houston departments or units responsible for developing specifications for such purchases should coordinate with EHS to ensure that health and safety requirements are considered.

4. *Permanent Hazard Abatement.* Engineering control methods are the preferred method of hazard control, followed by administrative control and personal protective equipment.

3.2 Hazard Reporting

Identification and reporting of potentially unsafe or unhealthful working conditions is the responsibility of all UTHealth Houston faculty, students, employees, and visitors. All individuals are encouraged to report unsafe or unhealthy working conditions to EHS and/or to their immediate supervisor who will promptly investigate the situation and take appropriate corrective actions.

Any physical hazard or unsafe act by an individual or contractor should be reported immediately by contacting Environmental Health & Safety (713-500-8100). EHS will promptly investigate any safety issues to determine the situation and appropriate corrective actions necessary.

3.3 Personal Protective Equipment

When engineering or administrative controls are implemented or are not practical or applicable, personal protective equipment may be considered to reduce or eliminate personnel exposure to hazards.

Personal protective equipment (PPE) will be provided, used, and maintained when it has been determined that its use is required and that such use will lessen the likelihood of occupational injuries and/or illnesses. EHS will recommend protective equipment, in addition to the engineering and administrative controls already in place, where there is a reasonable probability that the use of the equipment will prevent or reduce the severity of injuries or illness.

For more information concerning Personal Protective Equipment please see section 5.0 (Personal Protective Equipment Program)

3.4 Hazard Communication

UTHealth Houston Facilities Planning & Engineering, Auxiliary Enterprises, and laboratory and clinic personnel perform a wide range of operations and provide services that commonly require the use of chemicals that have inherent chemical and physical hazards. General office activities may also involve working with products that contain potentially hazardous chemicals. The Texas Hazard Communication Standard requires employers to provide information to their employees concerning the hazardous chemicals in the workplace through a written program, training sessions, access to safety data sheets (SDS), chemical labeling, and other pertinent information.

For more information please contact EHS at 713 500 8100 or visit the Chemical Hygiene Plan on the EHS website at: https://www.uth.edu/safety/chemical-safety/hygiene-plan.htm.

3.5 Noise

Evidence is well established that worker exposure to noise of sufficient intensity and duration can result in hearing damage. Noise-induced hearing loss rarely results from just one exposure but rather occurs from chronic exposure over a period of years. Initial noise-induced hearing loss occurs at the higher frequencies where the consonant portion of speech is found, making communications difficult.

Locations on campus with known high noise levels will be labeled as requiring hearing protection prior to entry.

Area noise monitoring can be conducted by EHS with a sound level meter to determine the need for personnel monitoring or engineering controls. Additionally, personnel monitoring can be conducted using a noise dosimeter, if indicated. Contact EHS at 713 500 8100 to schedule a noise exposure evaluation or for assistance with the establishment or maintenance of a hearing protection program.

3.6 Mold Management Program

Any visible mold contamination, regardless of the species of mold, must be removed in a timely manner to prevent further growth. Mold growth can be potentially damaging to cellulose-based products such as drywall, ceiling tiles, and paper. Complete removal of visible mold and mold contaminated porous building materials, removal of water source, and maintenance of proper IAQ parameters is essential to help ensure that mold growth does not reoccur.

As of January 1, 2005, mold assessment and remediation activities are regulated within the state by the Texas Mold Assessment and Remediation Rules (25 TAC §295.301 – 295.338). There are currently no federal regulations governing mold.

EHS employs several licensed Mold Assessment Consultants and oversees all mold related projects on campus. Please contact EHS at 713 500 8100 if any visible mold is found within the UTHealth Houston buildings. EHS will survey the area to determine the extent of contamination, the applicability of the Texas Mold Rules, and/or recommend the course of action for both exempt mold remediation projects and those that fall under the rules.

3.7 Asbestos Management Program

Numerous federal, state, and local regulations govern activities involving asbestos-containing materials (ACM). The State of Texas now has asbestos rules which must be followed.

These regulations set out permissible exposure limits, exposure monitoring specifications, respirator requirements, hygiene facilities and practices, communication standards, medical surveillance, employee training, recordkeeping and waste disposal requirements.

It is only when ACM is damaged that asbestos fibers can become airborne. Materials that commonly contain asbestos include fireproofing, floor tiles, pipe insulation, sprayed-on acoustical ceilings, as well as numerous other insulating materials.

EHS oversees the operations and maintenance program for all asbestos related projects. Prior to any renovation or demolition work within UTHealth Houston buildings, a licensed asbestos inspector must survey the area. EHS employs several licensed asbestos inspectors. Contact EHS at 713 500 8100 to schedule an asbestos evaluation for your area.

3.8 General Housekeeping

All places of employment including outside areas should be kept as clean as reasonable to prevent accidents and injuries. Inappropriate materials in the work area such as pallets debris, trash, scrap, spills or other extraneous materials should be promptly removed or managed. In particular, hallway clearance in our buildings is important from an emergency egress standpoint. EHS performs regular evaluations of all corridors within UTHealth Houston buildings to monitor for possible hallway occlusions.

Mechanical and electrical rooms shall not be utilized for storage of excess materials.

3.9 Safety Related Permits

EHS has developed a convenient online permit submission system to allow communication of hotworks and fire impairments during renovation and construction projects. The permits include:

Hot Works (See section 4.2)
Fire System Impairment (See section 6.2)

These permits can be accessed on the EHS web page at https://www.uth.edu/safety/occupational-safety-and-fire-prevention/index.htm and submitted electronically.

4.0 Personal Protective Equipment Program

4.1 Introduction

The objective of the Personal Protective Equipment (PPE) Program is to protect employees from the risk of injury by creating a barrier against workplace hazards. Personal protective equipment is not a substitute for good engineering or administrative controls or safe work practices, but should be used in conjunction with these controls to ensure the safety and health of employees. Personal protective equipment will be provided, used, and maintained when it has been determined that its use is required and that such use will lessen the likelihood of occupational injury and/or illness.

This program addresses eye, face, head, foot, and hand protection. Separate programs exist for respiratory and hearing protection. Contact EHS at 713 500 8100 for more information.

4.2 Responsibilities

1. *Supervisors and Team Leaders*

Supervisors have the primary responsibility for implementation of the PPE Program in their respective work area. This involves:

- Providing appropriate PPE and making it available to employees.
- Ensuring employees are trained on the proper use, care, and disposal or cleaning of PPE.
- Coordinate with EHS for maintaining records on PPE assignments and training.
- Supervising staff to ensure that the PPE Program elements are followed and that employees properly use and care for PPE.
- Notifying EHS when new hazards are introduced or when processes are added or changed.
- Ensuring defective or damaged equipment is immediately replaced.

2. *Employees*

The PPE user is responsible for following the requirements of the PPE Program. This involves:

- Wearing PPE as required.
- Attending required training sessions.
- Caring for, cleaning, and maintaining PPE as required.
- Informing the supervisor of the need to repair or replace PPE.
- Informing the supervisor of any unanticipated hazards that may warrant additional PPE or stoppage of work to perform additional risk assessment.

3. *EHS*

EHS is responsible for the development, implementation, and administration of the PPE Program. This involves:

- Conducting workplace hazard assessments to determine the presence of hazards which necessitate the use of PPE.
- Conducting periodic workplace reassessments as requested by supervisors and/or as determined by EHS.
- Maintaining records on hazard assessments.
- Providing training and technical assistance to supervisors on the proper use, care, disposal and/or cleaning of PPE.
- Providing guidance to the supervisor for the selection and purchase of approved PPE.
- Periodically reevaluating the suitability of previously selected PPE.
- Reviewing, updating, and evaluating the overall effectiveness of the PPE Program.

4.3 Program Components

1. *Hazard Assessment and Equipment Selection*

EHS will determine the suitability of the PPE presently available and as necessary select new or additional equipment which ensures a level of protection greater than the minimum required to protect the employees from the hazards. Adequate protection against the highest level of each of the hazards will be provided or recommended for purchase.

2. *Types of Protective Devices*

All personal protective clothing and equipment will be of safe design and construction for the work to be performed and shall be maintained in a sanitary and reliable condition. Only those

items of protective clothing and equipment that meet NIOSH or ANSI (American National Standards Institute) standards will be procured or accepted for use.
Careful consideration will be given to comfort and fit of PPE in order to ensure that it will be used. Protective devices are generally available in a variety of sizes. Care should be taken to ensure that the right size is selected. Samples of PPE can be obtained for workers to try different types or sizes, as necessary.

3. *Eye and Face Protection*

Prevention of eye injuries requires that all persons who may be in eye hazard areas wear protective eyewear. This includes employees, visitors, researchers, contractors, or others passing through an identified eye hazard area. Suitable PPE shall be used when employees are exposed to hazards from flying particles, molten metal, acids or caustic liquids, chemical liquids, gases, or vapors, bioaerosols, or potentially injurious light radiation.

- Wearers of contact lenses must also wear appropriate eye and face protection devices in a hazardous environment.
- Goggles and face shields shall be used when there is a hazard from chemical splash.
- Face shields shall only be worn over primary eye protection (safety glasses or goggles).
- For employees who wear prescription lenses, eye protectors shall either incorporate the prescription in the design or fit properly over the prescription lenses.
- Protectors shall be marked to identify the manufacturer.
- Equipment fitted with appropriate filter lenses shall be used to protect against light radiation. Tinted and shaded lenses are not filter lenses unless they are marked or identified as such. Contract the EHS Radiation Safety Program for a risk assessment and recommendation of appropriate laser safety glasses or goggles.

Prescription Safety Eyewear

OSHA regulations require that each affected employee who wears prescription lenses while engaged in operations that involve eye hazards shall wear eye protection that incorporates the prescription in its design, or shall wear eye protection that can be worn over the prescription lenses (goggles, face shields) without disturbing the proper position of the prescription lenses or the protective lenses.

4. *Head Protection*

Head protection shall be furnished to, and used by, all employees, contractors, and visitors engaged in construction and other miscellaneous work. Construction areas will be appropriately labeled where hard hats are required.

5. *Foot Protection*

Safety shoes shall be worn in the shops, warehouses, maintenance, cage wash, glassware, and other areas as determined by EHS. All safety footwear shall comply with ANSI Z41-1991, "American National Standard for Personal Protection - Protective Footwear." This includes consideration for steel toed and/or slip resistant footwear, as appropriate.

6. *Hand Protection*

Suitable gloves shall be worn when hazards from chemicals, cuts, lacerations, abrasions, punctures, burns, biological agents, and harmful temperature extremes are present. Glove

selection shall be based on performance characteristics of the gloves, conditions, duration of use, and hazards present. One type of glove will not work in all situations. Consult the Chemical Hygiene Plan for more information on glove selection for the purpose of protection against chemicals.

7. *Cleaning and Maintenance*

It is important that all PPE, which is not intended to be single use and disposed immediately after the first use, be kept clean and properly maintained. Personal protective equipment shall not be shared between employees until it has been properly cleaned and sanitized. It is also important to ensure that contaminated PPE which cannot be decontaminated is disposed of in a manner that protects employees from exposure to hazards.

8. *Training*

Any worker required to wear PPE shall receive training in the appropriate use and care of PPE. Periodic retraining shall be offered by EHS to both the employees and the supervisors, as needed. The training shall include, but not necessarily be limited to, the following subjects:

- When PPE is necessary to be worn.
- What PPE is necessary
- How to properly don, doff, adjust, and wear PPE.
- The limitations of the PPE.
- The proper care, maintenance, useful life and disposal of the PPE.

After the training, the employees shall demonstrate that they understand the components of the PPE Program and how to use PPE properly, or they shall be retrained.

9. *Recordkeeping*

Written records shall be kept of the names of persons trained, the type of training provided, and the dates when training occurred.

4.4 General Guidelines for Choosing Personal Protective Equipment

1. Description and Use of Eye/Face Protection

- *Safety Glasses.* Protective eyeglasses are made with safety frames, tempered glass or plastic lenses, temples and side shields which provide eye protection from moderate impact and particles. Safety glasses are also available in prescription form for those persons who need corrective lenses.

- *Single Lens Goggles.* Vinyl framed goggles of soft pliable body design provide adequate eye protection from many hazards. Single lens goggles provide similar protection to spectacles and may be worn in combination with spectacles or corrective lenses to ensure protection along with proper vision.

- *Face Shields.* These normally consist of an adjustable headgear and face shield of tinted/transparent acetate or polycarbonate materials, or wire screen. Face shields will be

used in operations when the entire face needs protection and should be worn to protect eyes and face against flying particles, metal sparks, and chemical/biological splash.

- *Welding Shields.* These shield assemblies consist of vulcanized fiber or glass fiber body, a ratchet/button type adjustable headgear or cap attachment and a filter and cover plate holder. These shields will be provided to protect workers' eyes and face from infrared or radiant light burns, flying sparks, metal spatter and slag chips encountered during welding, brazing, soldering, resistance welding, bare or shielded electric arc welding and oxyacetylene welding and cutting operations.

2. Head Protection

   Head injuries are caused by falling or flying objects, or by bumping the head against a fixed object.

   Protective hats are made in the following types and classes:

- Class A - General service, limited voltage. Intended for protection against impact hazards.
- Class B - Utility service, high voltage. Used by electrical workers.
- Class C - Special service, no voltage protection.

3. Foot Protection

   There are many types and styles of protective footwear and it's important to realize that a particular job may require additional protection other than listed here. Footwear that meets established safety standards will have an American National Standards Institute (ANSI) label inside each shoe.

a. *Steel-Reinforced Safety Shoes.* These shoes are designed to protect feet from common machinery hazards such as falling or rolling objects, cuts, and punctures. The entire toe box and insole are reinforced with steel, and the instep is protected by steel, aluminum, or plastic materials.

b. *Safety Boots. Safety boots offer more protection when splash or spark hazards (chemicals,* molten materials) are present. Types of safety boots include; nitrile, foundry or "Gaiter" style, and non-conductive.

4. Hand Protection

   Skin contact is a potential source of exposure to hazardous materials, and it is important that the appropriate steps be taken to prevent such contact. Gloves should be replaced periodically, depending on frequency of use and permeability to the substance(s) handled.

   Gloves should also be worn whenever it is necessary to handle rough or sharp-edged objects, and very hot or very cold materials. The type of glove materials to be used in these situations, include leather, welder's gloves, aluminum-backed gloves, and other types of insulated glove materials.

The following is a guide to the most common types of protective work gloves and the types of hazards they can guard against:

a. *Disposable Gloves.* Disposable gloves, usually made of light-weight plastic, can help guard against mild irritants.
b. *Leather Gloves.* These gloves are used to guard against injuries from sparks or scraping against rough surfaces. They are also used in combination with an insulated liner when working with electricity.
c. *Cut Resistant Gloves.* These gloves are used to protect hands form accidental cuts and scratches. They are used most commonly by persons working with cutting tools or other sharp instruments.
d. *Chemical Resistance Gloves.* These gloves may be made of rubber, neoprene, polyvinyl alcohol, vinyl, etc. When selecting chemical resistance gloves, be sure to consult the manufacturers' recommendations, especially if the gloved hand will be immersed in the chemical.
The Chemical Hygiene Plan may also be consulted, or contact EHS at 713 500 8100 for guidance on appropriate glove selection.

5.0 Fire Safety

5.1 Introduction

EHS administers the UTHealth Houston fire prevention and life safety inspection programs. This includes reviewing all new building construction and renovations to ensure compliance with applicable state, local, and national fire and life safety standards. Routine surveys are also conducted of maintenance rooms and non-routine facilities such as offices and classrooms.

Fire prevention measures are intended to reduce the incidence of fires by eliminating opportunities for ignition of flammable materials.

5.2 Fire and Life Safety Impairment Process

It is UTHealth Houston policy that, where feasible, its properties shall at all times be provided with automatic fire protection systems. When a facility's fire protection system is impaired in any way, EHS & UTPD shall be notified and arrangements made immediately to ensure interim fire protection measures are in place and that the fire protection system is returned to normal operation as quickly as possible.

When an impairment of a fire system is necessary, the following requirements shall be observed:

Scheduled and After Hours Emergency Impairments

a. Whenever possible, EHS must be notified 72 hours prior to the impairment. If the impairment occurs after hours due to an emergency, contact EHS at 713 500 5832 to reach an on-call EHS personnel, or notify EHS the following business day.
b. EHS shall inform the insurance carrier, UTPD and the Houston Fire Department of the scheduled impairment.
c. Contractors conducting the impairment will notify the Facilities, Planning and Engineering"FIXT" Line at 713-500-3498 and the building maintenance personnel of the scheduled impairment.
d. Fire watch personnel will be designated and instructed on emergency procedures.

e. A fire system impairment tag shall be hung on the system either at the control panel for electronically monitored systems or at the riser control valve for sprinklers.
f. The impairment tag shall have information indicating the length of impairment and responsible person(s) with phone numbers.
g. No welding, cutting, or any other hazards activity which could start a fire may be performed in the areas affected by the impaired fire system.

Responsibilities

a. EHS will be responsible for documenting the impairment and reviewing the described interim fire safety measures to be employed.
b. UTPD will assist with fire watches and monitoring of the fire panel during impairments.
c. Contractors or staff conducting the impairment shall provide primary fire watch personnel. Additionally, they shall ensure all associated valves are open, fire panels & pumps and devices have been appropriately reactivated once the impairment has been completed.

5.3 Flammable and Combustible Materials

A. Substitution

Flammable liquids sometimes may be substituted by relatively safe materials in order to reduce the risk of fires. Any substituted material should be stable and nontoxic and should either be nonflammable or have a high flashpoint.

B. Storage

Flammable and combustible liquids require careful handling at all times. The proper storage of flammable liquids within a work area is very important in order to protect personnel from fire and other safety and health hazards.

1) Cabinets

Not more than 120 gallons of Class I, Class II, and Class IIIA liquids may be stored in a storage cabinet. Of this total, not more than 60 gallons may be Class I and II liquids. Not more than three such cabinets (120 gallons each) may be located in a single fire area.

2) Maximum Allowable Capacity of Containers and Portable Tanks (NFPA 45)

Container Type	Flammable Liquids			Combustible Liquids	
IA	**IB**	**IC**	**II**	**IIIA**	
Glass	500 mL	1L	4L	4L	20L
Metal (Other than DOT approved)	4L	20L	20L	20L	20L
Safety Cans	10L	20L	20L	20L	20L
Metal Drums (DOT spec.)	Not Allowed	20L	20L	227L	227L
Polyethylene (DOT Spec. 34, UN 1H1)	4L	20L	20L	227L	227L

4L = 1.1 gallons 20 L = 5 gallons
227 L = 60 gallons

3) Storage Inside Buildings:

- Flammable or combustible liquid shall not be stored as to limit use of exits stairways, or areas normally used for the safe egress of people.
- Containers of flammable or combustible liquids must remain tightly sealed, except when transferred, poured or utilized. Remove only that portion of liquid in the storage container required to accomplish a particular job.
- If a flammable and combustible liquid storage building is used, it will be a one-story building devoted principally to the handling and storing of flammable or combustible liquids.
- Flammable paints, oils, and varnishes in 1 or 5 gallon containers, used for building maintenance purposes, may be stored temporarily in closed containers outside approved storage cabinets or room if kept at the job site for less than 10 calendar days.

C. Ventilation

Flammable and hazardous chemical storage rooms shall be provided with a continuous mechanical exhaust ventilation system. To prevent the accumulation of vapors, the location of both the makeup and exhaust air openings shall be arranged to provide, as far as practical, air movement directly to the exterior of the building and if ducts are used, they will not be used for any other purpose.

D. Elimination of Ignition Sources

All nonessential ignition sources must be eliminated where flammable liquids are used or stored. The following is a list of some of the more common potential ignition sources:

- *Open flames, such as Cutting and Welding Torches, Furnaces, Matches, and Heaters*

- *Electrical Sources of Ignition such as d.c. Motors, Switches, and Circuit Breakers*
- *Mechanical Sparks*
- *Static sparks*

E. Removal of Incompatibles

Materials that can contribute to a flammable liquid fire should not be stored with flammable liquids. Examples are oxidizers and organic peroxides, which, on decomposition, can generate large amounts of oxygen.

F. Flammable Gases

Generally, flammable gases pose the same type of fire hazards as flammable liquids and their vapors. Many of the safeguards for flammable liquids also apply to flammable gases, other properties such as toxicity, reactivity, and corrosivity also must be taken into account. Also, a gas that is flammable could produce toxic combustion products.

5.4 Fire Extinguishers

Fire extinguishers are strategically placed throughout each UTHealth Houston building according to NFPA 72. Please contact EHS at 713 500 8100 with any questions or concerns regarding fire extinguishers, or if a special event is taking place which might require additional fire extinguishers to be needed.

A. Classification of Fires and Selection of Extinguishers

Types of Fires

Class A - Fires in ordinary combustible materials, such as wood, cloth, paper, rubber, and many plastics. This would be offices, and labs that do not contain flammables.

Class B - Fires in flammable liquids, combustible liquids, petroleum greases, tars, oils, oil-based paints, solvents, lacquers, alcohol's, and flammables gases. This would include rooms or labs with flammable or combustible liquids.

Class C - Fires that involve electrical equipment where the electrical non-conductivity of the extinguishing media is important. (When electrical equipment is de-energized, fire extinguishers for Class A or Class B fires can be used. Included in this group would be rooms with highly sensitive computer equipment, such as servers.

Selection and Placement of Extinguishers

The selection of fire extinguishers for a given situation shall be determined by the characteristics of the fires anticipated, the construction and occupancy of the property, and the hazard to be protected. Extinguishers should have a label identifying the type of extinguisher and the type of fires for which it should be used.

- Fire extinguishers should be placed so the travel distance is no more than 75 ft.
- Fire extinguishers shall be kept in their designated places at all times when they are not being used.
- Fire extinguishers shall be conspicuously located where they will be readily accessible and immediately available in the event of fire. Preferably they should be located along paths of travel.
- Cabinets housing fire extinguishers shall not be locked.
- Portable fire extinguishers shall be securely installed on the hanger or in the bracket supplied or placed in the cabinets or wall recesses.

B. Inspections

Fire extinguisher inspections are conducted by EHS personnel on a quarterly basis. More frequent inspections will be conducted to meet specific accreditation requirements.

Annual inspections are completed by an approved contractor.

C. Maintenance

CO_2 and pressurized water extinguishers will be hydrostatically tested every 5 years. ABC extinguishers will be hydrostatically tested every 6 years.

Each fire extinguisher shall have a tag or label securely attached that indicates the month and year the maintenance was performed and that identifies the person performing the test and state license number.

A state licensed fire extinguisher service company will perform all hydrostatic tests.

5.5 Fire Safety Inspections/Housekeeping

EHS conducts routine facility safety surveys. These surveys include observations of worksite safety and housekeeping issues and will specifically address proper storage of chemicals and supplies, unobstructed access to fire extinguishers, and emergency evacuation routes. Fire safety issues are addressed during these evaluations.

5.6 Emergency Egress

Exit doorsshall be clearly visible, or the route to it conspicuously identified in such a manner that every occupant of the building will readily know the direction of escape from any point. At no time will exits be blocked.

Any doorway or passageway which is not an exit or access to an exit but which may be mistaken for an exit, will be identified by a sign reading **"Not An Exit"** or a sign indicating it actual use (i.e., “Store room”). Exits and accesses to exits will be marked by a readily visible sign. Each exit sign (other than internally illuminated signs) will be illuminated by a reliable light source providing not less than 5 foot-candles of light on the illuminated surface.

Reference: NFPA 101 Standard on Life Safety Code

5.7 Facilities Design Review

UTHealth Houston buildings and facilities are designed in a manner consistent with fire andlife safety code requirements. FPE and EHS perform a health and safety review of facility concepts, designs, and plans. A formal collaborative design review process is in place for all new construction and remodeling efforts.

6.0 Incident Reporting System and Investigation Procedure

6.1 Introduction

The timely reporting of accidents, injuries, illnesses and near misses on campus is designed to:

1. Track and analyze employee injuries and illnesses, property and vehicle damage, as well as serious events or near misses which might have resulted in personal injury, illness, or property and vehicle damage.
2. Initiate the workers' compensation process, if necessary.
3. Meet regulatory reporting requirements.

All incidents (incidents resulting in injury or causing illness to UTHealth Houston employees, students, or residents) shall be reported using the Supervisor's First Report of Injury form in order to document the event. EHS will facilitate investigations, determine the root cause of the event, and implement corrective actions in order to prevent recurrence. EHS maintains strict records to trend accident and injury data on campus in order to set priorities for prevention.

6.2 Applicability and Scope

All accidents, injuries, illnesses, and near misses involving UTHealth Houston employees, students and residents shall by reported to EHS. This shall be regardless of severity – even minor incidents should be reported.

A. Incidents (Occupational injuries and illnesses)

Injuries and illnesses that require reporting include those injuries and illnesses occurring on the job which result in any of the following: lost work time, work restrictions, requirement for first aid or outside medical attention, permanent physical bodily damages, or death.

Examples of reportable injuries and illnesses include, but are not limited to, heat exhaustion from working in hot environments, strained back muscles from moving equipment, acid burns on fingers, etc.

Other incidents requiring reporting include those incidents occurring on the job which result in any of the following: injury or illness, damage to a State vehicle, fire/explosion, property damage, or chemical releases requiring evacuation of at least that immediate spill area.

B. Near Misses

Near misses may not result in actual or observable injury, illness, death, or property damage, but are still required to be reported. The information obtained from such reporting can be extremely useful in identifying and mitigating problems before they result in actual personal or property damage.

Examples of near miss incidences required to be reported include the falling of a compressed gas cylinder, overexposures to chemical, biological, or physical agents (not resulting in an immediately observable manifestation of illness or injury), and slipping and falling on a wet surface without injury.

6.3 Responsibilities

All UTHealth Houston personnel have a responsibility to report all occupational injuries and illnesses as prescribed by HOOP 86: Medical Emergencies, Minor Injuries/Illnesses.

A. Workers' Compensation & Insurance

Workers' Compensation & Insurance is managed under the Risk Management & Insurance Program within the Office of Safety, Health, Environment and Risk Management. They can be contacted at 713 500 8100 or visit the webpage at: https://www.uth.edu/safety/risk-management-and-insurance/index.htm.

B. Supervisors

Supervisors are primarily responsible for ensuring that the Supervisor's First Report of Injury Form is completed and submitted in a timely manner.

C. UTHealth Houston Personnel

All UTHealth Houston personnel have the responsibility to initiate the incident reporting sequence by informing their supervisors immediately of an actual or potential injury or illness, or near miss, as soon as possible after an incident has occurred.

D. UT Health Services

In addition to providing medical treatment for occupational illnesses or injuries, the Occupational Health Program within UT Health Services is responsible for documenting safety and health related data on all injuries and illnesses obtained from the Supervisor's First Report of Injury Form.

6.4 Incident Reporting Procedures and Practices

This section describes the specific procedures that shall be followed by UTHealth Houston personnel in order to effectively report occupational injuries and illnesses and other incidents or events.

A. Incidents (Injuries and Illnesses)

Serious injury or illness posing a life-threatening situation shall be reported immediately by contacting UTPD Dispatch (Call 911 or 713-792-2890).

Injuries and illnesses shall be reported by the injured employee to theirsupervisor in person or by phone as soon after any life-threatening situation has been addressed. If the injured employee is unable to report immediately, then the incident should be reported as soon as possible by their supervisor or colleague.

Upon notification of an occupational injury or illness, the supervisor should complete the Supervisor's First Report of Injury which can be found here: https://www.uth.edu/safety/risk-management-and-insurance/supervisor%20first%20report%20packet%2008.14.19.pdf

B. Near Misses

Incidents not involving injury or illness, but considered near misses, should also be reported on the Supervisor's First Report of Injury within 48 hours of the incident.

C. Events

In cases of a fire or explosion that cannot be controlled by one person, vehicular accident, or a chemical release requiring a building evacuation, the involved party must immediately report the incident to the emergency response services in the area (911 - police, fire, etc.) If injuries or illnesses occur, the reporting must follow those procedures outlined in Section A above.

D. Recordkeeping

Workers' Compensation & Insurance will maintain the records of all Supervisor's First Report of Injury Forms and associated claims documentation. Data on all accidents, injuries, illnesses, and near misses at UTHealth Houston are maintained, analyzed, and used for decision making and prioritization of safety interventions and preventative activities. Summary data is routinely presented to the UTHealth Houston Safety Council.

6.5 Incident Investigations

EHS personnel will review each reported incident and event submitted via a Supervisor's First Report of Injury.

1. Determine root cause(s) of the incident
2. Make recommendations for corrective and/or preventative actions necessary to avoid recurrence
3. Ensure the affected employee, student or resident has been satisfactorily taken care of and that the associated safety or health concerns have been addressed.

7.0 UT Health Services

7.1 Introduction

UT Health Services, located at UCT 1620, serves as the Occupational Health Program administrator for UTHealth Houston employees and medical residents. Student Health Services administrates all care for students at UTHealth Houston.

7.2 Medical Emergencies

If a potentially life-threatening medical emergency occurs at the worksite, activate the emergency medical system by calling "911" immediately. Make arrangements to meet the emergency responder at a prearranged location to provide an escort and access to the location of the employee with the emergency**.**

7.3 UT Health Services Clinic

–The UT Health Services clinic is located at 7000 Fannin, suite 1620, telephone 713-500-3267. The office hours are 7:00 AM to 4:00 PM Monday – Friday. On-call service for needlesticks and other bloodborne pathogens exposures is provided 24/7/365by calling the hotline at 800-770-9206.

The primary mission of the Occupational Health Program is to monitor, prevent, and treat work-related injuries and illnesses. Secondarily, UT Health Services provides non-occupationally related care,which includes adult travel immunizations, blood pressure checks, and initial assessment of non-occupational illness that occur during work hours.

7.4 Occupational Health Program

Treatment of work-related traumatic injuries should be obtained as soon as possible after the injury. Although there will be instances when care is urgently needed, supervisors should fill out a Supervisor's First Report of Injury Form for the employee to carry with them to the clinic. If possible someone should call the Clinic to alert the staff that an injured employee will be seeking treatment.

Immunizations are available by calling the Clinic to make an appointment. The clinic offers all employees the opportunity to receive them against specific microorganisms encountered in their workplace and elsewhere. UTHS - Houston provides immunizations to those individuals requiring them because of potential occupational exposure to these infectious agents or these products. The program provides these immunizations to laboratory workers, clinical personnel, FPE personnel, field investigators, and other individuals who may be at potential risk of exposure to these agents. Immunizations are also available through UTHS - Houston and include vaccines for Hepatitis B, Influenza, Measles/ Mumps/Rubella, and Tetanus/Diphtheria.

UTHS – Houston also conducts the following medical surveillance programs for a variety of occupational hazards and positions:

- Hearing conservation
- Respirator use
- Selected chemical surveillance based on personal monitoring results
- Retrovirus exposure
- Tuberculosis screening
- Animal care

7.5 Non-Occupational Illness Visits

–UT Health performs a variety of non-injury, non-occupational preventive medical services for the UTHHSC community at large, such as blood pressure and weight checks.

Employees are also seen for non-work related illnesses and injuries via use of private insurance and fee for service. Anyone who has a significant, non-work related problem should call his/her private physician directly for non-urgent advice and treatment.

7.6 Injuries/Exposure Incidents

Treatment for work-related traumatic injuries can be obtained with the submission to the clinic by the supervisor. The supervisor should also assure the completion of the Supervisor's First Report of Injury Form. If possible, someone in the worksite should call the clinic to alert them that an injured employee will be seeking treatment.

7.7 International Travel

International travel visits for immunizations, malaria prophylaxis, and other medical counseling are available for employees and their dependents provided they are on official travel orders. Individuals needing such services should call UTHS - Houston at (713) 500-3267. Employees

are responsible for the cost of immunizations needed for international travel. University Departments that decide to cover this cost should send a memo to UTHS - Houston indicating they will pay for the immunizations.

7.8 Health Promotion Program

The mission of the Health Promotion Program is to promote the health and well-being of UTHEALTH HOUSTON employees through:

- Teaching health-promoting skills and behaviors
- Serving as an information resource to employees who wish to develop healthier lifestyles
- Assisting the UTHS - Houston in creating a work environment that encourages and facilitates healthy behaviors.

The Health Promotion Program services are delivered in a multifaceted manner, utilizing written and audiovisual self-help materials, classes and seminars, and small discussion group delivery, and individual counseling and training. The following services are provided on an ongoing basis:

- Back Injury Prevention Seminars
- Weight Management Classes
- Exercise Equipment Instruction Cholesterol Screening and Education Smoking Cessation

In addition to ongoing activities, frequent special activities and/or health promotion campaigns are conducted.

For more information about the Health Promotion Program, contact the clinic at (713) 500-3242.

7.9 Automatic External Defibrillator Program

What is an Automatic External Defibrillator?

Automatic External Defibrillators (AED) are a valuable resource for responding to sudden cardiac arrest victims on campus. AEDs can check a person's cardiac rhythm and recognize when that rhythm requires a shock. In addition, AEDs are very accurate and easy to use, since they walk the user through the steps with verbal commands from the on-board computer. While AEDs are very useful in treating sudden cardiac arrest victims, CPR is typically still needed in addition to the AED; therefore, it is highly encouraged that individuals using AEDs have CPR and AED training. The victim's chances of survival dramatically improve when a trained individual is administering the AED and CPR during first aid.

Any time an AED is used or needed, 911 shall be called.

NOTE: In fiscal year 2009, the Environmental Health & Safety initiated a program, with the help of Employee Health Services, to train Area Safety Liaisons in CPR and AEDs.

Where are AEDs located on the UTHEALTH HOUSTON Campus?

AEDs are located in all UTHEALTH HOUSTON owned buildings on campus. The AEDs are typically located in public areas of the building, like elevator lobbies. For a more detailed AED location list please contact the Area Safety Liaison for your area, or use the following link:

https://inside.uth.edu/safety/occupational-safety/drawings-with-aed-locations/campus-aed-locations

If you ever notice any problems with an AED, such as the AED beeping or that the AED is missing from the case, please contact Environmental Health & Safety at 713-500-8100 and report the problem and location.

Please contact Environmental Health & Safety at 713-500-8100 for more information on the AED Program.

8.0 Facility Planning & Engineering, Auxiliary Enterprises and Remodeling Services Safety

8.1 Responsibilities

A. Supervisors and Team Leaders

Supervisors must recognize those factors in the workplace with accident potential. The supervisor shall provide frequent inspections of job sites, work methods, and materials/equipment used. Any unsafe equipment/material shall be tagged and rendered inoperative or physically removed from its place of operation until repaired.

Supervisors/Team Leaders are responsible for:

- Ensuring safe working conditions;
- Providing necessary protective equipment;
- Ensuring that required guards and protective equipment are provided, used, and properly maintained;
- Ensuring that tools and equipment are properly maintained and used;
- Ensuring that the employees understand the work to be done, the hazards that may be encountered, and the proper procedure for doing the work safely;
- Taking immediate action to correct any violation of safety rules observed or reported;
- Ensuring workers exposed or potentially exposed to hazardous chemicals/materials have access to appropriate MSDS's.

8.2 Hot Works permits and Utility Shut-Down request form

A. Hot Works permit

This procedure has been prepared as a guide for contractors, building maintenance, and equipment repair personnel (including persons who perform cutting and welding), fire watchers, and their supervisors (including outside contractors).

Before any welding or cutting begins, the supervising personnel shall:

- Establish approved areas for cutting and welding or establish procedures for approval of cutting and welding operations;
- Designate an individual responsible to authorize cutting and welding operations in areas not specifically designed or approved for such processes. The individual shall be aware of the fire hazards involved and shall be familiar with the provisions of this guide;
- Ensure that only **approved** apparatus, such as torches, manifolds, regulators or pressure reducing valves, and acetylene generators, be used;
- Ensure that cutters or welders and their supervisors are suitably trained in the safe operation of their equipment, and emergency procedures in the event of a fire;
- Select contractors to perform cutting or welding who employ suitably trained personnel and who have an awareness of the magnitude of the risks involved;
- Advise all contractors of their duties and responsibilities during "hot works" operations.

Before cutting and/or welding, a "hot works" permit must be obtained from a ***designated* UT Representative***. The area shall be inspected by the supervisor responsible for the work and if necessary by EHS personnel to ensure that:

- Cutting and welding equipment is in satisfactory operating condition;
- All combustible materials in the area have been moved to a safe distance from the work or the combustibles have been properly shielded from ignition sources;
- The supervisor shall ensure that appropriate fire protection and extinguishing equipment are properly located on site;
- The supervisor shall make arrangements for a fire-watch to remain on site at least one- half hour after the completion of cutting or welding operations to detect and extinguish possible smoldering fires;
- The supervisor shall ensure that a copy of the "hot works" permit is located on the job site and EHS has been notified and received a copy of the permit.

**** Designated UT representatives must attend annual training provided by EHS***

Prior to issuing a hot works permit, the area will be inspected by a UTHEALTH HOUSTON designated representative.

- Before cutting or welding is permitted and at least once per day while the permit is in effect, the area shall be inspected by the UTHEALTH HOUSTON designated representative to ensure that it is a fire safe area. This individual shall designate precautions to be followed on the

"hot works" permit. This individual shall sign the permit and notify EHS that the work is authorized, and shall verify the precautions noted on the permit are being followed.

Ventilation

Adequate ventilation (natural, mechanical, or respirator) must be provided for all welding, cutting, brazing, and related operations. Adequate ventilation depends upon the following factors:

- Volume and configuration of space in which operations occur;
- Number and type of operations generating contaminants;
- Allowable levels of specific toxic or flammable contaminants being generated;
- Natural airflow (rate and direction) and general atmospheric conditions where work is being done;
- Location of the welder and other person's breathing zones in relation to the contaminants or sources;
- Natural ventilation is acceptable for welding, cutting, and related processes where the necessary precautions have been taken to keep the welder's breathing zone away from the welding or brazing plume.

Special Ventilation Concerns

Certain materials sometimes contained in the consumables, base metals, coatings, or atmospheres of welding or cutting operations, have low or very low exposure limits of 1.0 mg/m3 or less. Among these materials are:

Antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, manganese, mercury, nickel, selenium, silver, and vanadium.

The ***material safety data sheets*** must be on site available to identify any of the materials listed above that may be present.

Whenever these materials are encountered as designated constituents in welding, brazing, or cutting operations, special ventilation precautions shall be taken to assure the level of contaminants in the atmosphere are below permissible exposure limits or recommended levels.

B. Utility Shut-Down request

All utility shut-down requests must be submitted a minimum of **five (5) days** prior to the requested shutdown date.

FPE shutdown coordinator will return to the UTHEALTH HOUSTON Project Manager or designated representative a written copy of the scheduled time and day for the shutdown a minimum of two
(2) days prior to the shutdown.

Example of systems requiring Utility Shut Down request:

- Emergency exits, building entrances, parking lots, domestic water supply, TECO, natural gas, electrical, ventilation systems, HVAC, and streets.

8.3 General Shop/Work Areas

A. Employee Training

Employees shall be thoroughly trained in the use of protective equipment, guards, and safeguards for chemicals and safe operation of equipment, machines, and tools they use or operate. Only employees who have been trained and those undergoing supervised on-the-job training (OJT) shall be allowed to use shop equipment, machines, and tools.

B. Personal Protective Equipment (please refer to section 5.0 PPE for more information)

Personal protective equipment (PPE) is not a substitute for engineering controls or feasible work or administrative procedures. While these controls are being implemented, or if it has been determined that control methods are not feasible, personal protective equipment is required whenever there are hazards that can do bodily harm through absorption, inhalation, or physical contact. This equipment includes respiratory and hearing protective devices, special clothing, and protective devices for the eyes, face, head, and extremities. All PPE shall be of a safe design and constructed for the work to be performed and shall be maintained in a sanitary and reliable condition.

1. Eye Protection

Eye protection is required when there is a possibility of injury from chemicals or flying particles. Examples of operation requiring the use of eye protection include, but are not limited to:

- Chipping, grinding, impact drilling, brick laying, plastering, welding, soldering, riveting, burning metals, and handling chemicals.

2. Hearing Protection

Appropriate hearing protection shall be used where employees are in designated hazardous noise areas with operating noise sources, or using tools or equipment which are labeled as hazardous noise producers. EHS shall be contacted for noise level surveys and guidance on the type of hearing protection required.

3. Hand Protection

1. Rubber protective gloves shall be worn by personnel working in battery shops or where acids, alkalis, organic solvents, and other harmful chemicals are handled.
2. Electrical worker's gloves are designed and shall be used to insulate electrical workers from shock, burns, and other electrical hazards. These gloves shall

NOT be the only protection provided and will never be used with voltages higher than the insulation rating of the gloves.

3. Multi-use gloves shall be worn to protect the hands from injuries caused by handling sharp or jagged objects, wood, or similar hazard-producing materials. These gloves are usually made of cloth material with chrome leather palms and fingers or synthetic coating. All-leather gloves are also acceptable.

4. Foot Protection

Non-skid shoes shall be worn where floors may be wet or greasy. Where there is reasonable probability of foot or toe injury from impact and compression forces, safety footwear shall be worn.

5. Respiratory Protection

There are various airborne hazards, e.g., organic vapors, particulates, fumes, etc., that personnel may encounter and respiratory protection may be required. EHS shall be consulted for guidance on the type of protection required.

6. Head Protection

Hard hats shall be worn by all personnel working below other workers, in areas where sharp projections or other head hazards exist and designated construction zones.

7. Body Protection

Natural or synthetic rubber or acid-resisting rubberized cloth aprons shall be worn by personnel handling irritating or corrosive substances. Aprons shall normally be worn with acid sleeves and gloves for greater body protection against skin injuries.

8. Insulated Matting

Insulating matting shall be used by workers for additional resistance to shock where potential shock hazards exist, such as:

- Areas where floor resistance is lowered due to dampness.
- Areas where high voltages (above 600 volts) may be encountered.
- Areas with electrical repair or test benches.

9. Other

- No food or drink shall be brought into or consumed in areas exposed to toxic materials, chemicals, or shop contaminants. Workers shall wash their hands before eating or smoking after exposure to any contaminant.
- Workers shall not wear rings, earrings, bracelets, wristwatches, or necklaces in the vicinity of operating machinery and power tools.
- Long full beards, unrestrained long hair, and loose clothing shall be restrained so as not to get caught in moving equipment.

C. Shop Layout

Proper layout, spacing, and arrangement of equipment, machinery, passageways, and aisles are essential to orderly operations and to avoid congestion.

1. Equipment and machinery shall be arranged to permit an even flow of materials and to provide sufficient space to handle the material with the least possible interference from or to workers or other work being performed.

2. Passageways/aisles shall be provided and marked to permit the free movement of employees bringing and removing material from the shop. These passageways are independent of clear zones and storage spaces. They shall be clearly recognizable.

3. Where powered materials handling equipment is used, facility layout shall provide enough clearance in aisles, on loading docks, and through doorways to permit safe turns. Aisles shall be at least 3 feet wider than the widest vehicle used or most common material being transported. (See 4.13 Forklift Operations)

D. Illumination

Adequate illumination shall be provided to ensure safe working conditions.

1. Portable lamps shall have UL approved plugs, handles, sockets, guards, and cords for normal working conditions.

2. For work in boilers, condensers, tanks, turbines, or other grounded locations that are wet or may cause excessive perspiration, a low voltage lighting system should be used. In situations where these lighting systems are not available, a ground fault circuit interrupter lighting system shall be used.

3. Flashlights for use near energized electrical equipment and circuitry shall have insulated cases.

4. At least 50 foot-candles of illumination shall be provided at all workstations. However, fine work may require 100 foot-candles or more. This can be obtained with a combination of general lighting plus supplemental lighting.

E. Exits and Exit Markings

Every exit shall have "EXIT" sign in plain legible letters not less than 6 inches high with the strokes of the letters not less than three-quarters of an inch wide. The signs shall be powered by normal and emergency power circuits only.

Doors, passageways, or stairways which are neither exits nor ways to an exit (but may be mistaken for an exit) shall be clearly marked "NOT AN EXIT" or by a sign indicating their actual use, for example: "STORAGE ROOM" or "BASEMENT."

When the direction to the nearest exit may not be apparent to an occupant, an exit sign with an arrow indicating direction shall be used.

Exit access shall be arranged so it is unnecessary to travel toward any area of high hazard potential in order to reach the nearest exit (unless the path is effectively shielded by suitable partitions or other physical barriers).

Exit signs shall be clearly visible from all directions of egress and shall not be obstructed at any time. If occupancy is permitted at night, or if normal lighting levels are reduced at times during working hours, exit signs shall be suitably illuminated by a reliable light source.

A door from a room to an exit or to a way of exit access will be the side-hinged swinging type and will swing in the direction of travel if 50 or more persons occupy the room.

Areas around exit doors and passageways shall be free of obstructions. The exit route shall lead to a public way. No lock fastening device shall be used to prevent escape from inside the building.

Where occupants may be endangered by the blocking of any single exit due to fire or smoke, there shall be at least two means of exit remote from each other.

Exits, exterior steps, and ramps shall be adequately lit to prevent mishaps.

F. Housekeeping

Good housekeeping shall be maintained in all shops, yards, buildings, mechanical rooms, chases and mobile equipment. Supervisors are responsible for good housekeeping in or around the work they are supervising. As a minimum, the following requirements shall be adhered to:

1. Material shall not be placed where anyone might stumble over it, where it might fall on someone, or on or against any support unless the support can withstand the additional weight.

2. Aisles and passageways shall be kept clear of tripping hazards.

3. Nails shall be removed from loose lumber or the points turned down.

5. Trash and other waste materials shall not be allowed to accumulated and will be kept in approved receptacles

6. Disconnect switches, distribution panels, or alarm supply boxes shall not be blocked by any obstruction which may prevent ready access.

7. Machinery and equipment shall be kept clean of excess grease and oil and (operating conditions permitting) free of excessive dust.

8. **Mechanical and electrical rooms will not be utilized for storage, of spare parts, construction supplies, and other articles. But instead will be kept clean and properly illuminated to allow access for maintenance.**

G. Fire Prevention

All FPE and Remodeling Services personnel shall receive fire prevention training as part of their general training.

1. Supervisors in charge of operations where fuels, solvents, or other flammable liquids are used shall be constantly alert for hazards and unsafe acts. Open flames, open element heaters, equipment not properly grounded and non-explosion-proof electrical equipment used in the presence of flammable or combustible liquids shall be avoided.

2. Fire extinguishers of at least 20 pound BC or greater rating shall be installed in shop areas. The number of extinguishers depends upon the size and layout of the facility. More information concerning fire extinguishers can be found in section 6.4 (Fire Extinguishers)

3. Supervisors shall ensure that employees remove construction debris and rubbish from the job site upon completion of the job, or daily if extended beyond one day.

4. Interim Life Safety Measures (ILSM) shall be developed to ensure, during an emergency the occupants have an un-obstructed egress to safety.

H. Material Storage

All unnecessary accumulation of materials and supplies in the shop area shall be avoided.

1. The storage of materials shall not, of itself, create a hazard. Materials stored in tiers shall be stacked, strapped, blocked or interlocked, and limited in height so they are stable and secure against sliding or collapse. Storage racks shall have sufficient capacity to bear the loads imposed on them.

2. Stored materials shall not obstruct fire extinguishers, alarm boxes, sprinkler system controls, electrical switch boxes, machine operations, emergency lighting, first aid or emergency equipment, or exits.

3. Heavy materials and equipment should be stored low and close to the ground or floor to reduce the possibility of injury during handling.

4. All passageways and storerooms shall be maintained clean, unobstructed, dry, and in sanitary condition. Spills will be promptly removed.

5. Where mechanical handling equipment, such as lift trucks are used, safety clearance shall be provided for aisles at loading docks, through doorways, and wherever turns or passages must be made. No obstructions that could create a hazard are permitted in aisles.

I. Use of Tools

1. Hand Tools

Incidents at the job site involving hand tools are usually the result of misuse. Hand tools are precision tools capable of performing many jobs when used properly. Hand tool safety requires that the tools be of good quality and adequate for the job. All tools shall be kept in good repair and shall be stored properly.

When personnel use hand tools while they are working on ladders, scaffolds, platforms, or work stands, they shall use carrying bags for tools which are not in use.

Supervisors shall frequently inspect all hand tools used in the operation under their supervision. **Defective tools shall be immediately removed from service and tagged**.

4. Portable Power Tools

Portable power tools can be more hazardous to use than their stationary counterparts. Personnel who are required to use portable power tools in their work shall be thoroughly trained in safe operating practices. Safe operating procedures shall be set up for each type of tool consistent with the manufacturer's instructions.

J. Use of Compressed Air Sources

Compressed air has the appearance of a relatively harmless gas. The improper or inadvertent connection of items not designed for shop air pressure, i.e., equipment, storage vessels, or containers, to a shop air supply may cause serious personal injury and more than likely will damage the item being connected.

The maximum air pressure approved for general use in the shops and laboratories is 30 psi (pounds per square inch).

The following rules and practices are suggested to avoid personal injury, equipment damage, and potential environmental impact.

1. All personnel assigned to shops with air compressors shall be familiar with compressor operating and maintenance instructions.
2. Compressed air is not to be used to blow dirt, chips, or dust from clothing.
3. Air compressors shall be maintained strictly in accordance with the manufacturer's instructions.
4. The maximum working pressure of compressed air lines shall be identified in psi. Pipeline outlets shall be tagged or marked showing maximum working pressure immediately adjacent to the outlet.
5. Never use compressed air where particles can be accelerated by the air stream.

6. Do not use compressed air to clean machinery or parts unless absolutely necessary. Where possible, use a brush. If necessary, use a minimum pressure and provide barriers or clear the area of personnel. Wear goggles to protect your eyes.
7. Never apply compressed air to any part of a person's body.
8. Do not use a compressed air line that does not have a pressure regulator for reducing the line pressure.
9. Keep the hose length between tool housing and the air source as short as possible.
10. Where possible, attach a short length of light chain between the hose and the housing on air-operated tools. This keeps the hose from whipping should the hose-tool coupling separate.
11. Repair hoses where applicable.
12. Turn valve off and vent pressure from a line before connecting or disconnecting it. **Never work on a pressurized line**.

K. Working Safely at Elevations

These procedures are designed to prevent the injury of UTHEALTH HOUSTON personnel due to falls or slips any time personnel are working on portable stairs, ladders, or scaffolding, or at elevations of more than four feet above grade. The following includes information from the applicable OSHA standards.

29 CFR 1910.21-.68.

1. Scaffolding and Elevated Platforms

a. Only tube and coupler or tubular welded frame scaffolding shall be used by UTHEALTH HOUSTON personnel. It shall be erected according to OSHA standards, as specified in 29 CFR 1910.22, .23, and .28.
b. All platforms or scaffolds shall be inspected by the supervisor before use.
c. All elevated platforms shall be surrounded by a standard guardrail, securely fastened to a stationary object, and have a floor capable of withstanding a working load of 75 pounds per square foot.
d. Scaffolds with wheels constructed on the base (bottom) section shall not be used unless all wheels are intact and at least one wheel on each side is locked to prevent movement.
e. The following are general scaffolding rules:
1. Know scaffolding safety rules prior to set up, during operations, and for dismantling of scaffolding. Ensure manufacturer's instructions and safety warnings are legible and remain on scaffolding.
2. Inspect the equipment before use for damage or deterioration.
3. Keep equipment in good repair.
4. Inspect erected scaffolds regularly to ensure they are maintained in a safe condition.
5. Provide adequate sills and posts and use base plates.
6. Anchor wall scaffolds securely between structure and scaffold.
7. Use caution when working near power lines. Never be any closer than ten feet to electrical power lines.
8. Use adjusting screws instead of blocking to adjust for uneven grades.

9. Use outriggers where so equipped.
10. Equip all planked areas with proper guard rails and toe-boards.
11. Do not ride rolling scaffolding.
12. Do not leave materials and equipment on the platform when moving scaffolding.
13. Do not try to move rolling scaffolding without help..
14. Do not let working platform height exceed four times the smallest base dimension unless guyed or otherwise stabilized.
15. Do not overload scaffold.
16. Do not use ladders or makeshift devices on top of scaffolds to increase height.
17. Ensure the footing and anchorage for scaffolds are sound, rigid, and capable of carrying the maximum intended load without settling or displacement. Do not use unstable objects such as barrels, boxes, loose bricks or concrete blocks, etc., to support scaffolds or planks.

2. Rooftop Work

If the rooftop is not provided with an adequate guardrail, the following procedures shall apply:

No employee shall come within 10 feet of the roof's edge without wearing a harness securely attached to an anchored rope or line, with the entire system being capable of supporting a minimum dead weight of 5,400 pounds. No employee shall work on the rooftop if the wind speed exceeds 20 miles per hour.

L. Shoring and Trenching

The walls and faces of excavations and trenches over 5 feet, where workers may be exposed to danger, shall be guarded by a shoring system, sloping of the ground, or some other equivalent means. Trenches less than 5 feet deep with hazardous soil conditions also shall be effectively protected.

The following guidelines are provided:

- Appropriate trench boxes and/or shields may be used in lieu of shoring or sloping.

- Tools, equipment, and excavated material shall be kept 2 feet or more from the lip of the trench. Where employees are required to be in or work in trenches 4 feet deep or more, an adequate means of exit such as ladders or steps shall be provided within 25 feet of travel and used.

- Daily inspections shall be made of trenches and excavations by the supervisor in charge to ensure adequate slopes, shoring and bracing, and that there is no evidence of possible slides or cave-ins.

- Workers shall take extra care when hand excavating in close proximity to utilities to preclude interruption of services an personnel injury and/or

equipment damage which can result from breaking electrical, gas, and steam lines.

M. Barricades

Appropriate barriers shall be erected around excavations, open manholes, open electrical panels, or other such operations that present hazards to personnel working in or near the affected area. Barricades shall delineate the boundaries of work areas. Signs must be posted to warn people of dangers and to identify protective equipment required while in the work zone.

8.4 Electrical Equipment and Lock-out / Tag-out

A. Hazards

Hazards associated with electrical equipment include personnel electrocution or shock, fires, and explosions.

B. Requirements

Electrical installation and utilization equipment will be in accordance with the current edition of the National Electrical Code, National Fire Protection Association (NFPA 70); American National Standards Institute (ANSI) Standard C1. This code will also apply to every replacement, installation, or utilization equipment.

Frames of all electrical equipment, regardless of voltage shall be grounded.

Exposed non-current carrying metal parts of electrical equipment that may become energized under abnormal conditions shall be grounded in accordance with the National Electrical Code.

Wires shall be covered wherever they are joined, such as: outlets, switches, junction boxes, etc.

Parts of electrical equipment which in ordinary operation produce arcs, sparks,
etc., shall not be operated or used in explosive atmospheres or in close proximity to combustible materials.

Equipment connected by flexible extension cords shall be grounded either by a 3-wire cord or by a separate ground wire (except double insulated equipment).

Ground fault circuit interrupters (GFCI) shall be used on all 120-volt, single-phase, 15 and 20 ampere receptacle outlets at job sites when the receptacles are not a part of the permanent wiring of the building or structure. Receptacles on a two wire, single-phase portable or vehicle-mounted generator rated not more than 5 kilowatt, where the circuit conductors of the generator are insulated from the generator frame and all or the grounded surfaces, need not be protected with GFCI's.

C. Inspections

Supervisors will ensure that work areas are inspected for possible electrical hazards.

Sufficient workspace shall be provided and maintained around electric equipment to permit safe operations and maintenance of such equipment.

D. Control of Hazardous Energy (Lock-Out/Tag-Out)

The procedures specified in Appendix A comply with the requirements for the isolation or control of hazardous energy sources set forth in the OSHA standard (29 CFR 1910.147). The accidental release of energy during maintenance work can and frequently does cause severe injuries, amputations, and death. Energy can be present in the form of electricity, potential energy (due to gravity) stored in elevated masses, chemical corrosivity, chemical toxicity, or pressure.

The only exceptions allowed by OSHA to these requirements are those situations that involve "hot tap" operations. For this exception to be valid, UTHEALTH HOUSTON personnel involved must demonstrate that the continuity of services is essential, that shutdown of the energy source is impractical, and that documented (written) procedures and special equipment have been implemented that will provide proven effective protection.

These procedures apply to all maintenance or installation operations conducted at UTHEALTH HOUSTON facilities.

8.5 Machinery

All mechanical motion is potentially hazardous. Motion hazards, such as rotating devices, cutting or shearing blades, in-running nip points, reciprocating parts, linear moving belts and pulleys, meshing gears, and uncontrolled movement of failing parts, are examples of motion associated with machinery.

A. General

1. Personnel Training

Personnel should be trained to safely operate each machine they will be required to use; to recognize potential accident producing situations and to know what to do when hazards are discovered.

2. Personal Protective Equipment

a. Eye protection or face shields will be worn by all personnel within areas where machines are operated.

b. Loose fitting clothing, neckties, rings, bracelets, or other apparel that may become entangled in moving machinery will not be worn by machine operators or their helpers.

c. Hair nets or caps will be worn to keep long hair away from moving machinery.

d. Gloves will not be worn where there is a chance of them being caught in machinery.

e. Ear plugs or muffs will be used when required for worker protection.

EHS should be contacted to assist supervisors in determining personnel protective equipment needs.

3. Environmental

a. Machines designed for fixed locations will normally be securely fastened to the floor or other suitable foundation to eliminate all movement or "walking." Machines equipped with rubber feet, non-skid foot pads, or similar vibration dampening materials will be installed according to the manufacturer's recommendations. Machines that have the potential of tipping or falling over will be firmly secured.

b. Machines that develop fine dust and fumes will be equipped with effective exhaust hoods, connected to an effective exhaust system. An interlocking device should be installed to link the machine's power supply and the exhaust system to prevent the operation of machines without the exhaust system operating.

c. Machines will never be left unattended with the power on unless the worker is operating more than one machine in a battery of machines.

d. No attempt will be made to clean any part of a machine until the moving parts have come to a complete stop.

e. Brushes, swabs, lubricating rolls, and automatic or manual pressure guns will be used by operators to lubricate material, punches, or dies. This equipment will be used so that operators are not required to reach into the point of operation or other hazardous area.

4. Maintenance/Repair

a. When maintenance or repair is needed, machines will be completely shut down and the control switch(es) locked and tagged in the "OFF" position.

b. Cutting tools will be kept sharp and forming tools well dressed and free from accumulations of chips, dust, and other foreign matter. Where two or more cutting tools are used in one cutting head, they will be properly adjusted and balanced.

c. Damaged cutting tools will be removed from service, and repaired or replaced.

B. Guards

Many accidents are caused by machinery that is improperly guarded or not guarded at all.
An important factor that must be kept in mind relative to machinery guarding is that no mechanical motion that threatens a worker's safety should be left without a safeguard.

The following areas of machinery will be provided with barriers and/or enclosures that will effectively prevent personnel from coming in contact with moving components:

- Point of operation exposures such as blades, knives and cutting heads.
- Power transmission exposures such as belts, pulleys, shaft, gears, etc.
- Top, bottom and backside exposures, such as the underside of table saws and the wheels on band saws.
- When a point-of-operation guard cannot be used because of unusual shapes or cuts, jigs or fixtures which will provide equal safety for the operator will be used. Upon completion of an unusual operation, the guard will be immediately replaced.
- Whenever a guard is removed for other than an operational requirement, the machine will be shut down and the control switch(es) locked and tagged in the "OFF" position.
- Guards will be affixed to the machine. Where possible, they will be of the hinged type to enhance maintenance or adjustments.

8.6 Plumbing

A. Hazards

Plumbing maintenance normally includes the installation, preventive maintenance, and repair of water supply systems, sewage and water disposal systems, natural liquefied petroleum gas (LPG) or other gas supply systems (to include gas appliances), and oxygen supply systems. Hazards that may be encountered during plumbing maintenance include, but are not limited to, entry into an oxygen deficient atmosphere (confined space), fire or explosion by introducing an ignition or flame source into a hazardous environment, falls, cave-in of excavated area, burns from heat producing equipment, strains and sprains of the back or other muscle group, and cuts and/or bruises.

B. Personal Protective Equipment

Personal protective equipment worn during plumbing maintenance operations normally consists of eye and/or face protection, work or chemical resistant gloves, and safety-toe shoes. A bump cap or hard hat may be required under conditions that could result in head injuries. Eye or face protection is required while working plumbing connections, with chemicals, or where an eye hazard could exist while using tools or machines, and while working on pressure systems.

*C. Hot Operations (Refer to section **4.2** for "Hot Works" Permit Guidance)*

1. Torches and Furnaces

Only essential fire prevention items pertaining to the operation of blowtorches and plumber's furnaces are included. Work and storage areas for this equipment shall be well ventilated.

a. No one shall be permitted to use a torch or furnace until the user is trained on its use.

b. Where flammable or explosive vapors or dust may be present, torches and furnaces shall not be used until the atmosphere has been vented and the sources of such vapors or dust removed.

c. Gasoline blowtorches and furnaces shall not be used in small, unventilated spaces since they could cause explosions.

d. Combustible materials in locations where torches or furnaces are to be used shall be protected or kept far enough away to prevent their being subjected to sparks or dangerous temperatures.

2. Soldering and Brazing

Soldering and brazing is the joining of metal parts by melting a fusible alloy. When solders used have a melting point above 800 degrees F, the procedure is called brazing.

a. Improper equipment and/or unsafe practices may cause lead poisoning, irritation from fluxes, burns, electric shock, or fires.

b. The concentration of toxic fumes and irritants at the breathing level of the operation shall be checked. Where required because of toxic fumes, a respirator or adequate ventilation shall be provided. Lead-tin, zinc, silver, cadmium, and antimony-tin solders can pose moderate to serious health hazards. Soldering, particularly with lead-tin, in a confined space where ventilation is not adequate to remove toxic fumes may require the use of a self-contained breathing device. EHS shall be consulted for evaluation of potential health hazards and recommendations on respiratory protection during welding, soldering, and brazing operations.

c. Electric soldering irons shall be grounded unless of double insulation construction. All soldering irons shall be placed in suitable non-combustible receptacles when not in use.

d. When required, "Hot Works" permits shall be obtained for these operations.

e. Appropriate safety eyewear shall be worn during all soldering and brazing operations.

3. Tunnels, Pits, and Sumps

a. Where shop personnel are required to work in utility tunnels, pits, and sumps, the atmospheric conditions shall be checked for explosive atmosphere or oxygen deficiency before allowing them to enter. All tunnels, pits, or sumps known to be contaminated shall be tagged or identified for the information of work crews. Workers shall be assigned in pairs for work performed on underground utilities and all known contaminated tunnels, pits, and sumps shall be ventilated while work is in progress.

b. When a manhole or vault is open, at least one member of the crew shall be stationed at the surface. This person shall not, under normal circumstances, leave for any purpose.

NOTE: UNDER NO CIRCUMSTANCES SHALL A PERSON ENTER A SUBSURFACE STRUCTURE FOR ANY REASON WITHOUT A SECOND PERSON TO ACT AS A GUARD AND TO OBTAIN ASSISTANCE IN THE EVENT OF ANEMERGENCY.

In areas where removal of a victim would be difficult, an approved lifeline, equipped with a wrist harness, shall be worn by the person entering the area to facilitate rapid removal in case of an emergency.

4. Compressed Air

Plumbing workers should be trained and authorized to inspect, maintain, or install compressed air systems. Before opening a compressed air line, workers shall ensure the line has been completely drained of existing air to prevent a sudden release of air which will cause the line to whip. The reverse is also true; when personnel have installed a new compressed air system, all parts of the system shall be secured together before air is put into the system. Workers shall wear eye and face protective equipment while working on compressed air systems.

8.7 Gas System Maintenance Gas Systems Maintenance

Maintenance of gas systems, include natural gas, LPG, nitrogen and oxygen. Shop personnel shall be familiar with the properties of the gases in the systems they maintain.

Tools used to repair leaks in, or perform maintenance on, gas lines shall be spark-free and protective clothing shall be static-free.

Emergency Procedures for natural gas leaks:

A report of a suspected gas leak shall be responded too immediately.

Responding to gas leak reports

1. The FPE employee receiving a report of a gas leak should get as much of the information as possible.
2. All reports of gas leaks on UTHEALTH HOUSTON property get assigned a high priority.
3. Upon receiving pertinent information, and determining that a hazardous leak exists inside a building, the caller should be advised on the following:

- Do not operate (do not turn on or off) any electrical appliance or device.
- Extinguish all open flames. Do not light any matches, cigarettes, etc.
- Ventilate the building.

- Turn off the gas supply (only if the caller knows how to do so).
- Evacuate the building to a safe distance. Be close enough to relay information to arriving emergency personnel.

4. Dispatch necessary FPE personnel to the location.
5. Duties of the first responder on the scene, is to take any corrective actions necessary to ensure protection of life, then property.
6. Notify emergency personnel if necessary.

Leaks outside of buildings

1. Assess danger to passersby, surrounding buildings and their occupants, and other property.
2. Extinguish all open flames.
3. Notify UTPD, Houston Fire Department, Supervisor, Centerpoint and EHS (713-500- 8100 or after hours 713-500-5832).
4. If necessary block the street(s) or barricade access to source of leak.
5. Check neighboring buildings for gas vapors, fumes, etc.
6. Implement check list (see below).
7. Repair leak.
8. Upon completion of repairs, check the area using a Combustible Gas Indicator; if determined safe, allow occupants to return to building.

Leaks inside a building

1. Immediately evaluate the building to determine concentration of gas and source of the leak.
2. Do not operate any electrical switches or electrical appliances.
3. Do not use the telephone; turn off pagers and cell phones.
4. Shut off the gas meter valve.
5. Ventilate the building.
6. Notify UTPD, Houston Fire Department, Supervisor, Centerpoint and EHS (713-500- 8100 or after hours 713-500-5832).
7. CHECK ALL GAS PIPING AND APPLIANCE FOR LEAKS.
8. Implement check list (see below).
9. Repair leak.
10. If leak cannot be repaired, notify Supervisor. Turn off the meter, lock it and tag it out.

CHECK LIST

1. [ ] Has the Fire Department been notified?
2. [ ] Have the occupants been evacuated and the area secured?
3. [ ] Has UTPD been notified?
4. [ ] Has a repair crew been notified?
5. [ ] Has the UTHEALTH HOUSTON call list been executed?
6. [ ] Have Emergency Medical Services been notified?
7. [ ] Has the leak been shut off or brought under control?
8. [ ] Has EHS been notified?

9. [ ] Have emergency valves or proper valves to shut down or reroute the gas been identified and located?
10. [ ] If an area has been cut off from a supply of gas, has the individual building been cut off?
11. [ ] Is the situation under control and has the possibility of recurrence been eliminated?
12. [ ] Has the surrounding area, including adjacent buildings and cross streets, been probed for the possibility of further leakage?

RESTORATION OF GAS SERVICE DUE TO OUTAGE

When the supply of gas has been cut off to an area, the gas should not be restored to the affected area until the individual gas services in a UTHEALTH HOUSTON building have been turned off. In restoring service on the UTHEALTH HOUSTON to an affected area, all gas piping and meters must be purged and appliances re-lighted. Never turn gas on at a meter unless you have access to ALL appliances or equipment on the piping.

The UTHEALTH HOUSTON FPE person in charge is to coordinate this operation and be responsible for same.

8.8 Carpentry and Structural Maintenance

A. Hazards

Personnel performing duties in carpentry and structural maintenance are potentially exposed to a wide variety of hazards in many different environments and locations. Potential hazards include exposures to flammable and combustible adhesives, dusts, hazardous noise, eye hazards, working at heights above ground level, lifting hazards, electric and pneumatic power tools, and working with unfinished material which could expose them to splinters.. Potential physical and health hazards can be effectively controlled by proper work procedures and controls, and by using required personal protective equipment.

B. General Carpentry

1. Workers shall not leave a woodworking machine running unattended nor shall they attempt to clear, clean, or repair the machine while it is operating. When maintenance is necessary, the machine shall be turned off, and locked out to prevent operation.

   Supervisors shall ensure that periodic inspections are accomplished on all shop equipment. Machine guards shall not be removed or made inoperative except for authorized maintenance. When guards are removed during machine repair, power control switches shall be locked in the "OFF" position and properly tagged. The machine shall remain locked until the guards are replaced.

2. Personal protective equipment worn while operating machinery, equipment, and saws within the shop and on job sites normally consists of eye protection, safety-toe shoes, dust masks, hard hats, and hearing protection.

3. See Section 4.3 of this chapter for general guidance that applies to both, carpentry and structural maintenance work methods or tools. The following specific guidance applies to table saws:

- Keep hands out of the line of cut when feeding table saws. Use a push stick when close to the blade.
- Adjust saw to expose the least amount of saw blade above table and material being cut.
- Always stand out of line of stock being ripped.
- Hold stock being cut against a gauge when cutting with a circular table saw.
- Always use the appropriate saw for the cut (it would be unsafe to rip with a crosscut saw or to crosscut with a rip saw).
- Avoid crosscutting long boards on a table saw.
- Never adjust the saw or fence gauge while the saw is operating. Designate the line of cut on the table top with a permanent mark when setting the gauge of a table saw without removing the guards.
- Always use a brush or stick to clean or scrape sawdust from a saw.

C. Ventilation Systems

1. Application

   Machines that develop fine dust or other airborne contaminants should be equipped with effective industrial exhaust ventilation. In shops where small numbers of installed machines are not continuously in operation, portable collection systems may be used.

2. Exhaust Ducts and Pipes

   These shall be constructed and sized to minimize clogging. They shall discharge into an enclosed container.

3. Refuse

   Refuse shall be removed daily in all operations that are not required to have an exhaust system or where the refuse cannot be handled by an exhaust system.

D. Storage and Handling of Lumber

1. Storage areas for lumber and other building materials can be potentially hazardous. For example, when lumber is stored upright, precautions shall be taken to prevent it from falling into aisles or passageways. Lumber stored in tiers shall be stacked, blocked, and interlocked and the stacks shall be limited in height so they are stable and secure against sliding or collapse. Furthermore, storage areas shall be kept free of accumulations of materials that constitute tripping, fire, or explosion hazards.

2. When heavy stock cannot be safely handled by workers, suitable mechanical lifting devices shall be used.

3. Gloves shall be worn by workers to reduce injury potential to the hands from splinters or from being pinched between the stacks.

4. Use safe lifting techniques when manually handling lumber.

8.9 Refrigeration and Air Conditioning Maintenance

A. Hazards

Potential hazards associated with refrigeration and air conditioning maintenance include hazardous noise, electrical hazards, exposure to refrigerants, lifting hazards, and compressed gases and cylinders.

B. General Requirements

1. Equipment rooms where air conditioning equipment is installed shall be kept free and clear of all trash and clutter which could present tripping or fire hazards. Refrigerant piping shall be properly insulated, both to improve operating efficiency and to prevent injury to workers who may accidentally come in contact with it. Equipment rooms are not normally designed for, nor intended for, storage of materials.

2. All belts, pulleys, and rotating shafts shall be guarded to prevent accidental contact. Large valve handle stems which can present a bump or trip hazard shall be marked (color coded) for easy recognition.

3. Electrical parts of the equipment and controls shall have all covers and plates in place. Wiring shall be properly secured to the equipment or structure.

C. Storage and Handling

1. Workers shall ensure that containers are legibly marked with the type of gas contained and stored with minimum intermingling of types of refrigerant. Cylinders shall be stored separately from flammable gases and oxygen.

2. Where caps have been provided for valve protection, they shall be kept in place at all times until the cylinder is actually in use.

3. Cylinders shall not be dragged, slid, dropped, or allowed to strike each other or solid objects violently.

4. Containers shall never be lifted by the valve. Cylinders shall not be suspended by chains, ropes, or slings unless the manufacturer has provided appropriate attachment points.

5. Storage areas shall be legibly marked with the names of the gases being stored. Cylinders shall always be secured.

8.10 Heating Systems and Boiler Plant Maintenance

A. Boiler Operations

Written operating procedures and detailed checklists for operator guidance shall be posted in all equipment rooms. It is important that all functions be included, whether manual or automatic. The basic objectives or safe boiler operations are:

1. Require the minimum number of manual operations.
2. Standardize routine operation procedures for normal start-up and on-line operation.

Ensure the use of interlocks to minimize improper operating sequences and to stop sequences when conditions are not proper for continuation. Establish and rigidly enforce purge procedures with necessary interlocks.

B. Boiler Safety

1. Water Level

Water in boilers shall be checked and kept at proper levels. Water columns shall be monitored to ensure connections are clear and water returns to the proper level in the gauge glass when drain valves are closed.

2. Lighting Gas and Oil Fired Furnaces

Before lighting gas and oil fired furnaces, boilers and breaching shall be ventilated to remove explosive vapors. Burners shall not be lit if there is oil on the floors or combustion chamber, around the burners, or in front of the boilers. If the flame of a gas or oil-fired burner goes out, the fuel shall be immediately cut off and the furnace passages ventilated before it is re-lit.

3. Cleaning and Maintenance Procedures

a. Whenever a boiler is taken out of service for a prolonged period, it should be cleaned promptly and inspected for defects by an authorized boiler inspector.

b. At least once a year, the boiler, the flame safeguard supervisory system, and other safety controls shall be inspected during a scheduled shutdown by an authorized boiler inspector who is accompanied by the area supervisor. Defective parts shall be repaired or replaced.

c. Proper and convenient drain connections shall be provided for draining boilers. Unobstructed floor drains, properly located in the boiler room, facilitate proper cleaning. Infrequently used drains should be maintained to ensure they will function as designed.

d. When cleaning a boiler, employees shall wear required PPE.

4. Steam Piping and Valve Maintenance

a. All 4-inch and larger steam valves or main steam valves to any building shall be operated only by qualified heat systems personnel.

b. High pressure steam valves located in confined areas shall not be turned off until the valve controlling the steam is turned off at the main steam plant. After the valve in the confined area has been closed, the valve in the steam plant may be reopened to distribute steam to other areas.

c. When a valve in any confined area is to be opened, the operator shall close the main valve at the steam plant before opening the steam valve in the confined area. The operator shall ensure that all pressure has been bled off prior to opening the steam valve in the confined area. The operator shall open the steam valve in the confined area and move away from the confined area before the main valve at the steam plant may be reopened.

d. No operational changes, repair, or maintenance shall be accomplished on steam lines while there is steam pressure on the lines.

e. Operating personnel shall open drain valves and remove water from the steam line prior to opening a high pressure steam valve.

f. When bypass lines and valves are installed around a high pressure steam valve, the bypass valve shall be opened first. When the steam line becomes heated or the steam pressure equalized on both sides of main steam valve, the main steam valve may then be opened.

g. All high pressure steam valves shall be opened very slowly and everyone shall remain at a safe distance while valve positions are being changed.

h. When dismantling a valve for maintenance, the worker shall ensure pressure has been relieved through all possible means. Personnel shall never position their body over the valve or in line with the direction of travel, in case the bonnet blows.

5. Vaults, Manholes, and Tanks

a. All enclosed areas shall be considered hazardous until tested. They will be tested with oxygen deficiency and combustible gas indicators prior to entry. Contact EHS prior to entering hazardous atmospheres.

b. Only manhole cover hooks or other methods approved for this purpose shall be used when removing or replacing manhole covers. When replaced, the covers shall be properly seated.

c. Personnel shall enter and leave manholes or vaults only by means of a ladder; they will not step on cables, cable hangers, or pipes.

d. Personnel shall not throw tools or materials into or out of manholes or vaults. They will use canvas buckets, hand lines, or other approved methods for lowering and removing tools and equipment.

e. Working on energized equipment is especially hazardous in subsurface structures and will be performed by an electrician.

f. When a manhole or vault is open, at least one member of the crew shall be stationed at the surface to act as a safety observer and take appropriate actions in case of emergency.

g. Cool vests or other heat reducing equipment should be made available to workers who enter vaults or manholes under high heat conditions (e.g., steam leak repair).

C. Boiler Water Treatment Tanks

Some of the chemicals used to treat boiler water are hazardous and shall be handled properly. The following safety precautions shall be observed:

1. Acids

Tests for chemical residuals involve small quantities of acid. The risk is small if spillage is avoided and bottles containing acid are not broken.

Greater risks are involved in the handling of sulfuric acid in the hydrogen-zeolite, demineralizing, and direct-acid treatment processes. Observe the following precautions when handling sulfuric acid:

a. Do not permit diluted or strong sulfuric acid to come in contact with the eyes, skin, or clothing.

b. Always wear full face shields, chemical safety, goggles, neoprene gloves, and a neoprene apron.

c. Never add water or caustic solutions to concentrated acid since a violent reaction will result.

d. Wash down spills with plenty of water. Never use combustibles such as cloths, sawdust, or other organic materials to mop up spilled sulfuric acid. Neutralize spills with soda ash before washing down.

e. In the event of accidental contact, remove all contaminated clothing immediately and wash affected areas with water for at least 15 minutes. Have medical personnel examine affected areas to determine if further treatment is necessary.

2. Caustic Soda

Never add water to caustic soda (the proper method is to add caustic soda to water) because sufficient heat may be generated to cause the solution to boil and spatter.

a. Never store food or eat near caustic soda or in the work area where it is handled.

b. Do not depend upon creams or ointments for protection from caustic soda.

c. Ensure that all personnel exposed to caustic soda wear full face shield, close-fitting chemical safety glasses, neoprene gloves, apron, and coveralls which fit snugly at neck and wrist.

3. Application of Chemicals

a. Always drain the feeder before introducing chemicals into it. Before opening the drain valve, close all pressure connections to the feeder to prevent injury to the operator from hot water or chemicals.

b. Never place dry chemicals in a chemical feeder or pump. This practice plugs the chemical feed lines in a short time.

c. Wherever possible, mix chemicals at floor level to minimize the possibility of injury to eyes and face.

d. Check specifications, temperature, pressure, and materials of construction of piping, valves, and pumps, to determine whether they can be used safely with the chemicals.

4. Chemical Storage/Handling

a. Store all large quantities of chemicals used for boiler or condensate water treatment in locations where accidental spills will be contained and where drainage will not be hazardous to personnel or the environment.

b. Conspicuously post warning and handling instructions where use of toxic chemicals is necessary.

c. Train personnel who handle chemicals in safe chemical handling practices.

d. Practice neutralization and containment techniques and disposal instructions. Consult with EHS as needed.

8.11 Painting Operations

A. Hazards

Painting and paint removal present hazards requiring effective controls. Hazards include exposure to toxic materials and flammable or explosive mists, particulates, and vapors. Inhalation of mists and vapors from nearly all paints, solvents, thinners, cleaning chemicals, strippers, and epoxies can be injurious depending upon the agent's toxic characteristics and the amount and method of exposure.

B. Safety

1. Pressure Equipment

Pressure equipment used in painting operations is hazardous because of the compressed air component; therefore, the supervisor shall assure that spray painting equipment is in serviceable condition.

2. Other Equipment

Painter's ladders, scaffolds, and other equipment shall be inspected prior to use to be certain they are in safe condition.

3. Paint Mixing

Paint mixing shall be done in designated, adequately ventilated rooms constructed of fire- resistant materials. All sources of ignition shall be prohibited in mixing areas. All electrical fixtures or equipment in or within 20 feet of designated paint preparation areas shall meet the requirements of the National Electrical Code (NFPA #70) for Class I Division 2 locations.

4. Housekeeping

Good housekeeping is essential to safe operations in paint shops. Paint rooms, booths, etc., shall be kept clean with equipment stored in a proper and orderly manner. All solvent or paint soiled rags shall be placed in approved self-closing metal containers plainly marked to indicate the contents. At the end of each day, these containers shall be emptied or removed to an approved location for pickup and disposal.

C. Health

1. Personnel Exposures

There is a wide application of organic solvents in painting. All organic solvents have some effect on the central nervous system and the skin. The principal modes of personnel exposure are inhalation of vapors and skin contact and absorption. Personnel engaged in operations should review Material Safety Data Sheets (MSDS) in order to acquaint themselves with the properties and hazards of the solvents that are used. Skin contact with solvents may cause dermatitis, ranging in severity from a simple irritation to actual damage to the skin.

2. Protective Equipment

Personnel engaged in painting and paint removal shall wear protective clothing, devices if required during scraping or paint preparation (abrasive techniques). Clothing shall be changed, as needed, to minimize body contamination.

3. Respiratory Protection

EHS should be consulted for specific advice on respiratory protection required for specific painting activities.

4. Personal Hygiene

The hands and face shall be kept clean, clothes shall be changed when contaminated and hands and soiled objects shall be kept out of the mouth. Do not store or consume food or drink in paint shops. Wash hands thoroughly before eating or smoking.

D. Air and Water Pollution

1. Pollution Prevention

Liquid, solid, and gaseous waste products from painting and paint removal operations shall be disposed of in accordance with federal and state laws. Contact EHS for questions concerning disposal.

2. Spills

All spills of flammable or combustible liquids shall be cleaned up promptly. With major spills, remove ignition sources, evacuate, and ventilate the area, and contact EHS at 713-500-8100 for cleanup.

E. Fire Prevention and Protection

1. Fire Prevention

Painting operations of particular concern are those having a fire potential; i.e., paint removal, solvent wipe and paint application by means of spray apparatus. Certain paints, lacquers, varnishes, shellacs, solvents, and thinners are very flammable. Others, under certain conditions, will burn violently. These, for the purpose of control, are classified as being flammable. Solvent materials selected to do the residual clean up, after the initial
removal, shall have a flash point of 140^{o}F or above.

2. Spray Painting

Spray painting presents varying degrees of fire hazards, depending on the materials used. If possible, abstain from using spray paints with a flash point below 140°F.

3. Extinguishers

Portable fire extinguishers shall be installed near all paint spraying areas. EHS shall determine the type of extinguisher that is appropriate.

F. Ventilation Systems

Ventilation and exhaust systems shall be in accordance with the standard for Blower and Exhaust Systems for Vapor Removal, NFPA 91. Mechanical ventilation shall be in operation while spraying operations are being conducted and for a sufficient time vapors are completely exhausted.
Adequate conditioned make-up air must be provided.

G. Storage and Handling

1. Storage

a. The quantity of paints, lacquers, thinners, solvents and other flammable and combustible liquids kept near spraying operations shall be the minimum required for operations but shall not exceed 1 day's supply.

b. Bulk storage of these liquids shall be in a separate building detached from other buildings or in rooms specifically designed and constructed to meet
flammable storage room requirements.

c. No storage of open containers of solvents is permitted.

d. Supplies of flammable and combustible liquids shall be stored in approved fire- resistant safety containers.

2. Containers

Original closed containers, approved portable tanks, and approved safety cans shall be used for bringing flammable or combustible liquids into spray finishing rooms. Open or glass containers shall not be used.

3. Liquid Transfer

The withdrawal of liquids from containers and the filling of containers, including portable mixing tanks, shall be done only in a mixing room or in a spraying area when the ventilating system is in operation. Precautions shall be taken to protect against liquid spillage.

4. Grounding

Whenever flammable or combustible liquids are transferred from one container to another, both containers shall be effectively bonded and grounded.

H. Electrical

1. Electrical Wiring

Electrical wiring and equipment shall conform to the provisions of the National Electrical Code (NFPA 70). There are alternative electrical wiring in options when the location is adjacent to (rather than inside) a spray area (NFPA 33).

2. Electrical Equipment

Electrical equipment outside of, but within 20 feet horizontally and 10 feet vertically, of any spraying area and not separated from it by partitions extending at least to the boundary of the Division 2 location shall be of non-spark producing design. This

equipment shall also conform to the provisions of NFPA 70, for Class I or Class I, Division 2 locations as applicable.

3. Grounding

All metal parts of spray booths and exhaust ducts conveying flammable or combustible liquids or aerated combustible solids shall be electrically grounded.

I. Location of Paint Shops and Spray Finishing Operations

1. Paint Shops

Paint shops may be located in specially constructed rooms if they are separated from other operations by fire resistant walls. Paint shops should be provided with automatic sprinkler protection.

2. Spray Booths

When possible, paint spray booths shall be located in the paint shop. All spray booths shall be installed to conform to NFPA 33.

3. Prohibited Locations

Spray finishing operations shall not be conducted in a building classified as administrative or public assembly unless a room is specifically designed for that purpose, is protected with an automatic sprinkler system, and is separated vertically and horizontally from such occupancies by not less than two hour fire resistance construction.

J. Airless Paint Spraying

1. Never point an airless spray gun at any part of the body. Paint can be hypodermically injected into the body by the high operating pressures.

2. Do not disconnect the gun from the fluid hose or the hose from the pump until the pressure has been released from the hose.
3. When handling the gun but not actually spraying, hold the gun by the grip and remove the fingers from the trigger. Guns should be equipped with trigger guards and a safety lock. The lock should be in the non-operating position except when the gun is actually in use.

4. Check all hose connections and fittings to make sure they are tight and not leaking. All components shall be designed for such operations.

5. Inspect hose prior to use, and ensure that when in use the hose is kept free of sharps or moving parts.

6. Consult the manufacturer's operating manual for cleaning procedures.

7. The object being sprayed as well as the spray gun, should be grounded to prevent static electricity from being created. Periodic continuity checks should be performed to ensure the hose ground wire is intact.

8. The operator shall wear eye protection and gloves to guard against accidental contact with the spray. Respiratory protective equipment shall be used when needed. Contact EHS for questions concerning PPE.

K. Paint Spray Booths

1. Extinguishers

   Provide portable fire extinguishers adequate to handle the most flammable of the coating materials being used. EHS shall be consulted for appropriate extinguishers needed.

2. Floor Covering

   It is desirable that the floor of paint spray booths be covered with a non-combustible mat, removable for cleaning or disposal.

3. Hoses and Couplings

   Pressure hoses and couplings shall be regularly inspected for condition and shall be replaced as needed.

L. Portable Paint Spray Equipment

1. Compressor

   The air compressor shall be equipped with the following: an ASME rated air tank, a visible pressure gauge on the tank, a pressure reducer with its own gauge, a guard fully enclosing the drive belt and pulleys, and a pressure limiting switch to shut down the compressor when the system's working pressure has been reached. The equipment should be securely mounted on a wheeled carriage for portability. For interior painting only electric motor-driven equipment shall be used.
2. Overpressure Protection

   When separate paint pressure tanks are used, they shall be equipped with a gauge and a relief valve to prevent overpressure. Hoses shall be rated for the maximum working pressure of the system.

3. Maintenance

- A preventive maintenance program shall be implemented to cover periodic inspection and testing of all components.

- Storage of compressors, hoses, paint pressure tanks and spray guns shall be in areas designated and approved by the supervisor in conjunction with EHS.

M. Procedures for the Identification, Safe Removal, and Disposal of Lead-Based Paints

Due to the potential exposure of personnel to lead released during abatement of lead-based paint the following procedures shall be adopted in order to reduce the possibility of human exposure and contamination of the environment.

1. Identification of Lead-Based Paints

Lead-based paints have been used in the past in UTHEALTH HOUSTON buildings. The presence of lead on existing painted surfaces shall be determined by sequential use of the following methods:

a. First, knowledge by painters, maintenance personnel, or contractors of a specific paint that has been applied where the manufacturer's Material Safety Data Sheet documents there is greater than 1% lead in the paint.
b. Second, all "red or rust-colored", and gray primer coats are assumed to contain lead.

c. Third, presence of lead as determined by "lead swabs" or any other direct reading procedure or instrument.

d. Fourth, analysis by a contracted analytical laboratory by the AIHA Environmental Lead Laboratory Accrediation Program.

2. Training of Personnel

a. OSHA hazard communication training specific to lead and any hazardous materials used during the paint removal process. Please contact EHS for training.

b. Respiratory protection training and fit testing.

c. Maintenance supervisors responsible for causing the removal of lead-based paints should be trained by EHS.

d. Hazardous waste training pursuant to 40 CFR 265.16 and 262.34.
3. Work Practices

a. Interior building surfaces

1) All work areas where paint removal or scraping is to be conducted must be sealed off from other work areas. This step includes placing barrier tape across all access areas to the work site and taping 6-mil plastic over all vents, doorways, windows, and other openings into the work site.

2) Personnel shall be instructed not to grind or sand painted areas known to contain lead. Hand scraping is permitted.

3) The work area shall be cleaned periodically during the day by using a combination of a HEPA-filtered vacuum and wiping down the area using damp cloths.

b. Exterior building surfaces

When removing lead-containing paint from the exterior of UTHEALTH HOUSTON buildings, the following occupational health/ environmental guidelines shall be followed:

1) Special precautions shall be taken when working near air intakes, doors, and windows. Air intakes shall be protected by construction of a wood frame and plastic sheeting barrier and shall be of such a size to ensure that air is pulled from uncontaminated areas. Door and windows shall remain closed and shall be sealed with duct tape and/or plastic sheeting.

2) Physical barriers shall be set up around the work area to prevent pedestrian traffic through the work site.
3) Loose and flaking paint should be removed by manually scraping the surfaces of the building. Sanding or grinding will not be permitted.

4) A drop cloth shall be placed directly and completely under the work area. Paint chips shall be collected periodically throughout the day and at the end of the work day and shall be placed in a container with a tight fitting lid or sealed in a plastic bag (6-mil).

c. Abrasive blasting units

1) Removal of paints containing lead or other heavy metals must be conducted in a sealed abrasive blasting unit equipped with a high efficiency particulate air (HEPA) filter.

2) The abrasive blasting media should be used to its fullest extent prior to disposal.

3) Institute the protective measures listed below when cleaning out an abrasive blasting unit.
d. General Practices

1) Personnel shall remove contaminated clothing prior to leaving the work site for breaks, lunch, and at the end of the work day.

2) All surfaces shall be maintained as free as practicable of accumulation of lead- based paint debris.

3) All waste materials, including used disposable clothing, respirator cartridges, plastic, etc. shall be placed in a plastic bag or other container as appropriate and sealed.

4) All tools and equipment used on the project shall be wet-wiped prior to removal from the work site.

5) After the waste containers are sealed, the outside of the container shall be wiped off for any residual dust that may be present prior to being taken off-site for disposal.

4. Protective Measures

a. All personnel shall wear respiratory protection (half-mask, dual cartridge with HEPA filters, as a minimum) and full-body disposable clothing. Personnel shall have a current medical clearance to wear a respirator and have been fit-tested with their respirator.

b. Personnel shall also be provided and instructed to wear face shield or vented goggles, gloves, head coverings, and disposable shoe coverlets.

c. Personnel are not permitted to eat, drink, or smoke in or near the work area.

d. Personnel shall be instructed to wash their face and hands before eating, drinking or smoking and before leaving the work area for breaks or lunch.

e. All personnel involved in lead-based paint removal shall shower at the end of the shift before going home to prevent contamination of their vehicle and exposure of family members and others to lead-containing dust.

f. EHS requires that FPE and Remodeling Services personnel participate in the personal monitoring program in order to determine their potential exposures to lead dust. The results of this monitoring will also be used to determine if personnel need to be enrolled in a medical surveillance program for lead. Contact must be made with EHS prior to the start of the project to coordinate the sampling effort.

g. Contractors are responsible for meeting OSHA personnel air monitoring, personal protective equipment, and medical surveillance requirements for lead exposures (29 CFR 1910.1025, or 29 CFR 1926.62, as appropriate).

5. Waste Disposal

a. Hazardous wastes

Environmental Protection Manager shall be contacted prior to the initiation of a lead- based paint removal project. Environmental Protection can assist in determining whether or not a material is a hazardous waste regulated under the Resource Conservation and Recovery Act (RCRA), as well as specific requirements on proper waste reduction and disposal. EHS will dispose of hazardous wastes generated by in- house maintenance personnel only. Contractors are responsible for disposing of all waste materials that they generate in the course of their work/contract obligations. Specific wastes generated during lead-based paint removal can include, but is not limited to:

- Paint chips/dusts
- Solvents used to remove paints
- Media using in abrasive blasting units

8.12 Renovation and Construction Sites

Remodeling Services shall prepare and carry out an effective fire protection and prevention plan. This plan shall include the components listed below.

a. *Housekeeping*. Good housekeeping, with provision for prompt removal and disposal of accumulations of combustible scrap and debris, shall be maintained in all areas of the jobsite. Self-closing metal containers shall be used for disposal of waste saturated with flammable liquids.

b. *Codes and regulations*. Remodeling Services shall comply with the requirements published in the current revisions of the NEC and NFPA standards.

c. *Smoking*. Smoking or other sources of ignition shall not be permitted in areas where flammable or explosive materials are stored or are present. All such areas shall be conspicuously posted: NO SMOKING OR OPEN FLAMES. There is a no smoking policy in effect within all UTHEALTH HOUSTON facilities.

d. *Fires Detection Point Isolation.* When the potential for generation of smoke or heavy dust exists while performing a job, the building fire detection system shall be isolated at the panel in that building. The smoke detector heads shall never be covered with a bag or glove as an isolation method.

e. *Cleaning and degreasing*. Gasoline and liquids with a flash point below 100 degrees Fahrenheit shall not be used for cleaning and degreasing.

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

g. *Fire extinguishers*. Distinctly marked fire extinguishers rated 2A40B:C or greater shall be suitably placed as follows:

1. At least one located not less than 25 feet, nor more than 75 feet from any outside flammable or combustible liquid storage area.

2. At least one within 50 feet of wherever more than 5 gallons of flammable or combustible liquids or 5 pounds of flammable gas is being used.

8.13 Forklift Operations

The use of forklifts and electric pallet jacks is an integral part of the day to day operations of the UTHEALTH HOUSTON. The use of industrial trucks is governed by OSHA standard 1910.178, Powered Industrial Trucks.

Powered industrial trucks, if not operated properly and conscientiously by trained personnel, have the potential to cause serious personal injuries as well as damage to equipment or property.

Training

1. Only trained and qualified personnel may operate specific powered industrial trucks.
2. A qualified instructor or agency must conduct the forklift training.
3. Refresher training will be conducted every two years.
4. The EHS Department maintains training records.

Inspection

1. The authorized operator at the beginning of each shift must inspect all powered industrial trucks.
2. Should a powered industrial truck be inspected and serviced by a contractor specializing in such services, the area Supervisor will retain the reports generated by the contractor.

3. If a forklift is found to be in need of repair it should be reported to your Supervisor. If the condition of any truck creates a safety hazard, it must be tagged with a **"DO NOT USE"** tag. The tag must list the reason(s) the truck has been taken out of service, and be signed and dated by the operator removing it from service. The key should be removed and turned in to your Supervisor. All trucks taken out of service may only be repaired by a qualified service technician. The truck will not be returned to service until the Supervisor has determined that the truck is safe to operate.

4. Trucks should not be modified from factory specifications in any manner that may affect capacity and safe operation.

Operating Guidelines

- Only trained UTHEALTH HOUSTON employees are authorized to operate a state owned powered industrial truck.
- If the truck is equipped with safety devises such as a fall arrest system or seatbelt it must be used
- Operators may not ride on any truck that is not designed to be ridden.
- Under no condition shall a truck operator allow any person to ride as a passenger.
- Forklifts are not to be used as a substitute for a personnel lift by elevating workers on a pallet or other makeshift work platform.
- Personnel are not allowed to stand or walk under elevated forks.
- Powered industrial trucks are never to be driven directly toward anyone standing in front of a wall, stack of material, or other fixed object.
- Arms, legs or any other body part must never be placed between the lift uprights or outside the truck when operating.

- A forklift is considered unattended if the operator is 25 feet or more away from the truck while it remains in view, or if the operator leaves the vehicle and it is no longer in view.

Y If the truck will be unattended as defined above, the operator must:

* Lower the load or place fork tips on the ground
* Neutralize the controls
* Set the parking brake
* Shut off the engine

Y If the operator is going to get off the forklift but will be within 25 feet and the vehicle will remain in their sight, the following steps must be taken:

* Lower the load or place fork tips on the ground
* Neutralize the controls
* Set the parking brake

- A safe distance must be maintained from the edge of elevated loading docks.
- Always make sure there is adequate clearance overhead when passing under pipes, structures, etc.

Travelling

- Under any and all conditions, operate the truck at a safe speed - the speed limit at the UTHEALTH HOUSTON facility shall be 5 mph or less depending on floor conditions.
- Proceed slowly and sound horn when crossing aisles, going around corners or other instances where vision is obstructed.
- When traveling behind another vehicle, a distance of at least three truck lengths should be maintained.
- On a rider truck, if the load being carried obstructs forward view, the driver is required to travel with the load trailing or use an attendant to help guide them.
- Cross railroad tracks or elevated floor seams diagonally whenever possible.
- Grades and ramps shall be ascended and descended slowly, as close to the center of the ramp as possible. On grades in excess of 10 percent, loaded rider trucks shall be driven with the load upgrade whether they are traveling uphill or downhill. Unloaded rider trucks shall be driven with the forks downgrade whether they are traveling uphill or downhill. All walkie trucks shall travel with the forks downgrade with or without a load, unless the load backrest is needed to support the load or the load restricts visibility. In this situation the operator should walk off to one side so that the operator is protected from a runaway truck or a shifted load.
- If it is necessary to park on a grade the brakes must be set and the wheels chocked.
- Dock boards or bridge plates shall be secured and inspected before they are driven over.
- Be observant while driving. Avoid running over any type of loose objects on the driving surface.

Load Handling

- Only stable and safely arranged loads should be handled.
- Never move a load beyond the rated capacity of the truck.
- Forks should be placed under the load as far as possible and the mast tilted back carefully to stabilize the load.
- Never tilt an elevated load forward unless it is being deposited, as on the second floor or into a rack.
- When loading or unloading a truck van or trailer the vehicle brakes must be set and wheels chocked to prevent movement.
- The flooring of trucks, vans and trailers should be inspected for holes, missing boards or other weaknesses before they are entered with any industrial truck.

Charging And Refueling

- All industrial trucks must be refueled or recharged with the engine off and parking brake set.
- Industrial trucks with internal combustion engines shall only be refueled in designated areas. These areas must be well ventilated and free from sources of ignition such as excessive heat, sparks or open flames.
- When refueling LPG fuel cells, leather gloves must be worn to protect operator's hands from the liquefied gas. All valves must be closed and the fuel line negated of any stored pressure before uncoupling the fuel line connection. The operator should inspect the fuel cell and the fuel line before restarting the truck.
- Electric powered trucks shall only be recharged in designated areas. These areas must be well ventilated and free from sources of ignition such as excessive heat, sparks or open flames. An approved eye/wash and safety shower must be readily available. All electrical connections and wiring should be inspected before proceeding to charge the truck. After charging the operator shall insure that all battery retainers are securely in place. All wiring and power connections must be connected properly and placed in a secure position to prevent damage before continuing to operate the truck.

Reference: 29 CFR 1910.178 Powered Industrial Trucks

8.14 Confined Space Entry

This program defines the specific safety procedures and measures to be used as guidelines when entering a confined space. In addition to university personnel, contractors working at the University are required to follow the written program. FPE and Project Management are responsible for ensuring that the confined space procedures are being followed by the contractors. Contractors in direct control of their work site at the University (for example, a construction site outside of the campus buildings) are allowed to follow their own confined space program, provided that program is as strict or the University's program and has been approved by EHS. The confined space program contains a written procedure which includes:

1. Classification and identification of confined spaces.
2. Hazards associated with confined spaces.
3. Procedure for entering any Confined Space.
4. Responsibilities of all individuals involved in a confined space entry.
5. Inventory of confined spaces around the institution.

6. Air Quality Testing results for confined spaces around the campus.
7. Blank Permit for entry into permit required confined spaces.
8. Blank Non-permit confined space entry notification form for entry in permit required confined spaces rendered non-hazardous by various safety measures.
9. Copies of permit must be posted at the job site and returned to EHS at the completion of the job. The copy must be kept for one year by EHS.
10. An outline of the training requirements for affected employees.
11. Rescue procedures to be followed.
12. Annual review of the program and permits by EHS.

A copy of the confined space program is available upon request from EHS. **Prior to entering a confined space, contact EHS for a copy of the Confined Space Manual and to arrange for permit approval.**

8.15 Ladder Safety

Falls are the primary hazard associated with the use of ladders. Falls result from a number of unsafe acts and conditions such as:

1) Ladders being set on unstable surfaces.
2) Personnel reaching too far out to the sides.
3) Personnel standing too high to maintain balance.
4) Personnel using defective ladders (e.g., broken rails, rungs, missing hardware).

These hazards are minimized if workers adhere to proper ladder safety practices and if supervisors ensure equipment is used, inspected, and maintained in good condition. Tasks which require frequent use of ladders and involve significant climbing effort must be accomplished by workers capable of the physical exertion required under these conditions**.**

(At all times personnel must maintain a three point contact with the ladder)

A. Requirements

- Portable ladders procured for UTHHSC shall be of fiberglass construction.
- Portable ladders shall be equipped with nonslip bases such as safety feet or spikes, depending upon the type of usage.
- Metal ladders shall not be used in applications where the ladder or employee may be exposed to live electrical parts.

B. Care of Ladders

- Handle ladders with care. Do not drop, jar or misuse them.
- Ladders shall be stored in a manner that will provide easy access for inspection and will permit safe withdrawal for use. They shall not be stored in a manner that presents a tripping hazard not where they can fall on someone. They should be stored in a manner that will prevent sagging.
- Lubricate metal bearings of locks, wheels, pulleys, etc., as required to keep them working.

- Replace frayed or badly worn rope.
- Keep safety feet and other parts in good condition to ensure they work.
- Maintain ladders in good usable condition. Inspect ladders prior to use.
- Ladders with defects which cannot be immediately repaired, shall be removed from service for repair or destruction, and shall be tagged with a "Danger" tag.

C. Proper Use of Ladders

The correct procedures for using ladders are as follows:

1) Where possible, portable non-self-supporting ladders will be used at such a pitch that the base of the ladder is placed one foot from the vertical wall for every four feet of height. The ladder shall be placed to prevent slipping, or it will be lashed or manually held in position.

2) Ladders shall not be used by more than one person at a time.

3) Ladders shall not be placed in front of doors opening toward the ladder unless the door is blocked open, locked, or guarded.

4) Do not place ladders on boxes, barrels, or other unstable bases to obtain additional height.

5) To support the top of the ladder at a window opening, attach a board across the back of the ladder, extending across the window to provide firm support against the building walls or window frames.

6) When ascending or descending, users shall face the ladder and use both hands.

7) Ladders with broken or missing steps, rungs, or cleats, broken side rails, or other defects shall not be used. Do not make improvised repairs.

9) Do not splice short ladders together to provide long sections.

10) Do not use ladders as guys, braces, skids, horizontal platforms or scaffolds, or for other than their intended purposes.

11) Do not use a ladder to aid access to a roof unless the top of the ladder extends at least 3 feet above the point of support, at eave, gutter, or roof line.

12) Always raise extension ladders so that the upper section overlaps and rests on the bottom section. The upper section will always overlap on the climbing side of the extension ladder.

13) Nonslip bases are not intended as a substitute for care in safely placing, lashing, or holding a ladder that is being used upon oily, metal, concrete, or slippery surfaces.

14) The bracing on the back legs of step ladders is designed solely for increasing stability and not for climbing.

15) Hooks may be attached at or near the top of portable ladders to provide added stability.

16) When the ladder can be knocked over by others who are working in the area, the ladder will be securely fastened. As an alternative, someone will be assigned to steady the bottom, or the area around the ladder will be roped off.

17) Workers shall not stand higher that the third rung/ step from the ladder top and shall not attempt to reach beyond a normal arm's length.

9.0 Contractor Safety

9.1 Introduction

All firms contracted by University of Texas Health Science Center – Houston (UTHEALTH HOUSTON), because they are employers, are required by the Williams-Steiger Occupational Safety and Health Act of 1970 to provide safe and healthy employment to their employees.

UTHEALTH HOUSTON as an employer is also responsible for providing a safe and healthful work environment for its employees. Contract work, especially in occupied buildings, may present situations or conditions that may adversely impact on the safety and health of UTHEALTH HOUSTON employees.

9.2 Responsibilities

All UTHEALTH HOUSTON personnel responsible for managing contracts will ensure that:

- Each contractor is provided with warnings of hazards and information about UTHEALTH HOUSTON programs for abating these hazards;
- Each contractor is informed of UTHEALTH HOUSTON safety, health, and environmental requirements; and
- The work is conducted in a safe and responsible manner in compliance with applicable regulations and UTHEALTH HOUSTON requirements.

Project Manager

The Project Manager will, prior to the start of the contract, inform the contractor of the requirement to observe all environmental, health, and safety provisions specified in the contract, provided by statutes/regulations or otherwise required.

The Project Manager and his/her representative will:

1. Ensure EHS is provided with a copy of the contractor's written health and safety plan for review prior to the pre-construction meeting with the contractor.
2. Ensure EHS is represented at all pre-construction meetings held with contractors.
3. Provide EHS and UTPD with a tentative construction schedule for contractors' on-site and immediate written notification of changes.
4. Notify EHS/UTPD of contractor work schedule, location, and special precautions or concerns prior to the start of the project.
5. Monitor the contractor's work performance and determine if contractor is complying with the contract health and safety plan and pertinent environmental, health, and safety regulations. Any questions regarding compliance with specific regulations should be referred to EHS.
6. Ensure that all required permits are completed by the contractor and provided for review and signature of an authorized person and/or appropriate EHS personnel.
7. Notify EHS immediately of construction accidents and provide EHS with a copy of the contractor's accident reports.
8. Notify EHS immediately of an OSHA complaint and/or inspection of contractor's jobsite.

Environmental Health & Safety

Environmental Health & Safety (EHS) will conduct a pre-solicitation project review of the contract to ensure that all appropriate health and safety regulations and requirements and pertinent work site hazard information have been incorporated, where necessary. EHS will document review of the plan and will note any areas of special concerns.

EHS will review and monitor the contractor's adherence to its written health and safety plan and all applicable environmental, health, and safety requirements.

Contractor

A firm or individual contracted to UTHEALTH HOUSTON is responsible for meeting all contractual agreements and for providing a safe and healthy workplace for its employees.

The contractor will:

1) Provide for frequent and regular safety inspections of the worksites by a competent employee.
2) Notify the Project Manager of construction accidents in a timely manner.
3) Protect workers and pedestrians, by installing barricades to delineate the boundaries of work areas. Signs must be posted to warn people of dangers and to identify protective equipment required while in the work zone.
4) Certify that their employees have been trained in all regulatory requirements pertaining to the work to be performed.
5) Ensure that all their employees prominently displayed ID badges on their clothing.
6) Notify the Project manager of non-formal OSHA complaint notifications and/or OSHA inspection of the jobsite.

9.3 Health and Safety Plan

When required by the contract, the contractor must develop and implement a comprehensive health and safety plan for his or her employees in which covers all aspects of onsite construction operations and activities associated with the contract. This plan must comply with all applicable health and safety regulations and any project-specific requirements that UTHEALTH HOUSTON has specified.

9.4 Preconstruction Meeting

Representatives of the contractor shall meet with the Procurement Officer, Project Manager, and EHS representative prior to the start of construction for the purpose of reviewing safety requirements and discussing implementation of all health and safety provisions pertinent to the work under contract.

UTHEALTH HOUSTON is required by OSHA standards, most notably 29 CFR 1910.1200, Hazard Communication Standard, to provide information to contractors on the hazards present at the work site. This information will be made available to the contractor in the project specifications (pre-bid) as well as at the pre-construction meeting.

EHS will, during the pre-construction meeting, provide the contractor with information on Hot Works and Fire and Life Safety Impairment permit process.

9.5 Fire Prevention and Protection

The contractor shall prepare and carry out an effective fire protection and prevention plan, including provisions for the fire protection and suppression equipment set forth in this section.

- *Housekeeping.* Good housekeeping, with provision for prompt removal and disposal of accumulations of combustible scrap and debris, shall be maintained in all areas of the jobsite.
- *Codes and regulations.* The contractor shall comply with the requirements published in the current revisions of the National Electrical Code and the National Fire Protection Association standards.
- *Smoking.* There is a no smoking policy in effect within all UTHEALTH HOUSTON facilities.
- *Fires*. Fires and open flame devices shall not be left unattended.
- *Cleaning and degreasing*. Gasoline and liquids with a flash point below 100 degrees Fahrenheit shall not be used for cleaning and degreasing.
- Building exits. All buildings, shops, and plant facilities in which employees are required to work shall have at least two well-marked and lighted exits.
- Fire extinguishers. Distinctly marked fire extinguishers rated 2A40B:C or greater shall be suitably placed as follows:

1) One for each 3,000 square feet of building area or major fraction thereof. Travel distance from any point of protected area to nearest extinguisher shall not exceed 75 feet.
2) One or more on each floor of buildings with at least one located adjacent to each stairway.
3) At least one located outside but not more than 10 feet from the door opening into any room used for storage of more than 60 gallons of flammable or combustible liquids.
4) At least one located not less than 25 feet, nor more than 75 feet from any outside flammable or combustible liquid storage area.
5) At least one within 50 feet of wherever more than 5 gallons of flammable or combustible liquids or 5 pounds of flammable gas is being used.

9.6 Noncompliance with Safety and Health Requirements

If during the course of the contract, EHS personnel note any situations of non-compliance with the contractor's safety and health plan or UTHEALTH HOUSTON safety and health requirements, EHS personnel will bring them to the attention of the Project Manager and the Procurement Officer verbally and will immediately follow-up in writing. Failure to correct the violation or continued violations shall be grounds for termination of the contract.

If after notifying the Project Manager and Procurement Officer in writing of deficiencies in any health, safety, or environmental requirements, EHS personnel find continued violations of

those requirements, or find actions that pose an imminent danger, an immediate order to stop work will be issued. Should this occur, EHS personnel will bring the matter to the immediate

9.7 Safety Training

The contractor must ensure that its employees have completed appropriate health and safety training when required by statute/regulation and UTHEALTH HOUSTON requirements and provide documentation of such training when required by the contract.

9.8 Medical Clearance

The contractor must ensure that its employees have appropriate medical clearance when required either by governmental regulations or by UTHEALTH HOUSTON requirements. Copies of medical clearance for contractor personnel are required to be presented as specified by the contract.

9.9 Incident Reporting

EHS will participate with contractors in the investigations of incidents resulting in injury/illness and/or damage or loss of government property and also near misses.

9.10 Safety and Personal Protective Equipment

Unless otherwise specified, the contractor is responsible for providing all necessary safety and personal protective equipment needed by its employees. This equipment must meet appropriate OSHA and ANSI approval requirements and be in good working order.

The contractor shall ensure that its employees have received appropriate training on the use and maintenance of safety and personal protective equipment prior to its use. Failure to correctly use appropriate safety equipment is a violation of the contract and may result in default of the contract.

9.11 Documentation

The contractor must provide UTHealth Houston with documentation of all required training, medical exams, permits, safety data sheets (SDS), etc., for his or her employees or operations at the pre-construction meeting.

10.0 Office Safety

10.1 Office-Related Illness and Injury

A. Falls

Falls are the most common office accident, accounting for the greatest number of disabling injuries. The following checklist can help stop a fall before it happens.

- Be sure the pathway is clear before you walk.
- Close drawers completely after every use.
- Avoid excessive bending, twisting, and leaning backward while seated.
- Secure electrical cords and wires away from walkways.

- Always use a stepladder for overhead reaching. Chairs should never be used as ladders.
- Clean up spills immediately.
- Pick up objects co-workers may have left on the floor.
- Report loose carpeting or damaged flooring.
- Never carry anything that obscures your vision.
- Wear stable shoes with non-slip soles.

B. Strains and Overexertion

Although a typical office job may not involve lifting large or especially heavy objects, it's important to follow the principles of safe lifting. Small, light loads (i.e., stacks of files, boxes of computer paper, books) can wreak havoc on your back, neck, and shoulders if you use your body incorrectly when you lift them. Before you pick up a carton or load, ask yourself these questions:

- Is this too heavy for me to lift and carry alone?
- How high do I have to lift it?
- How far do I have to carry it?
- Am I trying to impress anyone by lifting this?
-

If you feel that the lift is beyond your ability, contact your supervisor or ask another employee to assist you.

Safe Lifting Steps

- Take a balanced stance feet placed shoulder-width apart. When lifting something from the floor, squat close to the load.
- Keep your back in its neutral or straight position. Tuck in your chin so your head and neck continue the straight back line.
- Grip the object with your whole hand, rather than only with your fingers.
- Draw the object close to you, holding your elbows close to your body to keep the load and your body weight centered.
- Lift by straightening your legs. Let your leg muscles, not your back muscles, do the work. Tighten your stomach muscles to help support your back. Maintain your neutral back position as you lift.
- Never twist when lifting. When you must turn with a load, turn your whole body, feet first.
- Never carry a load that blocks your vision.
- To set something down, use the same body mechanics designed for lifting.

Ergonomic Solutions to Backbreaking Tasks

If you are doing a lot of twisting while lifting, try to rearrange the space to avoid this.

Rotate through tasks so that periods of standing alternate with moving or sitting. Ask for stools or footrests for stationary jobs.

Store materials at knee level whenever possible instead of on the floor. Make shelves shallower (12-18") so one does not have to reach forward to lift the object. Break up loads so each weighs less.

C. *Struck By or Striking Objects*

Striking against objects is another cause of office injuries. Incidents of this type include:

- Bumping into doors, desks, file cabinets, and open drawers.
- Bumping into other people while walking.
- Striking open file drawers while bending down or straightening up.
- Striking against sharp objects such as office machines, spindle files, staples, and pins.

Pay attention to where you are walking at all times, properly store materials in your work area and never carry objects that prevent you from seeing ahead of you.

D. *Caught In or Between Objects*

The last category of leading disabling incidents occurs as a result of office workers who get their fingers or articles of clothing caught in or between objects. Office workers may be injured as a result of:

- Fingers caught in a drawer, door, or window.
- Fingers, hair or articles of clothing and jewelry caught in office machines.
- Fingers caught under the knife-edge of a paper cutter.
- While working on office equipment, concentrate on what you are doing.

E. *Material Storage*

Office materials that are improperly stored can lead to objects falling on workers, poor visibility, and create a fire hazard. A good housekeeping program will reduce or eliminate hazards associated with improper storage of materials. The following are good storage practices:

- Boxes, papers, and other materials should not be stored on top of lockers or file cabinets because they can cause landslide problems. Boxes and cartons should all be of uniform size in any pile or stack. Always stack material in such a way that it will not fall over.
- Store heavy objects on lower shelves.
- Try to store materials inside cabinets, files, and lockers.
- Office equipment such as typewriters, index files, lights or calculators should not be placed on the edges of a desk, filing cabinet, or table.
- Aisles, corners, and passageways must remain unobstructed. There should be no stacking of materials in these areas.
- Storage areas should be designated and used only for that purpose. Store heavy materials so you do not have to reach across something to retrieve them.

- Fire equipment, extinguishers, fire door exits, and sprinkler heads should remain unobstructed. Materials should be at least 18 inches minimum away from sprinkler heads.

10.2 Workstation Ergonomics

Ergonomics means fitting the workplace to the workers by modifying or redesigning the job, workstation, tool or environment. Workstation design can have a big impact on office workers health and well-being.

The key to comfort is in maintaining the body in a relaxed, neutral position. The ideal work position is to have the arms hanging relaxed from the shoulders. If a keyboard is used, arms should be bent at right angles at the elbow, with the hands held in a straight line with forearms and elbows close to the body. The head should be in lined with the body and slightly forward.

Arranging Your Workstation to Fit You

- Adjust the height of the chair's seat such that the thighs are horizontal while the feet are flat on the floor.
- Adjust the seat pan depth such that your back is supported by the chair back rest while the back of the knee is comfortable relative to the front of the seat.
- Adjust the back rest vertically so that is supports/fits the curvature of your lower back.
- With the arms at your sides and the elbow joint approximately 90 degrees, adjust the height/position of the chair armrests to support the forearms.
- Adjust the height of the keyboard such that the fingers rest on the keyboard home row when the arm is to the side, elbow at 90 degrees, and the wrist straight.
- Place the mouse, trackball, or special keypads, next to the keyboard tray. Keep the wrist in a neutral position with the arm and hand close to the body. Adjust the height of the monitor such that the top of the screen is at eye level.
- Place reference documents on a document holder close to the screen and at the same distance from the eye.
- A footrest may be necessary if the operator cannot rest his/her feet comfortably on the floor.

10.3 Indoor Air Quality and Ventilation

The University Administration shares a strong belief that there is a direct correlation between employee health and the quality of their work environment. Indoor Air Quality (IAQ) has proven to be a major component in providing a quality work environment.

Many times odors are associated with chemical contaminants from inside or outside the office space, or from the building fabric. This is particularly noticeable following building renovation or installation of new carpeting. Out-gassing from such things as paints, adhesives, sealants, office furniture, carpeting, and vinyl wall coverings is the source of a variety of irritant

compounds. **In most cases, these chemical contaminants can be measured at levels above ambient (normal background) but far below any existing occupational evaluation criteria.**

Overview of Ventilation Design

The National Institute for Occupational Safety and Health (NIOSH) has conducted hundreds of building studies which indicate that the most likely sources of this problem are - poor ventilation, poor thermal conditions, too high or low humidity, emissions from office machines, copiers and other building contaminants and poor ergonomic layout of workstations.

The American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) has established a general guideline of 20 cubic feet of outside air per minute/per person for an office environment. This is a sufficient amount of air to dilute building contaminants and maintain a healthy environment. Indoor air quality complaints increase significantly in offices that are not supplied sufficient outside air.

Environmental Parameters

UTHHSC Indoor Environment Standards (2000)

FPE is aiming to provide a campus wide standard for the following indoor environment parameters. These parameters are: temperature, humidity, ventilation, noise, lighting, and optimum indoor air quality (IAQ). The space heating and cooling for Animal Care, any specialized research laboratories, computer labs, lab equipment rooms could be modified as per customer request. However, the department should pay both capital and operating cost of providing any special arrangement.

The air distribution system across the campus has undergone several remodeling projects, as well as the age of the building may limit achieving the above standards. However, these problem areas will be identified and remedial measures will be undertaken as part of the facilities operations and capital planning exercise.

The humidity range will be maintained at relative humidity of 55 % + or - 5 % or a maximum of 60 F dew point. Currently we do not have any humidifier located in the air supply; therefore relative humidity could lower up to 20 % during extremely cold season.

For research laboratories, the minimum amount of ventilation will be provided as per research environment guidelines. In the administrative space, the minimum amount of ventilation will be provided to maintain volatile organic compounds, and carbon dioxide levels below the recommended levels.

Indoor Air Pollution

An inadequately ventilated office environment or a poorly designed ventilation system can lead to the build up of a variety of indoor air pollutants.

Controls to Prevent Indoor Air Pollution

The following recommendations and guidelines are useful in preventing indoor air quality problems:

1. HVAC systems should receive periodic cleaning and filters should be changed on a regular basis on all ventilation systems.

2. The ventilation system should introduce an adequate supply of fresh outside air into the office and capture and vent point air pollutant sources to the outside.

3. Office machinery should be operated in well-ventilated areas. Most office machinery does not require local exhaust ventilation in areas that are already provided with 7-10 air changes per hour. Photocopiers should be place away from workers' desks.

4. Office equipment should be cleaned/maintained according to the manufacturer's recommendations. Properly maintained equipment will not generate unhealthy levels of pollutants.

5. Special attention should be given to special operations that may generate air contaminants (such as painting, pesticide spraying, and heavy cleaning).

Evaluation

In order to determine if a possible relationship between any adverse health symptoms and indoor air quality exist, EHS will conduct an indoor air quality survey. Please contact EHS at 713- 500-8100 for an indoor air quality evaluation.

Lighting

Lighting is one of the most important factors affecting personal comfort on the job. The best lighting system is one in which the light level is geared to the task, where brightness ratios are controlled (no intensely bright or dark areas in one field of vision) and where ceilings, walls, and floors are carefully chosen to minimize glare.

Vision problems are one of the leading sources of complaints among office workers. Poor office lighting can cause eye strain and irritation, fatigue, double vision, watering and reddening of the eyelids, and a decrease in the power of focus and visual acuity. Headaches as well as neck and back pains may occur as a result of workers straining to see small or detailed items. Poor lighting in the workplace is also associated with an increase in accidents.

There are a number of measures that can be used to prevent and control poor lighting conditions in the work environment:

1. Regular maintenance of the lighting system should be carried out to clean or replace old bulbs and faulty lamp circuits.

2. A light-colored matte finish on walls, ceilings, and floors to reduce glare is recommended by the Illuminating Engineering Society.

3. Whenever possible, office workers should not face windows, unshielded lamps, or other sources of glare.

4. Adjustable shades should be used if workers face a window.

5. Diffuse light will help reduce shadows. Indirect lighting and task lighting are recommended, especially when work spaces are separated by dividers.

6. Task lamps are very effective in supplementing general office lighting for those who require or prefer additional lighting. Some task lamps permit several light levels.

10.4 Noise

Noise can be defined very simply as unwanted sound. Office workers are subjected to many noise sources including video display terminals, high-speed printers, telephones, fax machines, and human voices. Noise can produce tension and stress as well as damage to hearing at high noise levels.

When employees are subjected to sound levels exceeding OSHA standards, feasible administrative or engineering controls must be utilized. If such controls fail to reduce sound levels, personal protective equipment must be provided and used to reduce sound levels.

For many of the annoying sounds in the office environment, the following measures are useful for reducing the level of noise or its effects:

1. Select the quietest equipment if possible.

2. Provide for proper maintenance of equipment, such as lubrication and tightening of loose parts that can cause noise.

3. Locate loud equipment in areas where its effects are less detrimental.

4. Use barrier walls or dividers to isolate noise sources. Use of buffers or acoustically-treated materials can absorb noise that might otherwise travel further.

5. Schedule noisy tasks at times when it will have less of an effect on the other tasks in the office.

10.5 Office Electrical Safety

Electricity is essential to the operations of a modern automated office as a source of power. Electrical equipment used in an office is potentially hazardous and can cause serious shock and burn injuries if improperly used or maintained.

Types of electrical hazards found in an office environment include the following:

Ungrounded Equipment

Grounding is a method of protecting employees from electric shock. By grounding an electrical system, a low-resistance path to earth through a ground connection is intentionally created. Most fixed equipment such as large, stationary machines must be grounded. Cord and plug connected equipment must be grounded if it is located in hazardous or wet locations, if operated at more than 150 volts to ground, or if it is of a certain type of equipment (such as refrigerators and air conditioners). Smaller office equipment, such as typewriters and coffee pots, would generally not fall into these categories and therefore would not have to be grounded. However much of the newer office equipment is manufactured with grounded plugs as a precaution (three prong plugs). In such cases, the equipment should be used in accordance with the manufacturer's instructions. In any case, never remove the third (grounding) prong from any three-prong piece of equipment.

Overloaded Outlets

Insufficient or overloading of electrical outlets should be avoided. A sufficient number of outlets will eliminate the need for extension cords. Overloading electrical circuits and extension cords can result in a fire. Floor mounted outlets should be carefully placed to prevent tripping hazards.

Unsafe/Non-Approved Equipment

The use of poorly maintained or unsafe, poor quality, non-approved (by national testing laboratory) coffee makers, radios, lamps, space heaters, etc. (often provided by or used by employees) should be discarded. Such appliances can develop electrical shorts creating fire and/or shock hazards. Equipment and cords should be inspected regularly, and a qualified individual should make repairs. Defective, frayed or improperly installed cords for electrically- operated office equipment

Improper Placement of Cords

A cord should not be pulled or dragged over nails, hooks, or other sharp objects that may cause cuts in the insulation. In addition, cords should never be placed on radiators, steam pipes, walls, and windows. Particular attention should be placed on connections behind furniture, since files and bookcases may be pushed tightly against electric outlets, severely bending the cord at the plug.

Electrical Cords across Walkways and Work Areas

An adequate number of outlet sockets should be provided. Extension cords should only be used in situations where fixed wiring is not feasible. However, if it is necessary to use an extension cord, never run it across walkways or aisles due to the potential tripping hazard. If you must run a cord across a walkway, either tape it down or purchase a cord runner.

Live Parts Unguarded

Wall receptacles should be designed and installed so that no current-carrying parts will be exposed, and outlet plates should be kept tight to eliminate the possibility of shock.

Pulling of Plugs to Shut Off Power

Switches to turn on and off equipment should be provided, either in the equipment or in the cords, so that it is not necessary to pull the plugs to shut off the power. To remove a plug from an outlet, take a firm grip on and pull the plug itself. Never pull a plug out by the cord.

Working on "Live Equipment"

Disconnect electrical machines before cleaning, adjusting, or applying flammable solutions. If a guard is removed to clean or repair parts, replace it before testing the equipment and returning the machine to service.

Blocking Electrical Panel Doors

If an electrical malfunction should occur, the panel door, and anything else in front of the door will become very hot. Electrical panel doors should always be kept closed, to prevent "electrical flashover" in the event of an electrical malfunction.

10.6 Office Fire Prevention Strategies

The best time to think about fire safety is before a fire starts. Learn the location of fire escape routes and how to activate the fire alarm. Participate in practice fire drills on a regular basis. Become familiar with stairway exits - elevators may not function during a fire, or may expose passengers to heat, gas and smoke.

1. Heat-producing equipment – space heaters, copiers, work processors, coffee makers and hot plates - are often overlooked as a potential fire hazard. Keep them away from anything that might burn. (only EHS approved space heaters can be used)

2. Electrical appliances can be fire hazards. Be sure to turn off all appliances at the end of the day. Use only grounded appliances plugged into grounded outlets (three prong plug).

3. If electrical equipment malfunctions or gives off a strange odor, disconnect it and call the appropriate maintenance personnel. Promptly disconnect and replace cracked, frayed, or broken electrical cords.

4. Keep extension cords clear of doorways and other areas where they can be stepped on or chafed and never plug one extension cord into another.

5. Do not allow combustible material (boxes, paper, etc.) to build up in inappropriate storage locations (near sources of ignition).

6. Houston building codes does not permit the use of candles in UTHEALTH HOUSTON buildings.

10. 7 Holiday Decorations

Statistics show that hospital and university fires dramatically increase during the holiday season. By following these simple requirements, we can help ensure the safety of all faculty, students,

employees and visitors of UTHEALTH HOUSTON and still enjoy the festive atmosphere accompanying the holiday season.

Clinical and Research Laboratory Areas

- Naturally cut holiday trees or branches are prohibited.
- Artificial and live potted trees and plants are permitted.
- Lights that are used for decorating are to be UL approved and of the non-heat producing variety (Example: twinkle lights). Do not use lights on metal artificial trees.
- Replace any string of lights with worn or broken cords or loose bulb connections.
- Lights shall be unplugged at the end of each work day.
- Extension cords shall be UL approved.
- Extension cords shall not be run across walkways where they may present a trip hazard.
- Decorations shall not obstruct exit corridors, exit signs, fire sprinklers, or other safety equipment.
- Decorations shall not cover the laboratory door "Caution" signs and hazard labels.
- Candles are not permitted at UTHEALTH HOUSTON.

Office and Assembly Areas

- Natural cut holiday trees are permitted only in pre-arranged areas and must be treated with a flame retardant. Keep documentation of flame retardant treatment where the tree is used.
- Keep tree base filled with water to prevent the tree from drying out.
- Artificial and live potted trees and plants are permitted. Artificial trees shall be fire retardant.
- Lights used for decorating must be UL approved and of the non-heat producing variety (Example: twinkle lights). Do not use lights on metallic artificial trees.
- Replace any string of lights with worn or broken cords or loose bulb connections.
- Extension cords shall be UL approved.
- Extension cords shall not be run across walkways where they may present a trip hazard.
- Decorations shall not obstruct exit corridors, exit signs, fire sprinklers, or other safety equipment.
- Candles are not permitted at UTHEALTH HOUSTON.

10.8 Space Heaters

Environmental Health & Safety discourages the use of these devices and should be used only as a last resort for temperature control. If temperature discrepancies exist, customers should contact the FIXT line at 713-500-3498 and inform the Energy Team of the temperature problem. All avenues will be explored by the Energy Team to supply the desired room temperature.

Portable space heaters are strictly prohibited in laboratory areas or other areas where chemicals or combustible materials are stored.

Office Areas

Portable space heaters used in these areas will require inspection and approval by EHS prior to use.

- All heaters must be UL listed.
- All heaters must be equipped with an automatic shut-off device in the event a heater is tipped over or overheats.
- A clear area of three feet in all directions of the heater shall be maintained and in accordance with the clearances shown on the approval agency label.
- Extension cords shall never be used to supply power to the heater.
- Modular furniture electrical systems must be rated to accommodate the additional electrical load supplied to the heater.

Periodic monitoring will be conducted by Environmental Health & Safety to ensure heaters are being used in accordance with the conditions of this policy. After EHS has inspected and approved a space heater an orange zip tie will be placed on the cord. All heaters that are not in compliance must be taken out of service immediately and replaced.

10.9 Break Areas

The University break rooms are available for employees, staff, students and residents. The University of Texas Health Science Center at Houston acknowledge the importance of break rooms. However due to design limitations, break rooms do not have the required ventilation or fire suppression features to be a full use kitchen. Items specifically prohibited in break rooms include:

- Heat-producing electrical appliances are not permitted in offices or break rooms. This includes toaster ovens, griddles, George Foreman Grills, or hot plates.
- Alcohol lamps, sterno warming fluid, oil lamps, fireworks, flammable or combustible materials such as gasoline, kerosene, lighter fluid, charcoal products, or similar substances are not permitted in any break room.
- Candles & incense are not permitted anywhere on campus. If a candle cannot be easily removed from its holder/container/receptacle, all parts will be confiscated and disposed of.
- No Barbeque pits, grills, camp stoves, or open flame appliances are permitted.
- Fryers or hot oil containing cookers are strictly prohibited.

These items will be confiscated and disposed of immediately on the first violation The

Specific items that are allowed in break rooms include:

- Coffee makers with a thermostat and in line fuse
- Iced tea makers with a thermostat and in line fuse
- Hot air popper with a thermostat and in line fuse, no reservoir for heating butter or margarine
- Tea kettle with a thermostat and in line fuse and a restricted spout opening
- Microwaves
- Refrigerators

Approval Process

To get approval for any other items not specifically listed in this guidance document or for the approval of special events, please contact Environmental Health & safety at 713-500-8100.