Environmental Health & Safety

Occupational Safety Plan

EHS PROGRAM CONTACTS

Subject	Office Name	Telephone	Email
Occupational Safety	Occupational Safety Program Manger	940-369-8146	Steven.Wilson2@unt.edu
Occupational Safety	Occupational Safety Specialist	940-369-8790	Bradley.Prince@unt.edu
Environmental Health & Safety	Director	940-565-2167	Chris.Erickson@unt.edu
Environmental Compliance	Environmental Compliance Specialist	940-565-2123	Anthony.Roman@unt.edu
Laboratory Safety	Biological Safety Specialist	940-369-8513	Jordan.Murray@unt.edu
Laboratory Safety	Chemical Hygiene Officer	940-565-3282	Claire.Welton@unt.edu
Laboratory Safety	Radiation Safety Officer/ Laboratory Safety Program Manager	940-565-4196	Todd.Germain@unt.edu
Environmental Compliance	Environmental Program Manager	940-369-8055	Karla.Henson@unt.edu
Risk Management Services	Department Main Line	940-565-2109	AskRMS@unt.edu

Emergency Phone Numbers

Police/Fire/Health/Spill Emergency	Police Dispatch	911
Police/Spill Non-emergency	Police Dispatch	940-565-3000
Hazardous Material Exposure Non-emergency	Risk Management	940-565-2109
Emergency Power Outage	Facilities	940-565-2700

Other Important Institutional Phone Numbers

Research Integrity and Compliance	940-565-4643
UNT Trust Line	877-606-9187

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INTRODUCTION

It is the policy of the University of North Texas (UNT) to provide a safe and healthy working and learning environment for all faculty, staff, students, visitors, and contract employees.

This manual has been prepared by UNT Risk Management Services (RMS) to support that commitment by helping prevent work-related injuries, illnesses, and fatalities, protect UNT resources, and promote the identification and control of hazards encountered in the performance of duties in service to the university.

1.1 PURPOSE

The purpose of this manual is to provide employees with general guidance for developing, implementing, and maintaining a high-quality safety program. It is not intended to serve as an exhaustive source document, but rather as a practical framework for promoting safety throughout the University of North Texas.

This manual brings together information intended to assist employees and supervisors in understanding and fulfilling their responsibilities for maintaining a safe environment at UNT.

All personnel are expected to become familiar with the information contained in this manual and apply it as appropriate to their assigned duties.

1.1.1 Scope

The information and procedures contained in this manual apply to all areas of the University of North Texas and establish general minimum safety standards. They are not intended to replace specialized operating manuals or procedures developed for specific buildings, laboratories, or other work environments to address unique hazards or operational needs. Rather, this manual serves as a foundational document upon which supervisors shall build by incorporating additional safety measures appropriate to their individual work areas and activities.

This manual is intended primarily for internal university use. Its procedures and requirements have been developed in consideration of the facilities, operations, and resources available at UNT. At the same time, they establish a consistent institutional standard for safe work practices.

This manual further sets forth the objectives, standards, and procedures applicable to all employees. It also outlines the general responsibilities, administrative processes, and operational requirements necessary to support university operations and to prevent occupational injuries and illnesses.

1.1.2 Development and Revision Process

This manual has been developed to support hazard mitigation efforts at the University of North Texas. It is based on current industry best practices, as well as applicable state and federal laws, regulations, and guidance.

As requirements and guidance are issued by the Occupational Safety and Health Administration (OSHA), the Environmental Protection Agency (EPA), the National Fire Protection Association (NFPA), the National Institute for Occupational Safety and Health (NIOSH), and the Texas Administrative Code (TAC) are revised, the online version of this manual will be updated as necessary. This manual will be reviewed at least annually.

1.1.3 Record of Changes

Revision #	Date	Revised By	Description
24-01	09-12-24	Steven Wilson	Major Revision
26-01	01-05-26	Bradley Prince	Minor / Contacts
26-02	03-25-26	Steven Wilson	Minor / Formatting

1.1.4 EHS Contacts

Name	Position	Telephone	Email
Scott Dunkle	Exec. Dir. RMS	940-565-4751	Scott.Dunkle@unt.edu
Chris Erickson	Director EHS	940-565-2167	Chris.Erickson@unt.edu
Steven Wilson	Occ. Safety. Prog. Mgr.	940-369-8146	Steven.Wilson2@unt.edu
Bradley Prince	Occ. Safety Specialist	940-369-8790	Bradley.Prince@unt.edu

1.1.5 Emergency Phone Numbers

All Emergencies	Police Dispatch	911
Police / Fire Emergency	Police Dispatch	911
Water Leak	Facilities	940-565-2700
Emergency Power Outage	Facilities	940-565-2700
Hazardous Material Release / Spill	Police Dispatch	940-365-3000

Hazardous Material Exposure / Non-Emergency	Occupational Health	940-565-2109
Laboratory Safety Incident / Non-Emergency	Occupational Health	940-565-2109

1.1.6 Other Important Institutional Phone Numbers

Abuse of Children, Elderly or Disabled	Clay Simmons VP & Chief Integrity Officer	940-565-4364
Ethics Violation	Clay Simmons VP & Chief Integrity Officer	940-565-4364
Report an Ethics Complaint	Call 877-606-9187	Text 940-340-5156

1.1.7 Important Institutional Websites

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PROGRAM MANAGEMENT

2.1 PROGRAM ELEMENTS

2.1.1 Prevention

Risk Management Services (RMS) will promote strategies intended to reduce or prevent adverse outcomes affecting UNT students, faculty, staff, contractors, visitors, and members of neighboring communities.

2.1.2 Surveillance

RMS will provide for the systematic inspection of facilities and the collection, analysis, interpretation, and evaluation of safety and health data essential to the planning, implementation, and continuous improvement of the Occupational Safety Program.

2.1.3 Protection and Control

A system for hazard control will be maintained and will incorporate the hierarchy of controls, including elimination, substitution with less hazardous alternatives, engineering controls, administrative controls, and the use of personal protective equipment.

2.1.4 Education, Promotion, and Training

Health and safety awareness will be promoted by managers, supervisors, employees, and contractors through orientation programs and regularly scheduled safety education and training, as appropriate.

2.1.5 Notification and Communication

Employees and other affected parties, including visitors and contractors, will be notified by RMS of actual or potential exposure to hazardous substances or conditions and informed of the risks associated with such exposure.

2.1.6 Confidentiality

In accordance with UNT policies, RMS will make every reasonable effort to maintain the confidentiality of employee health and exposure records.

2.1.7 Program Evaluation

RMS will conduct an annual evaluation of the program to ensure continued alignment with applicable regulatory requirements and recognized standards. This evaluation will assess program strengths, identify opportunities for improvement, and support ongoing program enhancement.

2.2 CAMPUS-WIDE OCCUPATIONAL SAFETY ASSESSMENTS

This manual outlines the campus-wide building assessment program conducted by Occupational Safety for both on-campus and off-campus facilities to help ensure they are maintained in accordance with applicable standards. Deficiencies identified during these assessments are classified by priority level as High, Medium, or Low and are reported to the designated representative for corrective action. Upon completion of the corrective work, Occupational Safety will inspect the affected area to verify that the deficiencies have been properly addressed and that the work complies with applicable standards.

RESPONSIBILITIES

3.1 ASSIGNMENT OF PROGRAM RESPONSIBILITY

3.1.1 Director for Environmental Health and Safety

The Director of Environmental Health and Safety (EHS) is responsible for:

Identifying the applicable standards, guidelines, and recommendations necessary to maintain a safe and healthy workplace.

Requesting program reviews and audits to support continuous improvement.

Ensuring that accident and incident investigations are conducted promptly and thoroughly, and that accurate findings are communicated to the appropriate departments.

Developing metrics to track trends and support problem-solving initiatives.

Ensuring that UNT personnel take all necessary and appropriate safety precautions.

Providing leadership, vision, and support for Environmental Health and Safety managers.

3.3.2 Occupational Safety Program Manager

The Occupational Safety Program Manager is responsible for:

Identifying the applicable safety and health standards, rules, and regulations pertaining to the various areas of the UNT campus.

Providing an appropriate level of oversight when conditions require corrective actions.

Providing training and education opportunities.

Investigating and generating incident reports as requested.

Conducting regular surveys of UNT campus operations to ensure compliance with safety

Initiating corrective actions necessary to remediate identified hazards or immediately dangerous to life and health (IDLH) conditions.

Ensuring UNT personnel take all necessary and appropriate safety precautions to protect themselves, others, property, and the environment.

Providing guidance and oversight for Occupational Specialists.

3.3.3 Occupational Safety Specialist

The Occupational Safety Program Specialist is responsible for:

Ensuring safe operations through facility and site inspections.

Maintaining comprehensive records of hazards at the operational level and providing information to program management

Providing training and education opportunities.

Investigating and generating incident reports as requested.

Conducting regular surveys of UNT campus operations to ensure compliance with safety standards.

Initiating corrective actions necessary to remediate identified hazards or immediately dangerous to life and health (IDLH) conditions.

Ensuring UNT personnel take all necessary and appropriate safety precautions to protect themselves, others, property, and the environment.

3.3.4 Supervisors and Managers

Supervisors at all levels throughout the university are responsible for maintaining a safe and healthy workplace. Each member of the management team shall ensure compliance with all applicable safety and health standards, rules, and regulations governing the activities under their authority. Supervisors shall also ensure that all personnel under their supervision complete required training related to the safety and health precautions applicable to their work. In carrying out these responsibilities, supervisors may request assistance from Environmental Health and Safety (EHS) as needed.

3.3.5 Employees

Employees at all levels throughout the university are responsible for complying with all applicable health and safety standards, rules, and procedures related to the activities in their work areas. Employees are also responsible for completing all assigned workplace safety training in a timely manner. All personnel shall take the necessary and appropriate precautions to protect themselves, other individuals, university property, and the environment.

GENERAL HEALTH AND SAFETY

4.1 GENERAL

It is the goal of the University of North Texas to comply with all applicable requirements and guidance issued by the Occupational Safety and Health Administration (OSHA), the Environmental Protection Agency (EPA), the National Fire Protection Association (NFPA), the National Institute for Occupational Safety and Health (NIOSH), and the Texas Administrative Code (TAC). This section provides general information regarding the recognition, evaluation, and control of occupational health hazards to which employees may be exposed.

4.2 PREVENTION AND CONTROL OF WORKPLACE HAZARDS

To support the university's safety objectives, the Occupational Safety Program has been established to promote a safe environment in which to work and learn. All recognized safety and health hazards shall be mitigated in accordance with the hierarchy of controls, with priority given to hazards presenting the greatest risk.

4.2.1 Principles of Hazard Control

Elimination

- Does this task or activity need to be performed?

- Can the desired result be achieved in another manner or obtained from another source?
- Can this task be performed from the ground rather than at elevation?
- Can this blind spot be eliminated?

Substitution / Replacement

The risk of injury or illness may be reduced by replacing an existing process, material, or piece of equipment with a comparable alternative that presents less hazard potential. Care shall be taken to ensure that any substitution is technically acceptable and does not introduce new or unforeseen hazards.

- Can a less toxic chemical be used, such as low-VOC paint?
- Can a different piece of equipment be used, such as a larger or newer forklift?

Engineering Controls

Hazards should be controlled through engineering methods whenever feasible.

- Isolation: Hazards may be controlled by placing an appropriate barrier between the hazard and the individual who may be affected. This may include physical barriers, time separation, or distance. Examples include machine guards, electrical insulation, glove boxes, acoustic enclosures, and remote-controlled equipment. Increasing distance from the hazard and reducing exposure time are also effective methods of control.
- Ventilation: Airborne hazards may be controlled through ventilation by capturing and removing the contaminant at its source through local exhaust or, where local exhaust is not feasible, by reducing the concentration through dilution with uncontaminated air.
- Other examples may include equipment modifications such as speed limiters on golf carts.

Administrative Controls

Administrative controls rely on effective work practices and procedures to reduce employee exposure to chemical, physical, and other workplace hazards. These measures may include training, established safe work procedures, preventive maintenance programs, modified work schedules, job rotation, and restricted access to high-hazard areas.

Examples include:

- Training and certification of forklift operators
- Training on warning devices such as backup alarms
- Training pedestrians to recognize forklift blind spots
- Training machine operators on the hazards of wearing jewelry or loose-fitting clothing
- Requiring electricians and other affected employees to follow lockout/tagout procedures

Personal Protective Equipment (PPE)

Personal protective equipment is the least preferred method of hazard control because it depends on proper selection, use, and wear by the employee and is generally less effective than elimination, substitution, engineering controls, or administrative controls. Nevertheless, there are situations in which adequate risk reduction cannot be achieved through other means, and PPE must be used either alone or in combination with other protective measures.

Each department is responsible for providing appropriate PPE for its employees and ensuring that it is properly used, stored, maintained, and disposed of.

Examples include:

- High-visibility vests
- Hard hats
- Safety glasses
- Welding helmets
- Respiratory protection

4.2.2 Application of Hazard Control Principles

Hazardous conditions in the workplace can often be prevented through appropriate planning and decision-making during facility design, development of operating procedures, and the procurement of equipment and materials.

Permanent Hazard Abatement

Engineering controls are the preferred method of hazard control, followed by administrative controls and the use of personal protective equipment.

Design Reviews

Occupational health and safety considerations shall be incorporated into the design and engineering of all facilities that are acquired, constructed, or renovated. To help ensure that appropriate hazard control measures are included, Risk Management Services (RMS) shall participate in the review of plans and specifications for construction and renovation projects.

Operating Procedures

Standard operating procedures, safety policies, and similar directives shall be developed collaboratively by RMS and the affected department(s) to ensure that policies and procedures are comprehensive, practical, and effective. All university employees and subcontractors shall comply with the applicable safety policies and procedures for the work being performed.

Purchasing Procedures

Many hazards can be avoided by incorporating appropriate health and safety specifications into the purchase of equipment, materials, and contracted services involving work at UNT facilities. University departments responsible for developing specifications for such purchases shall coordinate with RMS to ensure that applicable safety and health requirements are properly addressed.

4.3 HAZARD REPORTING

The identification and reporting of potentially unsafe or unhealthful working conditions is a shared responsibility of all University of North Texas employees. All employees are encouraged to promptly report unsafe or unhealthy working conditions to Risk Management Services (RMS) or to their immediate supervisor so that the situation may be investigated and appropriate corrective action taken.

Any physical hazard or unsafe act involving an employee or contractor should be reported immediately to Risk Management Services at 940-565-2109 or AskRMS@unt.edu. A safety representative will respond to the location, investigate the concern, and work directly with the responsible individual or department to mitigate the hazard.

4.4 HAZARD COMMUNICATION

UNT Facilities Services personnel and laboratory employees perform a wide range of operations that often require the use of chemicals with inherent physical and health hazards. In accordance with the Texas Hazard Communication Standard, the university shall provide employees with information regarding hazardous chemicals present in the workplace through a written program, employee training, safety data sheets (SDS), labels and warnings, and other relevant hazard information. Additional information is available in the UNT Chemical Hygiene Plan and Hazard Communication Program.

4.5 HEARING CONSERVATION

Noise is one of the most common occupational health hazards in the workplace. Exposure to elevated noise levels may result in temporary or permanent hearing loss and may also contribute to other adverse health effects. The extent of hearing damage depends primarily on the intensity of the noise and the duration of exposure. Noise-induced hearing loss is irreversible, may worsen with continued exposure, and can be further aggravated by the normal aging process. Individual susceptibility to hearing loss from noise exposure may vary.

To support compliance with OSHA standard 29 CFR 1910.95, Occupational Noise Exposure, Risk Management Services (RMS) will conduct noise monitoring and assist departments in the selection of appropriate hearing protection and, where feasible, engineering controls.

4.6 MOLD MANAGEMENT PROGRAM

Visible mold contamination, regardless of species, shall be addressed promptly to prevent further growth and potential damage to building materials. Mold growth may adversely affect cellulose-based materials such as drywall, ceiling tiles, paper products, and similar porous surfaces. Effective mold management requires the complete removal of visible mold, removal and replacement of mold-contaminated porous materials when necessary, correction of the moisture source, and maintenance of appropriate indoor air quality (IAQ) conditions to help prevent recurrence.

In Texas, mold assessment and remediation activities are regulated under the Texas Mold Assessment and Remediation Rules, 25 TAC §§ 295.301–295.338. There are currently no federal regulations that specifically govern mold. Any suspected or observed mold growth within UNT facilities shall be reported to Risk Management Services (RMS). RMS will assess the affected area, determine the extent of contamination, and recommend an appropriate course of action.

4.7 ASBESTOS MANAGEMENT PROGRAM

Activities involving asbestos-containing materials (ACM) are governed by applicable federal, state, and local regulations. These requirements address, as applicable, permissible exposure limits, exposure monitoring, respiratory protection, hygiene practices and facilities, hazard communication, medical surveillance, employee training, recordkeeping, and waste handling and disposal.

Asbestos fibers generally become a hazard when asbestos-containing materials are damaged, disturbed, or otherwise rendered capable of releasing fibers into the air. Materials that may contain asbestos include, but are not limited to, fireproofing, floor tile, pipe insulation, sprayed-on acoustic materials, and other insulating or surfacing materials.

Before any renovation, demolition, dismantling, or other activity that may disturb building materials within UNT facilities, the affected area shall be evaluated by a properly licensed asbestos inspector, and Risk Management Services shall be contacted to ensure compliance with all applicable requirements. When asbestos-containing material is identified, Facilities Services and/or RMS shall oversee or coordinate asbestos-related activities as appropriate.

4.8 HOUSEKEEPING

All work areas, including exterior areas, shall be maintained in a condition consistent with the nature of the work being performed. These areas shall be kept free of pallets, debris, trash, scrap materials, spills, and other unnecessary items that could create health hazards, fire hazards, or unsafe conditions that may result in injury.

Mechanical rooms, electrical rooms, and similar service areas shall not be used for storage.

HEALTH SERVICES

5.1 INJURIES

5.1.1 Emergency Treatment of Occupational Illness or Injury

In the event of a life-threatening emergency, call 9-1-1 immediately or seek treatment at the nearest emergency room. Transportation provided by emergency medical services will be to a hospital emergency room only. If emergency responders arrive, assess the individual, and transportation is offered but declined, the individual may be required to sign a release indicating that treatment and transport were refused.

If an employee declines transport by emergency medical services but still wishes to seek medical treatment, it is the employee's responsibility to arrange appropriate transportation. Employees shall not drive themselves if the injury involves a limb, impaired mobility, or an altered level of consciousness or awareness that could affect the safe operation of a motor vehicle. In such cases, transportation should be arranged by the employee's work center using an authorized driver and state vehicle, as appropriate. Minor injuries requiring only first aid may be treated at the site of the incident when appropriate.

5.1.2 Reporting of Injuries and Incidents

All work-related injuries shall be reported as soon as possible through the Insurance and Claims program on the Risk Management Services website. All laboratory incidents shall be reported to Risk Management Services (RMS) through the online incident report form.

5.1.3 Medical Treatment

Medical evaluation and treatment for personnel exposed to hazardous health conditions are essential components of the occupational health program. Such examinations and follow-up care shall be appropriate to the type of exposure or operation involved. Any person who knows or suspects that they have been exposed to a hazardous substance or condition shall immediately notify their supervisor and Risk Management Services.

Any individual exposed to a harmful contaminant that may present a risk of contaminating other persons or the work area shall remain isolated, if feasible, until appropriate assistance is obtained.

Employees who are injured on the job and require medical treatment must be seen by an approved workers' compensation in-network provider. Treatment obtained from an out-of-network primary care provider may be at the employee's expense and may not be covered by workers' compensation.

If an employee is injured on the job, the supervisor shall complete the Employee Injury Report, available on the Forms page under the "Insurance and Claims" section of the UNT Risk Management Services website.

For life-threatening emergencies, call 9-1-1 or go to the nearest emergency room. The medical provider should be informed that the individual is employed by UNT and that the injury is work related.

For non-life-threatening injuries, the Insurance and Claims section of RMS can direct employees to approved providers. Nova Medical Center in Denton is experienced in the treatment of occupational injuries and is generally open during normal weekday business hours. Care Now facilities may also accept workers' compensation claims; however, wait times may be longer and online check-in may not be available. A supervisor may authorize treatment for a work-related injury, and employees do not need to wait for RMS personnel to provide that authorization.

Even if an employee declines medical treatment, the supervisor shall still complete the Employee Injury Report Form. If the employee later determines that medical treatment is needed, RMS will provide guidance regarding the next steps.

5.2 EMPLOYEES WITH DISABILITIES

Architectural barriers should be identified and eliminated whenever feasible, and appropriate emergency planning measures, including the development of a "buddy system," should be considered to help ensure that employees are able to evacuate or relocate safely during an emergency. Employees with disabilities are encouraged to contact the Occupational Safety Department for assistance in developing a personalized emergency plan. Applicable accessibility requirements are addressed in the Uniform Federal Accessibility Standards issued under the Architectural Barriers Act, 42 U.S.C. §§ 4151–4157, 36 CFR Part 119, and the Americans with Disabilities Act (ADA).

5.3 IMMUNOCOMPROMISED INDIVIDUALS

Individuals with compromised immune systems are encouraged to discuss workplace hazards and potential limitations with their personal healthcare provider. Such individuals are also encouraged to self-identify, as appropriate, so that workplace risks may be assessed and reasonable precautionary measures considered.

5.4 MEDICAL SURVEILLANCE AND EXPOSURE CONTROL PROGRAMS

Certain positions at UNT involve inherent risks that require enhanced review, monitoring, and medical evaluation through the Occupational Health Program. Based on applicable risk assessments, an employee may be required to participate in a specific exposure monitoring or

medical surveillance program. The purpose of medical surveillance is to support the early detection and prevention of occupational illness and to identify conditions that may increase an individual's risk of work-related disease.

When participation in a medical surveillance program is required, the employee must complete a medical questionnaire. Information contained in the questionnaire is confidential and will not be reviewed by UNT personnel. These forms are submitted to the occupational health physician or other licensed healthcare professional (PLHCP) for review and determination of whether additional medical evaluation or preventive services are necessary. Such services may include, as appropriate:

- Review of work history and hazard exposure
- General physical examination
- Blood and urine testing
- Vision and hearing testing
- Pulmonary function testing
- Immunizations, when indicated
- Allergy testing

Referral for additional specialized testing, when needed, such as chest radiographs or laser eye examinations.

Following evaluation, the PLHCP will provide a written medical opinion to the appropriate UNT division and the employee indicating whether the individual is medically cleared for work, along with any applicable conditions, limitations, personal protective equipment recommendations, or work practice recommendations. Specific medical diagnoses or underlying conditions requiring limitations, restrictions, or modifications will not be disclosed to UNT.

The PLHCP may also provide recommendations to Risk Management Services (RMS) regarding workplace risk assessments or exposure control measures. Covered individuals must update medical questionnaires as required by the medical clearance determination or whenever there is a change in health status that may affect work-related risk. Periodic medical review applies only to personnel whose exposures are covered by applicable regulations, standards, or institutional guidelines.

Enrollment in surveillance programs is based on individual workplace risk. Current surveillance programs include the following:

This program applies to covered individuals who work with animals or animal tissues and is intended to evaluate the potential for occupationally induced animal allergies, laboratory-acquired allergies, and other related illnesses.

The purpose of UNT's Animal Exposure Surveillance Program is to reduce health risks associated with the care and use of animals in research, teaching, and service activities.

Covered individuals who experience work-related allergy symptoms should seek medical evaluation through a UNT workers' compensation-authorized treating physician.

UNT reduces the risk of occupational illness and allergy associated with animal use through a combination of annual occupational health risk assessments, training, personal hygiene practices, engineering and administrative controls, personal protective equipment, and annual medical surveillance. Control measures include building ventilation and HVAC systems, caging systems with HEPA filtration, pressure differentials, and directional airflow to enhance containment, and work practices designed to reduce allergen levels, such as transporting waste and bedding in sealed containers and using wet or damp cleaning methods instead of dry sweeping. Personal protective equipment may include protective clothing, gloves, and respiratory protection, as appropriate for the tasks performed.

Annual animal allergy and exposure medical surveillance is provided for covered individuals, along with preventive medical services as described above. Vaccinations may be recommended or required when an individual works with an infectious agent for which an FDA-approved vaccine is available, and such vaccinations will be provided at no cost to the covered individual. Tetanus immunization is recommended every ten years for certain employees and may be required in specific work areas, such as the vivarium or animal laboratories. Immunization history will be evaluated during the risk assessment process.

5.4.1 Animal Worker Medical Surveillance and Allergy Prevention Program

- This program applies to covered individuals who work with animals or animal tissues in order to evaluate the potential for occupationally induced animal allergies, laboratory-acquired allergies, or other related illnesses.
- The purpose of UNT's Animal Exposure Surveillance Program is to reduce health risks associated with the care and use of animals in research, teaching, and service activities.
- Any individual experiencing work-related allergy symptoms should seek medical evaluation through a UNT workers' compensation-authorized treating physician.
- Measures used by UNT to reduce the development of occupational illness and allergy associated with animal use include:
    - Annual occupational health risk assessments
    - Training, including information provided following enrollment in the Occupational Health Program
    - Personal hygiene practices
    - Facilities, procedures, and monitoring, including:
- Building ventilation and HVAC systems

- Caging systems with HEPA filtration, pressure differentials, and directional airflow to enhance containment
- Work practices designed to reduce allergen levels, including transporting waste and bedding in sealed containers and using wet or damp cleaning methods instead of dry sweeping

v. Personal protective equipment, including:

Protective clothing, gloves, and respiratory protection, as appropriate for animal work

vi. Annual animal allergy and exposure medical surveillance, along with preventive medical services as described above

Vaccinations may be recommended or required when an individual works with an infectious agent for which an FDA-approved vaccine is available, at no cost to the covered individual.

Tetanus immunization is recommended every ten years for certain employees and may be required in specific work areas, such as the vivarium or animal laboratories. Immunization history will be evaluated during the risk assessment process.

5.4.2 Medical Treatment

B. Rabies Immunization Program

Pre-exposure rabies immunization, follow-up antibody titer monitoring every two years, and booster immunization as indicated by risk assessment shall be provided for personnel who work directly with the rabies virus, have direct contact with animals held for rabies surveillance, may be exposed to animals or animal tissues potentially containing rabies virus, are responsible for the control of wild animals on campus, have routine contact with potentially rabid animal species, or perform certain laboratory duties involving rabies risk.

5.4.3 Medical Treatment

C. Hepatitis B Vaccination Program

Hepatitis B vaccination shall be made available to employees who may reasonably anticipate exposure to bloodborne pathogens in the performance of their regular job duties.

5.4.4 Medical Treatment

D. Other Vaccinations

Additional vaccinations may be made available based on risk assessment and consultation with the UNT occupational health provider.

INCIDENT REPORTING AND INVESTIGATION PROCEDURE

6.1 INTRODUCTION

The university shall maintain an incident reporting system to document incidents involving UNT personnel that arise out of, or in the course of, employment and that result in, or have the potential to result in, property damage, injury, illness, or death.

The purposes of incident reporting are to:

- ensure that all incidents are reported and investigated appropriately
- establish a written record of the circumstances and contributing factors associated with each event
- provide data for incident tracking, trend analysis, and continuous improvement
- identify and evaluate serious events and near misses that may pose a hazard to employees, visitors, students, or other individuals on campus
- support compliance with applicable reporting requirements

6.2 APPLICABILITY AND SCOPE

These reporting requirements apply to all incidents involving UNT personnel that arise out of or in the course of employment and that result in, or could reasonably have resulted in, personal injury, illness, property damage, or vehicle damage.

6.2.1 Incident

For purposes of this manual, an incident is any unplanned event or sequence of events, whether or not it results in injury, illness, disease, death, property damage, equipment damage, material loss, or environmental harm. Incident-related losses may include personal injury or illness, damage to property or equipment, material loss, environmental impact, or other adverse consequences.

Reportable injuries and illnesses include those that occur in the course of work and result in lost time, work restrictions, first aid, medical treatment, permanent bodily injury, or death.

Examples include, but are not limited to:

- heat exhaustion resulting from work in hot environments
- back strain resulting from moving equipment
- acid burns to the fingers
- damage to a state vehicle

- fire or explosion
- property damage
- chemical releases requiring evacuation of the immediate spill area

6.2.2 Near Misses

Near misses are also considered incidents and must be reported even when they do not result in observable injury, illness, disease, death, or property damage. Information obtained through near-miss reporting is valuable in identifying hazards and correcting unsafe conditions before they result in actual loss or harm.

Examples of reportable near misses include, but are not limited to:

- a falling compressed gas cylinder
- overexposure to chemical, biological, or physical agents without an immediately observable injury or illness
- slipping on a wet surface without injury
- failure to obtain a required permit for high-hazard work, such as confined space entry or elevated work

6.3 RESPONSIBILITIES

6.3.1 Risk Management Services

Occupational Safety will review and investigate incidents referred by Insurance and Claims to determine the root cause or causes that contributed to the injury or event. Occupational Safety will provide management with a brief summary of the incident, along with recommended corrective and preventive actions intended to reduce the likelihood of recurrence.

6.3.2 Workers' Compensation and Insurance

Risk Management Services Insurance and Claims has overall responsibility for administering the Incident Reporting System and maintaining employee records associated with workers' compensation and insurance claims.

6.3.3 Managers and Supervisors

Managers and supervisors are primarily responsible for ensuring that required incident report forms are completed accurately and submitted to the appropriate parties in a timely manner.

6.3.4 UNT Personnel

All UNT personnel are responsible for initiating the incident reporting process by notifying their supervisor as soon as possible of any actual or potential injury, illness, or incident arising out of work activities.

6.4 INCIDENT REPORTING PROCEDURES AND PRACTICES

This section describes the procedures that UNT personnel shall follow to report incidents, occupational injuries and illnesses, and other related events.

6.4.1 Reporting

To officially report an incident, the Employee Injury Report (Incident Only) form must be completed online through the UNT Risk Management Services website.

Employees shall report all incidents to their supervisor immediately. If the employee is in a life-threatening situation, UNT Police should be contacted by calling 9-1-1. Once the affected employee is no longer in immediate danger, the supervisor shall complete the workers' compensation packet with the injured employee within 24 hours of the incident. Supervisors are responsible for ensuring that the required electronic forms are completed in a timely manner for all reportable incidents.

6.4.2 Incident Scene

The scene of any serious incident shall be secured until the investigation has been completed. Work in the affected area shall be suspended until the investigation is concluded and Risk Management Services, in consultation with management, authorizes work to resume.

6.4.3 Recordkeeping

Insurance and Claims shall maintain records of all Employee Injury Report forms. Information derived from injury and illness reports shall be used to identify trends, evaluate risks, and support corrective actions intended to prevent recurrence.

6.5 INCIDENT INVESTIGATIONS

Risk Management Services Occupational Safety personnel will review each significant incident referred by Workers' Compensation and Insurance based on factors that may include:

- the type or severity of the incident
- the number of injuries involved
- the level of continuing risk the hazard poses to people or property
- a request from the Claims department

Based on the initial incident assessment, Risk Management Services Occupational Safety will:

- determine whether a root cause investigation is required
- recommend corrective actions necessary to reduce or eliminate hazardous conditions
- monitor the remediation process to help ensure that safety requirements and corrective measures are properly implemented

RISK ASSESSMENT

Risk assessment is the process of evaluating a workplace, process, activity, or work method to identify potential hazards and assess the risks associated with those hazards. After hazards are identified and the severity and likelihood of associated risks are evaluated, appropriate control measures shall be implemented to eliminate the hazard or, when elimination is not feasible, reduce the risk to an acceptable level.

The risk assessment process generally includes the following steps:

- hazard identification, including the recognition of hazards and risk factors that have the potential to cause injury, illness, property damage, or other harm
- risk analysis and evaluation, including assessment of the likelihood and severity of harm associated with the identified hazard
- determination and implementation of appropriate control measures to eliminate the hazard or reduce the risk when elimination is not possible

7.1 IMPORTANCE OF RISK ASSESSMENTS

Risk assessments are a fundamental component of an effective occupational health and safety program. They help to:

- increase awareness of hazards and associated risks
- identify individuals who may be affected, including employees, students, visitors, contractors, and members of the public
- determine whether specific control measures are necessary for a given hazard
- evaluate whether existing controls are adequate or whether additional measures are needed
- prevent injuries and illnesses, particularly when conducted during the design or planning phase
- prioritize hazards and corrective actions based on risk
- support compliance with applicable legal and regulatory requirements

7.2 GOALS OF RISK ASSESSMENTS

The goal of a risk assessment is to identify, eliminate, or reduce hazards through the implementation of appropriate control measures. Effective risk assessment supports the creation and maintenance of a safer and healthier workplace.

7.3 WHEN TO CONDUCT A RISK ASSESSMENT

A risk assessment should be conducted whenever conditions, processes, or activities may introduce new hazards or change existing levels of risk. Circumstances requiring a risk assessment include, but are not limited to:

- before new processes or activities are introduced
- before changes are made to existing processes that may increase hazards
- whenever hazards are identified

7.4 COMPLETING A RISK ASSESSMENT

Risk assessments should be conducted by an individual or team with a thorough working knowledge of the operation, activity, or process being evaluated. Supervisors and employees who are familiar with the work under review should be included in the assessment process, or consulted as sources of information, because they are often most familiar with the associated tasks, conditions, and hazards. In laboratory settings, the Principal Investigator is responsible for ensuring that an appropriate risk assessment is completed.

In general, the risk assessment process should include the following steps:

A. Identify hazards.

B. Determine the likelihood and severity of harm, including the potential for injury, illness, property damage, or other adverse outcomes.

- Consider both normal operating conditions and non-routine events, such as maintenance activities, shutdowns, power outages, emergencies, and extreme weather.
- Review all available health and safety information related to the hazard, including safety data sheets (SDS), manufacturer literature, information from reputable organizations, results of testing, workplace inspection findings, incident records, and near-miss reports.
- Understand any applicable legal, regulatory, and institutional requirements.

C. Identify actions necessary to eliminate the hazard or control the risk using the hierarchy of controls.

D. Evaluate the effectiveness of selected controls to confirm that the hazard has been eliminated or that the risk has been reduced to an acceptable level.

E. Monitor the activity or process to ensure that the controls remain effective over time.

F. Maintain any documentation or records necessary to support the assessment process. Documentation may include the method used to assess the risk, the information reviewed, the evaluations conducted, and the basis for the conclusions reached.

When conducting a risk assessment, consideration should also be given to the following:

- The methods and procedures used in the processing, use, handling, or storage of substances, materials, or equipment.
- The actual and potential exposure of workers, including how many individuals may be exposed, the nature of the exposure, and the frequency and duration of that exposure.
- The measures and procedures necessary to control exposure through engineering controls, administrative controls, work practices, hygiene practices, and related facilities.
- The duration and frequency of the task.
- The location where the task is performed.
- The machinery, tools, equipment, materials, and substances used in the operation, as well as the manner in which they are used.
- Possible interactions with other activities in the area and whether the task may affect other individuals, such as employees, students, visitors, contractors, or custodial personnel.
- The lifecycle of the product, process, or service, including design, construction, operation, maintenance, and decommissioning.
- The education, training, and experience of the personnel performing the work.
- How an individual is likely to respond in a particular situation, including foreseeable human reactions to equipment failure, malfunction, or abnormal operating conditions.

It is important that the assessment address not only current workplace conditions, but also reasonably foreseeable situations and non-routine events. By determining the level of risk associated with a hazard, Risk Management Services (RMS) can determine whether a formal control program is required and what additional protective measures may be necessary.

7.5 IDENTIFYING HAZARDS

The objective of hazard identification is to recognize and document hazards that may be present in the workplace. This process is often most effective when conducted by a team that includes individuals familiar with the work area as well as those who can provide a fresh perspective. The person or team performing the assessment should have a working knowledge of the hazard being evaluated, the situations that are reasonably likely to occur, and the protective measures appropriate to that hazard or risk.

To help ensure that hazards are thoroughly identified, the assessment should:

- Consider all aspects of the work being performed.
- Include non-routine activities such as maintenance, repair, and cleaning.
- Review accident, incident, and near-miss records.
- Include employees who work off site, including those who work from home, travel to other job sites, drive as part of their duties, telework, or work with clients.

- Evaluate how the work is organized and performed, including the experience of employees and the systems being used.
- Consider reasonably foreseeable unusual conditions, such as a power outage.
- Determine whether a product, machine, or piece of equipment could be intentionally or unintentionally altered in a way that creates risk, such as removal of a safety guard.
- Review all phases of the lifecycle of the operation, process, material, or equipment.
- Evaluate potential risks to visitors and members of the public.
- Consider groups that may face different levels of risk, such as young or inexperienced workers, people with disabilities, and new or expectant mothers.

7.6 DETERMINING RISK

Each identified hazard should be evaluated to determine its level of risk. In assessing the hazard, relevant information may include:

- Product information and manufacturer documentation.
- Past experience and knowledge from employees performing the work.
- Applicable legal requirements, regulations, and recognized standards.
- Industry codes of practice and accepted best practices.
- Health and safety information related to the hazard, including safety data sheets (SDS), research studies, manufacturer information, and guidance from reputable organizations.
- Results of testing, such as atmospheric monitoring, air sampling, biological swabs, or other relevant measurements.
- Input from an occupational health and safety professional.
- Information regarding previous injuries, illnesses, near misses, and incident reports.
- Direct observation of the process or task.

The assessment should also consider factors that influence the level of risk, including:

- The work environment, including layout and condition.
- The systems of work being used.
- The range of reasonably foreseeable conditions.
- The manner in which the hazard may cause harm, such as inhalation, ingestion, or physical contact.
- The frequency, duration, and degree of exposure.
- The interaction, capability, skill, and experience of the employees performing the work.

7.7 RANKING AND PRIORITIZING RISKS

Ranking or prioritizing hazards is one method used to determine which risks are most serious and should be addressed first. Priority is typically established by considering the degree of

employee exposure and the potential for an incident, injury, or illness. Assigning priority to identified risks helps create a ranking system or action list for implementing corrective measures.

There is no single method for determining the level of risk, and no one technique is appropriate for every situation. The individual or team conducting the assessment must determine which method is most suitable based on the circumstances. Effective hazard ranking requires knowledge of workplace activities, an understanding of the urgency of the situation, and sound, objective judgment.

For simple or less complex situations, the assessment may consist of a discussion or brainstorming session based on experience and familiarity with the work. In some cases, checklists or probability matrices may be useful tools. For more complex situations, a team of knowledgeable personnel familiar with the work is generally necessary.

Figure XXX RISK MATRIX

7.8 METHODS OF MITIGATION

Once priorities have been established, appropriate measures can be selected to control each identified hazard. Hazard control methods are generally grouped into the following categories:

1st Elimination, including substitution where appropriate.

2nd Engineering controls.

3rd Administrative controls.

4th Personal protective equipment.

7.9 DOCUMENTATION FOR RISK ASSESSMENTS

Maintaining records of the assessment process and any control measures implemented is an important part of risk management. In some cases, risk assessments may be required to be retained for a specified period of time in accordance with applicable legal or institutional requirements.

The level of documentation required will depend on:

- The level of risk involved.
- Applicable legal or regulatory requirements.
- The requirements of any management systems in place.

Risk assessment records should demonstrate that the following actions were completed:

- A thorough hazard review was conducted.
- The risks associated with identified hazards were evaluated.

- Control measures appropriate to the level of risk were implemented.
- Workplace hazards were reviewed and monitored on an ongoing basis.

PERSONAL PROTECTIVE EQUIPMENT PROGRAM

8.1 INTRODUCTION

The purpose of the Personal Protective Equipment (PPE) Program is to protect employees from workplace hazards by providing an appropriate barrier against potential injury or exposure. Personal protective equipment is not a substitute for engineering controls, administrative controls, or safe work practices, but shall be used in conjunction with those measures when necessary to help ensure employee safety and health.

Appropriate personal protective equipment shall be provided by each department and shall be used and maintained whenever a hazard assessment determines that such protection is required and that its use will reduce the likelihood of occupational injury or illness. This program addresses eye, face, head, foot, and hand protection.

8.2 MANAGERS AND SUPERVISORS

Managers and supervisors shall be responsible for:

- Providing required personal protective equipment and making it available to employees.
- Ensuring that personnel are trained in the proper use, inspection, and care of the personal protective equipment required for their specific work activities.
- Maintaining records of required PPE training.
- Providing appropriate storage for personal protective equipment to protect it from environmental conditions that may reduce its effectiveness or result in contamination during storage.
- Ensuring that defective, damaged, or contaminated equipment is removed from service and replaced immediately.
- Notifying Risk Management Services (RMS) when new hazards are introduced or when processes are added or changed so that PPE requirements can be re-evaluated.

8.3 EMPLOYEES

Employees shall be responsible for:

- Following the requirements of the Personal Protective Equipment Program.
- Wearing required personal protective equipment as directed.
- Attending required training sessions.

- Caring for, cleaning, and maintaining personal protective equipment as required.
- Promptly informing their supervisor of any need to repair or replace personal protective equipment.

8.4 ENVIRONMENTAL HEALTH AND SAFETY (EHS)

Environmental Health and Safety (EHS) shall be responsible for:

- Developing, implementing, and administering the Personal Protective Equipment Program.
- Conducting workplace hazard assessments to determine the presence of hazards requiring the use of personal protective equipment.
- Conducting periodic workplace reassessments as requested by supervisors or as otherwise determined necessary by EHS.
- Providing guidance regarding the selection and purchase of approved personal protective equipment.
- Providing training and technical assistance to supervisors on the proper use, care, and cleaning of approved personal protective equipment.
- Reviewing, updating, and evaluating the overall effectiveness of the Personal Protective Equipment Program.

8.5 PROGRAM COMPONENTS

- Hazard Assessment and Equipment Selection
- Types of Protective Devices
- Eye and Face Protection
- Head Protection
- Foot Protection
- Hand Protection
- Cleaning and Maintenance
- Training and Recordkeeping

8.5.1 Hazard Assessment and Equipment Selection

Departments and Programs are responsible for ensuring their employees are provided with the appropriate safety equipment. PPE being used will ensure a level of protection equal to or greater than the minimum required to protect the employees from the hazards. EHS will provide consultative services to help determine the suitability of the PPE presently available. If EHS identifies new or additional equipment are needed to meet requirements, it shall be the departments/programs responsibility to purchase or make changes in a timely manner.

8.5.2 Standards for 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 protective clothing and equipment that meet criteria developed by a Nationally Recognized Testing Laboratory (NRTL), when required, shall be used. Careful consideration will be given to comfort and fit of PPE to ensure that it will be used. In addition, care should be taken to ensure that the right size is selected.

8.5.3 Eye and Face Protection

Preventing eye injuries requires that all persons who may be in eye hazard areas wear protective eyewear. The recognized standard is ANSI Z88. This includes employees, visitors, researchers, contractors, or others passing through an identified eye hazard area. Suitable protectors shall be used when employees are exposed to hazards from flying particles, molten metal, acids or caustic liquids, chemical liquids, gases, or vapors, bio-aerosols, 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.
- 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.

8.5.4 Prescription Safety Eyewear

OSHA regulations require that each 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.

8.5.5 Types 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 insure protection along with proper vision.

- Face Shields

These normally consist of 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.

8.5.6 Head Protection

Head protection shall be provided to and worn by all personnel working in areas where there is a risk of head injury from impact, falling or flying objects, or electrical shock and burns. This includes, as applicable, operators of material-handling equipment, personnel engaged in construction activities, warehouse personnel, employees working in excavations, and personnel using tools such as pickaxes, sledgehammers, or chainsaws.

ANSI Standard Z89.1-1969

This standard establishes specifications for industrial protective helmets for the protection of heads of occupational workers from impact and penetration from falling and flying objects and from limited electric shock and burn.

- Class G - General service, limited voltage. Protection against impact hazards.
- Class E - Utility service, high voltage. Used by electrical workers.
- Class C - Special service, no voltage protection.

8.5.7 Foot Protection

Protective footwear shall be worn in shops, warehouses, maintenance areas, cage wash areas, glassware handling areas, and other locations as determined by Risk Management Services. Where foot hazards are present, ASTM F2413 shall be used as the applicable standard for

selecting footwear appropriate to the work being performed. ASTM F2413 and ANSI Z41 are the recognized standards for protective footwear.

8.5.8 Hand Protection

Appropriate hand protection shall be worn when hazards involving chemicals, cuts, lacerations, abrasions, punctures, burns, biological agents, or harmful temperature extremes are present. Glove selection shall be based on the performance characteristics of the glove, the conditions of use, the duration of exposure, and the specific hazards involved. No single type of glove is suitable for all tasks or hazards.

8.5.9 Cleaning and Maintenance

All personal protective equipment shall be kept clean and properly maintained. Personal protective equipment shall not be shared between employees unless it has been thoroughly cleaned and sanitized. Whenever feasible, PPE shall be assigned for individual use. Contaminated PPE that cannot be adequately decontaminated shall be disposed of in a manner that protects employees from exposure to hazards.

8.5.10 Training

Any employee required to wear personal protective equipment shall receive training in its proper use and care. Risk Management Services (RMS) shall provide retraining to employees and supervisors upon request or when otherwise determined to be necessary. Training shall include, at a minimum, the following topics:

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

Following training, employees shall demonstrate an understanding of the PPE Program and the ability to use PPE properly. Employees who do not demonstrate adequate understanding or proper use shall receive additional training.

FIRE AND LIFE SAFETY

9.1 INTRODUCTION

Risk Management Services – Office of Emergency Management and Safety Services is responsible for enforcing fire safety procedures and managing fire safety equipment on campus. This includes reviewing university buildings and operations to help ensure compliance with applicable local, state, and national fire and life safety requirements.

9.2 RESPONSIBILITIES

Risk Management Services – Office of Emergency Management and Safety Services is responsible for implementing programs that strengthen the university's ability to mitigate, prepare for, respond to, and recover from fire and life safety incidents that may threaten the campus community or disrupt university operations.

9.3 FLAMMABLE AND COMBUSTIBLE MATERIAL

9.3.1 Substitution

When feasible, less hazardous materials should be substituted for flammable or combustible substances. Any substitute material should be stable, non-toxic, and either nonflammable or characterized by a higher flash point.

9.3.2 Storage

Flammable and combustible liquids require careful handling at all times. Proper storage within the work area is essential to protect personnel from fire and related safety and health hazards.

Cabinets

No more than 120 gallons of Class I, Class II, and Class IIIA liquids may be stored in a storage cabinet. Of this total, no more than 60 gallons may consist of Class I and Class II liquids. No more than three such cabinets, each with a maximum capacity of 120 gallons, may be located within a single fire area.**Figure Image NFPA 45 max all cap of cont and port tanks**

Storage Inside Buildings

- Flammable and combustible liquids shall not be stored, even temporarily, in exit routes, stairwells, or other areas of egress.
- Containers of flammable or combustible liquids shall be kept tightly closed except when being transferred, dispensed, or used. Only the quantity necessary to complete the immediate task shall be removed from storage.
- Where a flammable and combustible liquid storage building is used, it shall be a one-story structure devoted primarily to the handling and storage of flammable or combustible liquids.
- Flammable paints, oils, and varnishes in 1-gallon or 5-gallon containers used for building maintenance may be stored temporarily in closed containers outside approved storage cabinets or storage rooms when kept at the job site for fewer than 10 calendar days.

9.3.3 Ventilation

Flammable liquid and hazardous chemical storage rooms shall be equipped with a continuous mechanical exhaust ventilation system. To prevent the accumulation of vapors, exhaust air inlets

and outlets shall be arranged, to the extent practicable, to direct airflow to the exterior of the building. Where ductwork is used, it shall serve no other purpose.

9.3.4 Elimination of Ignition Sources

All nonessential ignition sources shall be eliminated in areas where flammable liquids are used or stored.

Common ignition sources include:

- Open flames, such as cutting and welding torches, furnaces, matches, and heaters
- Electrical ignition sources, such as motors, switches, and circuit breakers
- Mechanical sparks
- Static discharge

9.3.5 Removal of Incompatibles

Materials that may contribute to a flammable liquid fire shall not be stored with flammable liquids. Examples include oxidizers and organic peroxides, which may release large quantities of oxygen during decomposition.

9.3.6 Flammable Gases

Flammable gases generally present fire hazards similar to those associated with flammable liquids and their vapors. Many of the same protective measures applicable to flammable liquids also apply to flammable gases. However, additional properties, including toxicity, reactivity, and corrosivity, shall also be considered. In addition, combustion of flammable gases may produce toxic byproducts.

9.4 FIRE EXTINGUISHERS

Portable fire extinguishers are active fire protection devices intended for use in controlling or extinguishing small, incipient-stage fires during emergencies. They are not intended for use on large or rapidly spreading fires.

When used by a properly trained individual and matched to the appropriate class of fire, a portable fire extinguisher can help protect life and property. Portable fire extinguishers shall be installed and maintained in the workplace in accordance with applicable fire and life safety requirements and relevant NFPA standards.

9.4.1 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, alcohols, 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.
- Class D – Fires in combustible metals such as aluminum, lithium, potassium, magnesium, and titanium.
- Class K – Fires in cooking appliances like commercial vent hoods in restaurants that involve vegetable or animal fats and oils.

Selection and Placement of Extinguishers

The selection of portable fire extinguishers for a given area shall be based on the types of fires that may be anticipated, the construction and occupancy of the facility, and the nature of the hazard to be protected. Each extinguisher shall be clearly labeled to identify the type of extinguisher and the class or classes of fire for which it is intended.

- Fire extinguishers should be placed so the travel distance is no more than 75 ft.
- Fire extinguishers shall be always kept in their designated places 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

9.4.2 Inspections

The UNT Facilities Services personnel will perform a visual inspection of portable fire extinguishers at least once per month to ensure:

- The extinguisher is still present in its designated location.
- No damage has occurred to the equipment.
- No obstructions are blocking the equipment from view or from easy access.
- The extinguisher is fully charged and operational. If needed, inspections that are more frequent will be conducted to meet specific accreditation requirements.

9.4.3 Maintenance

Carbon dioxide and pressurized water fire extinguishers shall be hydrostatically tested every five years. ABC extinguishers shall be hydrostatically tested every six years. Each fire extinguisher

shall have a securely attached tag or label indicating the month and year the maintenance was performed, along with the name and state license number of the person who performed the service.

9.4.4 Emergency Egress

Each exit shall be clearly visible, or the route to the exit shall be conspicuously identified so that building occupants can readily determine the direction of egress from any location. Exits shall not be blocked at any time. Any doorway or passageway that is not an exit or an access route to an exit, but could be mistaken for one, shall be identified by a sign reading "Not an Exit" or by a sign indicating its actual use, such as "Storage Room." Exits and access routes to exits shall be marked by readily visible signs. Each exit sign, other than an internally illuminated sign, shall be illuminated by a reliable light source providing not less than five foot-candles on the illuminated surface.

9.4.5 Facilities Design Review

University facilities shall be designed in a manner consistent with applicable health and safety regulations and recognized standards of sound design. UNT Facilities Services and Risk Management Services shall ensure that appropriate health and safety considerations are incorporated into the review of facility concepts, designs, and plans. A formal design review process should be maintained for all new construction and renovation projects.

OCCUPATIONAL SAFETY PLANS

10.1 RESPONSIBILITIES

10.1.1 Managers and Supervisors

Managers and supervisors shall identify workplace hazards that present the potential for accidents, injuries, or unsafe conditions. They shall conduct regular inspections of job sites, work practices, and materials and equipment in use. Any unsafe equipment or materials shall be tagged and removed from service, rendered inoperative, or otherwise prevented from use until repaired or replaced.

All departments are responsible for:

- Ensuring safe working conditions.
- Providing necessary personal protective equipment (PPE).
- Taking immediate action to stop work and correct any observed or reported safety hazard.
- Ensuring that required guards and protective equipment are provided, used, and properly maintained.
- Ensuring that tools and equipment are properly maintained and used safely.

- Ensuring that employees understand the work to be performed, the hazards that may be encountered, and the procedures necessary to perform the work safely.
- Ensuring that workers who are exposed, or may be exposed, to hazardous chemicals or materials have access to the appropriate Safety Data Sheets (SDS).

10.1.2 Employees

Employees must recognize factors in the workplace with accident potential. Employees shall complete training in relation job sites, work methods, and materials/equipment used.

10.2 GENERAL SHOP AND WORK AREAS

10.2.1 Employee Training

Employees shall be thoroughly trained in the use of protective equipment, machine guards, chemical safeguards, and the safe operation of the equipment, machines, and tools they use. Only employees who have completed the required training, or those participating in supervised on-the-job training, shall be permitted to operate shop equipment, machines, or tools.

10.2.2 Food and Beverages

Food and beverages shall not be brought into or consumed in areas where employees may be exposed to toxic materials, chemicals, or shop contaminants. Employees shall wash their hands before eating or drinking following exposure to any contaminant. A separate area shall be designated for the safe consumption of food and beverages.

10.2.3 Personal Protective Equipment (PPE)

Personal protective equipment is not a substitute for engineering controls or administrative controls. However, when those measures do not provide adequate protection, appropriate personal protective equipment shall be used. All PPE shall be of safe design and construction for the work being performed and shall be maintained in a sanitary and reliable condition.

10.2.4 Illumination

Adequate illumination shall be provided to ensure safe working conditions.

- Portable lamps shall be equipped with UL-approved plugs, handles, sockets, guards, and cords suitable for normal working conditions.
- Ground-fault circuit interrupter (GFCI) protection is required for work performed in wet or damp locations.
- Flashlights used near energized electrical equipment or circuitry shall have insulated cases.

- A minimum of 50 foot-candles of illumination shall be provided at workstations. Fine-detail work may require 100 foot-candles or more, which may be achieved through a combination of general and supplemental lighting.

10.2.5 Housekeeping

Good housekeeping shall be maintained in all shops, yards, buildings, mechanical rooms, chases, and mobile equipment. Supervisors are responsible for maintaining good housekeeping in and around the work areas under their supervision. At a minimum, the following requirements shall apply:

- Aisles and passageways shall be kept clear of tripping hazards.
- Trash and other waste materials shall not be allowed to accumulate and shall be placed in approved receptacles.
- Disconnect switches, distribution panels, and alarm supply boxes shall not be blocked by any obstruction that would prevent ready access.
- Machinery and equipment shall be kept free of excess grease and oil.
- Mechanical and electrical rooms shall not be used for storage.

10.2.6 Use of Tools

All tools shall be maintained in good repair and stored properly. Defective tools shall be removed from service immediately and tagged to prevent use.

10.2.7 Barricades

Appropriate barriers shall be erected around excavations, open manholes, open electrical panels, and other operations that present hazards to personnel working in or near the affected area. Signs shall be posted to warn individuals of the hazards present and to identify any protective equipment required within the work zone.

10.3 LOCKOUT / TAGOUT (LOTO)

OSHA Standard 29 CFR 1910.147, the Control of Hazardous Energy (Lockout/Tagout) standard, applies to situations in which injury could result from the unexpected startup, energization, or release of stored energy while a machine or piece of equipment is being serviced or repaired. The standard requires that each piece of equipment be evaluated to determine the energy sources that must be isolated and that an energy control program be developed that includes documented:

- Energy control procedures
- Periodic inspections
- Training

This standard does not apply to work involving cord-and-plug-connected electrical equipment when exposure to the hazards of unexpected energization or startup is controlled by unplugging the equipment from the energy source and when the plug remains under the exclusive control of the person performing the servicing or repair.

A sample lockout procedure is included as Appendix E.

10.4 FALL PROTECTION

The University of North Texas requires fall protection whenever an employee is performing elevated work at an unprotected side or edge, working from an aerial lift, or performing any other task where a fall of 6 feet or more could occur. Fall protection is also required whenever an employee could fall any distance and contact dangerous machinery, hazardous chemicals, or any other condition capable of causing serious injury. An exception may apply when work is performed from a properly selected, properly used, and properly installed ladder or scaffold. In emergency situations, supervisors and managers shall exercise sound judgment based on the circumstances while taking all feasible precautions to protect personnel.

This program is aligned with 29 CFR 1926 Subpart M. In the absence of guardrails, parapet walls, or other engineered fall protection barriers, an Elevated Work Permit is required. Work performed from aerial lifts, on roofs, or in any other location where a Personal Fall Arrest System (PFAS) is required shall be permitted in advance. A Personal Fall Arrest System consists of a body harness, a shock-absorbing lanyard or self-retracting lifeline, and an approved anchorage point. These systems are designed to arrest a fall if an employee slips or falls from an elevated work area and to minimize the forces imposed on the employee during fall arrest. Risk Management Services can assist departments in identifying and evaluating fall protection needs and in providing fall protection training. Elevated work shall be reviewed and approved through submission of an Elevated Work Permit. Refer to Appendix C for the UNT Elevated Work Program Standard Operating Procedure.

10.5 ELECTRICAL

All electrical work shall be performed in accordance with applicable OSHA standards for electrical safety-related work practices, including 29 CFR 1910.331 through 1910.335 and 29 CFR 1926.416 through 1926.417, as well as NFPA 70E, Standard for Electrical Safety in the Workplace, as amended. It is the responsibility of all electrical and electronic maintenance and repair personnel, as well as their supervisors, to become familiar with these requirements and to follow the applicable safe work practices.

Work on exposed energized circuits or parts shall not be performed unless the employees are qualified and specifically trained to do so. Safety-related work practices shall be followed to prevent electric shock, arc flash injuries, and other electrically related hazards. Qualified

employees are those who have been trained to work safely on energized circuits and to use appropriate personal protective equipment, insulating and shielding materials, and insulated tools.

Whenever work must be performed on high-voltage energized circuits or equipment, at least two qualified employees shall be present, and one of those employees shall be trained in cardiopulmonary resuscitation (CPR). All electrical and electronic repair personnel shall be trained in CPR and shall complete refresher training every two years in accordance with current American Heart Association standards.

10.6 MACHINERY AND MACHINE GUARDING

For most applications, machine guarding is an engineering control and is generally the preferred method for protecting personnel working around machinery and equipment. The installation and proper use of machine guards are critical factors in preventing accidents and injuries. When machinery does not have a manufacturer-installed guard, the selection of an appropriate guarding method may depend on factors such as space limitations, the size of the material being worked, and the frequency of use.

The following general guidelines are provided to assist in the selection of machine guards. For detailed requirements, refer to OSHA Standard 29 CFR 1910.211.

Design and construction characteristics of machine guards include:

- The guard shall be considered a permanent part of the machine or equipment.
- The guard shall provide positive protection. Personnel shall not be able to reach the hazard by reaching into, over, under, or through a properly designed and installed guard.
- The guard shall prevent access to the danger zone during operation of the equipment.
- The guard shall be as convenient as possible and shall not interfere with the normal operation of the machine or required maintenance. This may include hinged guards, drift pins, latches, or minimizing cumbersome attachments.
- The guard should be designed for the specific machine and the work being performed, with consideration for lubrication, inspection, adjustment, and repair.
- The guard shall be durable and constructed to withstand normal wear.
- The guard shall not create an additional hazard.
- The guard shall not be easily bypassed or defeated. The use of “dead-man” controls is preferred because, if the safety device fails or is bypassed, the machine will not continue to present a hazard to personnel.

Under no circumstances shall any UNT machine guard be removed to simplify operator use, nor shall any UNT machinery be operated without the required guard in place. If guards must be

removed or serviced to perform maintenance, applicable lockout/tagout procedures shall be followed.

10.7 PLUMBING

Plumbing maintenance may include installation, preventive maintenance, and repair of water supply systems, sewage and water disposal systems, natural gas and liquefied petroleum gas (LPG) systems, 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, including permit-required confined spaces
- Fire or explosion caused by introducing an ignition source or open flame into a hazardous environment
- Falls
- Cave-ins in excavated areas
- Burns from heat-producing equipment
- Strains and sprains affecting the back or other muscle groups
- Cuts and bruises

Personal protective equipment used during plumbing maintenance operations may include:

- Eye and/or face protection when working on plumbing connections, with chemicals, on pressure systems, or in any situation where an eye hazard is present
- Work gloves or chemical-resistant gloves, as appropriate
- Safety-toe footwear
- Hard hats where conditions may result in head injury

Plumbing personnel working on compressed air systems shall be properly trained and authorized to inspect, maintain, or install those systems. Before opening a compressed air line, employees shall ensure that the line has been completely depressurized to prevent sudden release and line movement. Likewise, when a new compressed air system is installed, all components shall be properly secured before air is introduced into the system. Employees shall wear appropriate eye and face protection while working on compressed air systems.

10.8 GAS SYSTEM MAINTENANCE

Maintenance of gas systems may involve natural gas, liquefied petroleum gas (LPG), nitrogen, and oxygen systems. Personnel performing this work shall be familiar with the properties and hazards of the gases in the systems they maintain. Tools used to repair leaks or perform maintenance on gas lines shall be spark-resistant, and protective clothing worn during such work shall minimize the potential for static discharge.

10.9 CARPENTRY AND STRUCTURAL MAINTENANCE

Personnel performing carpentry and structural maintenance duties may be exposed to a wide variety of hazards in different environments and locations. Potential hazards include:

- Exposure to flammable and combustible adhesives
- Dusts
- Hazardous noise
- Eye hazards
- Work performed at heights above ground level
- Lifting hazards
- Electric and pneumatic power tools
- Contact with unfinished materials that may present splinters, sharp edges, or similar hazards

These physical and health hazards can be controlled through proper work practices, appropriate engineering and administrative controls, and the use of required personal protective equipment.

Personal protective equipment shall be worn when operating machinery, equipment, and saws in shops and at job sites. Required PPE may include:

- Eye protection
- Safety-toe footwear
- Dust masks or other respiratory protection, as appropriate
- Hard hats
- Hearing protection

Supervisors shall ensure that periodic inspections are conducted on all shop equipment. Machine guards shall not be removed or rendered 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 out until the guards have been reinstalled.

Machines that generate fine dust or other airborne contaminants should be equipped with effective local exhaust ventilation. In shops where only a small number of installed machines operate intermittently, portable collection systems may be used.

Exhaust ducts and piping shall be designed and sized to minimize clogging and shall discharge into an enclosed collection container.

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

10.10 REFRIGERATION AND AIR CONDITIONING MAINTENANCE

Potential hazards associated with refrigeration and air conditioning maintenance include:

- Hazardous noise
- Electrical hazards
- Exposure to refrigerants
- Lifting hazards
- Compressed gases and cylinders

Equipment rooms housing air conditioning or refrigeration equipment shall be kept free of trash, debris, and other materials that could create tripping or fire hazards. Refrigerant piping shall be properly insulated to improve operating efficiency and to help prevent injury to employees who may come into contact with it. Equipment rooms are not designed or intended for general storage and shall not be used for that purpose.

Employees shall ensure that all containers are clearly labeled with the type of gas they contain and that cylinders are stored in a manner that minimizes the intermingling of refrigerant types. Cylinders shall be stored separately from flammable gases and oxygen. Where valve protection caps are provided, they shall remain in place at all times except when the cylinder is in active use.

10.11 PAINTING OPERATIONS

Appropriate preventive measures shall be taken during operations involving paints, varnishes, lacquers, cleaners, solvents, plastic coatings, and other finishing materials that can ignite at relatively low temperatures and present fire or health hazards.

Many materials used in painting and spraying operations are volatile and may produce vapors capable of forming explosive and/or toxic air mixtures if not controlled through adequate ventilation.

Conspicuous “NO SMOKING” signs shall be posted in areas where flammable materials are used or stored. The quantity of flammable or combustible liquid kept near spraying operations shall be limited to the minimum amount necessary for daily use. All flammable liquids and similar materials shall be stored in approved safety containers and/or approved storage cabinets.

The requirements of the UNT Respiratory Protection Program shall be followed at all times during painting or spraying operations. Refer to Appendix D for the applicable standard operating procedure.

10.12 FORKLIFT AND AERIAL LIFT OPERATIONS

All applicable requirements of 29 CFR 1910.178 and 29 CFR 1926.602 shall be followed, including the requirement that forklift operators possess a valid certification authorizing

operation of the equipment. Aerial lift operators shall also be trained and authorized prior to operating aerial lifts. These certifications are valid for no more than three years and apply only to work performed in the course and scope of employment at UNT. Certification obtained through UNT shall not be valid for work performed on behalf of another entity.

10.13 PERMIT REQUIRED CONFINED SPACE ENTRY (PRCS)

Permit-required confined spaces are among the most hazardous work environments. A permit-required confined space is generally defined as a space with limited means of entry or exit, the potential for an oxygen-deficient or oxygen-enriched atmosphere, the accumulation of flammable or toxic gases or vapors, or a configuration that makes rescue difficult. OSHA Standard 29 CFR 1910.146 establishes the requirements for entry into and work within permit-required confined spaces, including training, permitting, and emergency equipment.

Examples of permit-required confined spaces at UNT may include sewers, pits, sumps, chemical or septic waste tanks, vessel voids or bilges, trenches greater than four feet deep, elevator shafts, ventilation ducts, neutralization pits, and manholes.

Refer to Appendix B for the UNT Permit-Required Confined Space Entry Program Standard Operating Procedure.

10.14 LADDER SAFETY

Ladders shall be inspected by the user before each use. Ladders with broken or missing rungs, broken or split side rails, or other defective parts shall be removed from service and disposed of or otherwise prevented from use immediately. A ladder shall not be placed in front of a door that opens toward the ladder unless the door is locked, blocked, barricaded, or otherwise guarded. Employees shall not ascend or descend a ladder unless both hands can be used freely.

Employees using ladders shall maintain three points of contact at all times. When materials or tools must be moved, a rope or other approved method shall be used to raise or lower them.

Portable ladders placed against a wall or other fixed object shall be secured or held by another employee to prevent slipping. The base of the ladder shall be positioned at a distance from the vertical support equal to one-fourth of the working length of the ladder to maintain the proper 4:1 angle. No ladder shall be used to gain roof access unless the side rails extend at least three feet above the point of support at the roof edge, eave, or gutter. Ladders shall not be placed on boxes, barrels, or other unstable surfaces to gain additional height. When used on smooth floors or sloped surfaces, portable ladders shall be equipped with slip-resistant bases.

GENERAL SAFETY REQUIREMENTS

11.1 INTRODUCTION

Personnel safety shall be a primary consideration in all operations in order to provide the highest practical level of protection and to prevent unnecessary exposure to injury and health hazards. All individuals are responsible for complying with established safety rules, policies, and regulations.

Management and supervisory personnel at all levels are responsible for ensuring that safety precautions are understood and implemented within their respective work areas.

This section provides basic guidance in several essential areas of safety and health that are generally applicable across the University of North Texas. These provisions represent minimum requirements and are not intended to serve as a comprehensive safety and health program for every work area or operation.

11.2 COMPLIANCE WITH SAFETY REGULATIONS

All UNT personnel shall comply with applicable safety and health rules and regulations. Safety precautions shall not be disregarded or subordinated because of the urgency of a particular task. Safe work practices and administrative controls are intended to reduce exposure to hazards and include written procedures, safety policies, rules, and established work practices.

Safe work practices and administrative controls exist at multiple organizational levels and include:

- The use of and compliance with written protocols and Standard Operating Procedures (SOPs) that define required procedures and safety practices.
- Safety audits and oversight conducted to support ongoing hazard identification, risk assessment, and evaluation of control measures. Routine health and safety audits may be conducted by various university entities, including Biosafety, Radiation Safety, the Institutional Biosafety Committee (IBC), the Institutional Animal Care and Use Committee (IACUC), and Risk Management Services (RMS). Medical professionals may also contribute through medical evaluations and risk assessments.
- General safety guidelines and manuals applicable to employees, students, and volunteers, including, as appropriate:
  - Biosafety
  - Chemical Hygiene
  - Radiation and Laser Safety
  - Electrical Safety
  - Mechanical Safety

11.3 SAFETY TRAINING

Supervisors shall ensure that all new or reassigned personnel are instructed in safe methods for performing assigned tasks before work begins and during the initial stages of each new assignment.

11.4 TWO-PERSON RULE

The two-person rule shall apply whenever work involves a high potential for injury or other life-threatening conditions. No employee shall work alone when there is reason to believe that a situation could develop in which assistance could not be summoned within a reasonable time, or when another person would be needed to provide assistance in the event of an accident.

When the distance or physical arrangement between employees is such that visual observation or voice communication cannot be maintained for extended periods, the work shall be limited to activities involving a low likelihood of a serious or incapacitating accident for which assistance could not be obtained promptly.

11.5 REFRIGERATORS AND FREEZERS

Flammable liquids or chemicals capable of producing flammable or explosive vapors and requiring refrigeration shall not be stored in domestic-type refrigerators. Such materials shall be stored only in approved explosion-proof or laboratory-safe refrigerators designed for that purpose. In confined spaces, even small quantities of flammable liquids may create an explosive atmosphere that could be ignited by an interior light switch, thermostat, or other electrical component.

Standard refrigerators and freezers shall be clearly labeled with a “NO FLAMMABLES” sign.

Food intended for human consumption shall not be stored in any refrigerator or freezer used to store chemicals or biological samples. Laboratory refrigerators and freezers shall be clearly labeled with a “Not for Food Use” sign.

11.6 HOUSEKEEPING

High standards of housekeeping shall be maintained in all shops, offices, laboratories, buildings, work areas, and surrounding grounds.

- Work areas, including workshops and laboratories, shall be kept clean and orderly at all times.
- Floors shall be kept free of clutter and other tripping hazards.
- Aisles, passageways, stairways, and exits shall be kept clear at all times.
- Restrooms shall be maintained in a clean and sanitary condition.

- University-provided and personal microwave ovens and refrigerators used for the preparation or storage of food shall be kept clean.
- Broken glass shall not be placed in wastebaskets. It shall be placed in a separate puncture-resistant container labeled “Broken Glass – Handle Carefully” for removal by custodial personnel, or taken directly to an appropriate dumpster for disposal.
- Other sharp objects, such as scalpel blades, needles, and razor blades, shall be disposed of in properly labeled sharps containers.

11.7 COMPRESSED GAS CYLINDERS

Compressed gas cylinders shall be stored in an upright position and secured at all times to prevent tipping, falling, or rolling. Protective valve caps shall be installed on all cylinders when not in use.

Cylinders shall not be handled, transported, or stored without valve protection caps in place, unless they are specifically designed for use without a cap. Compressed gas cylinders shall be kept away from excessive heat, generally defined as temperatures above 125°F (51.5°C), and shall not be placed where they may become part of an electrical circuit. Oxygen cylinders in storage shall be separated from fuel-gas cylinders or combustible materials, especially oil or grease, by a minimum distance of 20 feet or by a noncombustible barrier at least 5 feet high with a fire-resistance rating of at least 30 minutes.

11.8 COMPRESSED AIR

Compressed air shall not be used for cleaning when vacuum systems or other safer alternative methods are available. Compressed air may be used for cleaning only when the pressure is reduced to less than 30 psi and appropriate eye protection is worn by all personnel in the area. The use of compressed air for cleaning clothing or any part of the body is prohibited at any pressure.

11.9 WORKING ON, OVER, OR NEAR THE WATER

Employees working over or near water where a drowning hazard exists shall be provided with U.S. Coast Guard-approved personal flotation devices (PFDs). Personal flotation devices shall be inspected before and after each use to ensure they are in serviceable condition.

11.10 WORK CLOTHING

Clothing worn around moving machinery shall be close fitting. Neckties and other loose items shall not be worn. Long sleeves shall be worn during welding, cutting, and other tasks where exposure to chemicals or ultraviolet or infrared radiation is possible. Long sleeves are also required when operating a chainsaw or performing similar activities.

In industrial operations where no hazard exists to the upper arms, short-sleeved shirts or blouses may be worn, provided they adequately cover the upper torso. Personnel engaged in industrial operations shall wear trousers, slacks, or coveralls that fully cover the lower extremities.

Safety shoes are required for personnel performing work with the potential for crushing or laceration injuries to the feet. This includes personnel working in shops, exterior maintenance and grounds operations, and other areas with similar exposure. Additional requirements are addressed in the section on personal protective equipment.

Personnel working in laboratories shall wear appropriate protective clothing. Lab coats or aprons shall be worn whenever there is a possibility of a splash or spill. Footwear that provides protection from splashes and spills shall be worn at all times in laboratory areas. Open-toed shoes, sandals, and flip-flops are prohibited in laboratories because they do not provide adequate protection. Bare feet are prohibited in all laboratory areas. Routine cleaning of lab coats and aprons is the responsibility of the individual laboratory. Lab coats and aprons shall not be laundered at home.

PERMITTING PROCESS

The purpose of the permitting process is to identify and mitigate risks to the University of North Texas and, above all, to protect personnel involved in high-hazard work. The permitting process has been developed and maintained to support the following objectives:

- Protect university personnel performing high-hazard work.
- Protect university personnel and the campus community from hazards associated with contractors or others performing high-hazard work at university facilities.
- Protect UNT from avoidable risk, including injury, liability, operational disruption, and harm to the university's reputation and standing in the community.
- Avoid delaying work except in situations that are Immediately Dangerous to Life or Health (IDLH).
- Keep the permitting process simple and accessible for users at all levels of computer literacy.
- Ensure the process is available from any electronic device with internet access.
- Maintain a process that is efficient and timely.
- Provide support on a 24/7 basis.
- Provide contact information for multiple department representatives in the event questions arise.

Permits are administered through UNT Campus Optics. The permitting process has been established to provide an additional layer of review and protection for personnel performing high-hazard activities. Permits are currently required for Elevated Work, Permit-Required

Confined Space Entry, and Hot Work. Each permit applies to a specific activity, at a specific location, and for a specific period of time.

The permitting process is not intended to control work unnecessarily or create avoidable delays. Rather, it is intended to provide a second level of experienced review to help protect personnel, support sound decision-making, and provide timely service to university departments. Risk Management Services Safety will only consider delaying work when conditions are determined to be Immediately Dangerous to Life or Health. In addition, the use of backup reviewers helps ensure that permit requests can still be reviewed and processed when the primary reviewer is unavailable.

One of the hazards associated with repetitive or routine tasks is complacency, which can increase the likelihood of incidents. For that reason, requesting a permit should not be viewed as seeking permission to perform work, but as obtaining a second set of experienced eyes on high-hazard activities.

The permitting process is designed to be straightforward and is completed electronically, with the exception of the Attendant Log for Permit-Required Confined Spaces, which must be printed and signed by all individuals entering or leaving the space. In most cases, a permit request can be completed in less than five minutes from any phone, tablet, or computer with internet access.

To request a permit, the user shall navigate to the Occupational Safety and Health website and select the “Permitting” tab located at the bottom of the page. That tab contains links for Permit-Required Confined Space permits, Elevated Work permits, Hot Work permits, and the Permit-Required Confined Space Attendant Log.

After selecting the appropriate permit link, the user will be directed to a webpage containing questions specific to the type of permit being requested. Once all required information has been entered, the user shall select “Submit.”

Upon submission, the Occupational Safety team will receive an email notification that a permit request has been entered. Safety will review the request and respond through Campus Optics, indicating whether the permit is accepted or rejected.

If the request is accepted, a member of the Safety team will inspect the worksite before work begins and will document the inspection and approval in Campus Optics.

If the request is rejected, the requestor may contact Safety for clarification or correct the identified deficiency and resubmit the request. Rejections most commonly occur when required information, such as contact details or other key permit information, has been omitted.

For Permit-Required Confined Space permits, the completed and cancelled permit, along with the Attendant Log, shall be returned to Safety electronically after the work has been completed.

Contact information for the Occupational Safety team is provided below:

- Steve Wilson — Cell: 580-434-2419 | Direct: 940-369-8146 | Steven.wilson2@unt.edu
- Bradley Prince — Cell: 303-396-9039 | Direct: 940-369-8790 | Bradley.Prince@unt.edu
- Chris Erickson — Cell: 214-240-6953 | Direct: 940-565-2167 | Chris.erickson@unt.edu

The permitting process is not intended to manage emergency situations. In emergencies, managers and supervisors shall continue to exercise professional judgment and take whatever actions are necessary to protect personnel and property.

PLAN REVIEW

This plan shall be reviewed by Risk Management Services at least annually.

APPENDIX A

29 CFR 1910.134 Appendix A

Fit Testing Procedures (Mandatory)

Source: Official published CFR PDF for 29 CFR 1910.134 (govinfo, 7-1-24 edition).

APPENDIX A TO § 1910.134-FIT TESTING

PROCEDURES (MANDATORY)

PART I. OSHA-ACCEPTED FIT TEST

PROTOCOLS

A. Fit Testing Procedures-General

Requirements The employer shall conduct fit testing using the following procedures. The requirements in this appendix apply to all OSHA-accepted fit test methods, both QLFT and QNFT.

1. The test subject shall be allowed to pick
the most acceptable respirator from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.

2. Prior to the selection process, the test
subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine an acceptable fit. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This instruction may not constitute the subject's formal training on respirator use, because it is only a review.

3. The test subject shall be informed that
he/she is being asked to select the respirator that provides the most acceptable fit. Each respirator represents a different size and shape, and if fitted and used properly, will provide adequate protection.

4. The test subject shall be instructed to
hold each chosen facepiece up to the face and eliminate those that obviously do not give an acceptable fit.

5. The more acceptable facepieces are
noted in case the one selected proves unacceptable; the most comfortable mask is donned and worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in the following item A.6. If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.

6. Assessment of comfort shall include a review of the following points with the test

subject and allowing the test subject adequate time to determine the comfort of the respirator:
(a) Position of the mask on the nose
(b) Room for eye protection
(c) Room to talk
(d) Position of mask on face and cheeks

7. The following criteria shall be used to
help determine the adequacy of the respirator fit:
(a) Chin properly placed;
(b) Adequate strap tension, not overly tightened;
(c) Fit across nose bridge;
(d) Respirator of proper size to span distance from nose to chin;
(e) Tendency of respirator to slip;
(f) Self-observation in mirror to evaluate fit and respirator position.

8. The test subject shall conduct a user
seal check, either the negative and positive pressure seal checks described in appendix B-1 of this section or those recommended by the respirator manufacturer which provide equivalent protection to the procedures in appendix B-1. Before conducting the negative and positive pressure checks, the subject shall be told to seat the mask on the face by moving the head from side-to-side and up and down slowly while taking in a few slow deep breaths. Another facepiece shall be selected and retested if the test subject fails the user seal check tests.

9. The test shall not be conducted if there
is any hair growth between the skin and the facepiece sealing surface, such as stubble beard growth, beard, mustache or sideburns which cross the respirator sealing surface. Any type of apparel which interferes with a satisfactory fit shall be altered or removed.

10. If a test subject exhibits difficulty in
breathing during the tests, she or he shall be referred to a physician or other licensed health care professional, as appropriate, to determine whether the test subject can wear a respirator while performing her or his duties.

11. If the employee finds the fit of the respirator unacceptable, the test subject shall
be given the opportunity to select a different respirator and to be retested.

12. Exercise regimen. Prior to the commencement of the fit test, the test subject
shall be given a description of the fit test and the test subject's responsibilities during the test procedure. The description of the process shall include a description of the test exercises that the subject will be performing. The respirator to be tested shall be worn for at least 5 minutes before the start of the fit test.

13. The fit test shall be performed while
the test subject is wearing any applicable safety equipment that may be worn during actual respirator use which could interfere with respirator fit.

14. Test Exercises. (a) Employers must perform the following test exercises for all fit

testing methods prescribed in this appendix, except for the two modified ambient aerosol CNC quantitative fit testing protocols, the CNP quantitative fit testing protocol, and the CNP REDON quantitative fit testing protocol. For the modified ambient aerosol CNC quantitative fit testing protocols, employers shall ensure that the test subjects (i.e., employees) perform the exercise procedure specified in Part I.C.4(b) of this appendix for fullfacepiece and half-mask elastomeric respirators, or the exercise procedure specified in Part I.C.5(b) for filtering facepiece respirators. Employers shall ensure that the test subjects (i.e., employees) perform the exercise procedure specified in Part I.C.6(b) of this appendix for the CNP quantitative fit testing protocol, or the exercise procedure described in Part I.C.7(b) of this appendix for the CNP REDON quantitative fit testing protocol. For the remaining fit testing methods, employers shall ensure that the test exercises are performed in the appropriate test environment in the following manner:
(1) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally.
(2) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply, taking caution so as not to hyperventilate.
(3) Turning head side to side. Standing in place, the subject shall slowly turn his/her head from side to side between the extreme positions on each side. The head shall be held at each extreme momentarily so the subject can inhale at each side.
(4) Moving head up and down. Standing in place, the subject shall slowly move his/her head up and down. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling).
(5) Talking. The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song.

Rainbow Passage

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.
(6) Grimace. The test subject shall grimace by smiling or frowning. (This applies only to QNFT testing; it is not performed for QLFT)
(7) Bending over. The test subject shall bend at the waist as if he/she were to touch his/her toes. Jogging in place shall be substituted for this exercise in those test environments such as shroud type QNFT or QLFT units that do not permit bending over at the waist.
(8) Normal breathing. Same as exercise (1).
(b) Each test exercise shall be performed for one minute except for the grimace exercise which shall be performed for 15 seconds. The test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried. The respirator shall not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated.

B. Qualitative Fit Test (QLFT) Protocols

1. General

(a) The employer shall ensure that persons administering QLFT are able to prepare test solutions, calibrate equipment and perform tests properly, recognize invalid tests, and ensure that test equipment is in proper working order.
(b) The employer shall ensure that QLFT equipment is kept clean and well maintained so as to operate within the parameters for which it was designed.

2. Isoamyl Acetate Protocol

NOTE: This protocol is not appropriate to
use for the fit testing of particulate respirators. If used to fit test particulate respirators, the respirator must be equipped with an organic vapor filter.
(a) Odor Threshold Screening Odor threshold screening, performed without wearing a respirator, is intended to determine if the individual tested can detect the odor of isoamyl acetate at low levels.
(1) Three 1 liter glass jars with metal lids are required.
(2) Odor-free water (e.g., distilled or spring water) at approximately 25 °C (77 °F) shall be used for the solutions.
(3) The isoamyl acetate (IAA) (also known at isopentyl acetate) stock solution is prepared by adding 1 ml of pure IAA to 800 ml of odor-free water in a 1 liter jar, closing the lid and shaking for 30 seconds. A new solution shall be prepared at least weekly.
(4) The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well-ventilated to prevent the odor of IAA from becoming evident in the general room air where testing takes place.
(5) The odor test solution is prepared in a second jar by placing 0.4 ml of the stock solution into 500 ml of odor-free water using a clean dropper or pipette. The solution shall be shaken for 30 seconds and allowed to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution shall be used for only one day.
(6) A test blank shall be prepared in a third jar by adding 500 cc of odor-free water.
(7) The odor test and test blank jar lids shall be labeled (e.g., 1 and 2) for jar identification. Labels shall be placed on the lids so that they can be peeled off periodically and switched to maintain the integrity of the test.
(8) The following instruction shall be typed on a card and placed on the table in front of the two test jars (i.e., 1 and 2): ‘‘The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil."
(9) The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.
(10) If the test subject is unable to correctly identify the jar containing the odor test solution, the IAA qualitative fit test shall not be performed.

(11) If the test subject correctly identifies the jar containing the odor test solution, the test subject may proceed to respirator selection and fit testing.
(b) Isoamyl Acetate Fit Test
(1) The fit test chamber shall be a clear 55gallon drum liner suspended inverted over a 2-foot diameter frame so that the top of the chamber is about 6 inches above the test subject's head. If no drum liner is available, a similar chamber shall be constructed using plastic sheeting. The inside top center of the chamber shall have a small hook attached.
(2) Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors.
(3) After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well-ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.
(4) A copy of the test exercises and any prepared text from which the subject is to read shall be taped to the inside of the test chamber.
(5) Upon entering the test chamber, the test subject shall be given a 6-inch by 5-inch piece of paper towel, or other porous, absorbent, single-ply material, folded in half and wetted with 0.75 ml of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber. An IAA test swab or ampule may be substituted for the IAA wetted paper towel provided it has been demonstrated that the alternative IAA source will generate an IAA test atmosphere with a concentration equivalent to that generated by the paper towel method.
(6) Allow two minutes for the IAA test concentration to stabilize before starting the fit test exercises. This would be an appropriate time to talk with the test subject; to explain the fit test, the importance of his/her cooperation, and the purpose for the test exercises; or to demonstrate some of the exercises.
(7) If at any time during the test, the subject detects the banana-like odor of IAA, the test is failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.
(8) If the test is failed, the subject shall return to the selection room and remove the respirator. The test subject shall repeat the odor sensitivity test, select and put on another respirator, return to the test area and again begin the fit test procedure described in (b) (1) through (7) above. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject shall wait at least 5 minutes before retesting. Odor sensitivity will usually have returned by this time.
(9) If the subject passes the test, the efficiency of the test procedure shall be demonstrated by having the subject break the respirator face seal and take a breath before exiting the chamber.
(10) When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test, so that there is no significant IAA concentration buildup in the chamber during subsequent tests. The used towels shall be kept in a self-sealing plastic bag to keep the test area from being contaminated.

3. Saccharin Solution Aerosol Protocol

The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) Taste threshold screening. The saccharin taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of saccharin.
(1) During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches in diameter by 14 inches tall with at least the front portion clear and that allows free movements of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts # FT 14 and # FT 15 combined, is adequate.
(2) The test enclosure shall have a 3⁄4-inch (1.9 cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.
(3) The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through his/her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a sweet taste.
(4) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the threshold check solution into the enclosure. The nozzle is directed away from the nose and mouth of the person. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.
(5) The threshold check solution is prepared by dissolving 0.83 gram of sodium saccharin USP in 100 ml of warm water. It can be prepared by putting 1 ml of the fit test solution (see (b)(5) below) in 100 ml of distilled water.
(6) To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, then released and allowed to fully expand.
(7) Ten squeezes are repeated rapidly and then the test subject is asked whether the saccharin can be tasted. If the test subject reports tasting the sweet taste during the ten squeezes, the screening test is completed. The taste threshold is noted as ten regardless of the number of squeezes actually completed.
(8) If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the second ten squeezes, the screening test is completed. The taste threshold is noted as twenty regardless of the number of squeezes actually completed.
(9) If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the third set of ten squeezes, the screening test is completed. The taste threshold is noted as thirty regardless of the number of squeezes actually completed.
(10) The test conductor will take note of the number of squeezes required to solicit a taste response.
(11) If the saccharin is not tasted after 30 squeezes (step 10), the test subject is unable to taste saccharin and may not perform the saccharin fit test.

NOTE TO PARAGRAPH 3(a): If the test subject

eats or drinks something sweet before the screening test, he/she may be unable to taste the weak saccharin solution.
(12) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

(13) Correct use of the nebulizer means that approximately 1 ml of liquid is used at a time in the nebulizer body.
(14) The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least each morning and afternoon or at least every four hours.
(b) Saccharin solution aerosol fit test procedure.
(1) The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.
(2) The fit test uses the same enclosure described in 3. (a) above.
(3) The test subject shall don the enclosure while wearing the respirator selected in section I. A. of this appendix. The respirator shall be properly adjusted and equipped with a particulate filter(s).
(4) A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.
(5) The fit test solution is prepared by adding 83 grams of sodium saccharin to 100 ml of warm water.
(6) As before, the test subject shall breathe through the slightly open mouth with tongue extended, and report if he/she tastes the sweet taste of saccharin.
(7) The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of saccharin fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test. A minimum of 10 squeezes is required.
(8) After generating the aerosol, the test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.
(9) Every 30 seconds the aerosol concentration shall be replenished using one half the original number of squeezes used initially (e.g., 5, 10 or 15).
(10) The test subject shall indicate to the test conductor if at any time during the fit test the taste of saccharin is detected. If the test subject does not report tasting the saccharin, the test is passed.
(11) If the taste of saccharin is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).
(12) Since the nebulizer has a tendency to clog during use, the test operator must make periodic checks of the nebulizer to ensure that it is not clogged. If clogging is found at the end of the test session, the test is invalid.

4. BitrexTM (Denatonium Benzoate) Solution

Aerosol Qualitative Fit Test Protocol The BitrexTM (Denatonium benzoate) solution aerosol QLFT protocol uses the published saccharin test protocol because that protocol is widely accepted. Bitrex is routinely used as a taste aversion agent in household liquids which children should not be drinking and is endorsed by the American Medical Association, the National Safety Council, and the American Association of Poison Control Centers. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) Taste Threshold Screening. The Bitrex taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of Bitrex.
(1) During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches (30.5 cm) in diameter by 14 inches (35.6 cm) tall. The front portion of the enclosure shall be clear from the respirator and allow free movement of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts # FT 14 and # FT 15 combined, is adequate.
(2) The test enclosure shall have a 3⁄4 inch (1.9 cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.
(3) The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through his or her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a bitter taste.
(4) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the Threshold Check Solution into the enclosure. This Nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.
(5) The Threshold Check Solution is prepared by adding 13.5 milligrams of Bitrex to 100 ml of 5% salt (NaCl) solution in distilled water.
(6) To produce the aerosol, the nebulizer bulb is firmly squeezed so that the bulb collapses completely, and is then released and allowed to fully expand.
(7) An initial ten squeezes are repeated rapidly and then the test subject is asked whether the Bitrex can be tasted. If the test subject reports tasting the bitter taste during the ten squeezes, the screening test is completed. The taste threshold is noted as ten regardless of the number of squeezes actually completed.
(8) If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the second ten squeezes, the screening test is completed. The taste threshold is noted as twenty regardless of the number of squeezes actually completed.
(9) If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the third set of ten squeezes, the screening test is completed. The taste threshold is noted as thirty regardless of the number of squeezes actually completed.
(10) The test conductor will take note of the number of squeezes required to solicit a taste response.
(11) If the Bitrex is not tasted after 30 squeezes (step 10), the test subject is unable to taste Bitrex and may not perform the Bitrex fit test.
(12) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.
(13) Correct use of the nebulizer means that approximately 1 ml of liquid is used at a time in the nebulizer body.
(14) The nebulizer shall be thoroughly rinsed in water, shaken to dry, and refilled at least each morning and afternoon or at least every four hours.
(b) Bitrex Solution Aerosol Fit Test Procedure.
(1) The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.

(2) The fit test uses the same enclosure as that described in 4. (a) above.
(3) The test subject shall don the enclosure while wearing the respirator selected according to section I. A. of this appendix. The respirator shall be properly adjusted and equipped with any type particulate filter(s).
(4) A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.
(5) The fit test solution is prepared by adding 337.5 mg of Bitrex to 200 ml of a 5% salt (NaCl) solution in warm water.
(6) As before, the test subject shall breathe through his or her slightly open mouth with tongue extended, and be instructed to report if he/she tastes the bitter taste of Bitrex.
(7) The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of the fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test.
(8) After generating the aerosol, the test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.
(9) Every 30 seconds the aerosol concentration shall be replenished using one half the number of squeezes used initially (e.g., 5, 10 or 15).
(10) The test subject shall indicate to the test conductor if at any time during the fit test the taste of Bitrex is detected. If the test subject does not report tasting the Bitrex, the test is passed.
(11) If the taste of Bitrex is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).

5. Irritant Smoke (Stannic Chloride)

Protocol This qualitative fit test uses a person's response to the irritating chemicals released in the ‘‘smoke" produced by a stannic chloride ventilation smoke tube to detect leakage into the respirator.
(a) General Requirements and Precautions
(1) The respirator to be tested shall be equipped with high efficiency particulate air (HEPA) or P100 series filter(s).
(2) Only stannic chloride smoke tubes shall be used for this protocol.
(3) No form of test enclosure or hood for the test subject shall be used.
(4) The smoke can be irritating to the eyes, lungs, and nasal passages. The test conductor shall take precautions to minimize the test subject's exposure to irritant smoke. Sensitivity varies, and certain individuals may respond to a greater degree to irritant smoke. Care shall be taken when performing the sensitivity screening checks that determine whether the test subject can detect irritant smoke to use only the minimum amount of smoke necessary to elicit a response from the test subject.
(5) The fit test shall be performed in an area with adequate ventilation to prevent exposure of the person conducting the fit test or the build-up of irritant smoke in the general atmosphere.
(b) Sensitivity Screening Check The person to be tested must demonstrate his or her ability to detect a weak concentration of the irritant smoke.

(1) The test operator shall break both ends of a ventilation smoke tube containing stannic chloride, and attach one end of the smoke tube to a low flow air pump set to deliver 200 milliliters per minute, or an aspirator squeeze bulb. The test operator shall cover the other end of the smoke tube with a short piece of tubing to prevent potential injury from the jagged end of the smoke tube.
(2) The test operator shall advise the test subject that the smoke can be irritating to the eyes, lungs, and nasal passages and instruct the subject to keep his/her eyes closed while the test is performed.
(3) The test subject shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its irritating properties and to determine if he/she can detect the irritating properties of the smoke. The test operator shall carefully direct a small amount of the irritant smoke in the test subject's direction to determine that he/she can detect it.
(c) Irritant Smoke Fit Test Procedure
(1) The person being fit tested shall don the respirator without assistance, and perform the required user seal check(s).
(2) The test subject shall be instructed to keep his/her eyes closed.
(3) The test operator shall direct the stream of irritant smoke from the smoke tube toward the faceseal area of the test subject, using the low flow pump or the squeeze bulb. The test operator shall begin at least 12 inches from the facepiece and move the smoke stream around the whole perimeter of the mask. The operator shall gradually make two more passes around the perimeter of the mask, moving to within six inches of the respirator.
(4) If the person being tested has not had an involuntary response and/or detected the irritant smoke, proceed with the test exercises.
(5) The exercises identified in section I.A.
14. of this appendix shall be performed by the test subject while the respirator seal is being continually challenged by the smoke, directed around the perimeter of the respirator at a distance of six inches.
(6) If the person being fit tested reports detecting the irritant smoke at any time, the test is failed. The person being retested must repeat the entire sensitivity check and fit test procedure.
(7) Each test subject passing the irritant smoke test without evidence of a response (involuntary cough, irritation) shall be given a second sensitivity screening check, with the smoke from the same smoke tube used during the fit test, once the respirator has been removed, to determine whether he/she still reacts to the smoke. Failure to evoke a response shall void the fit test.
(8) If a response is produced during this second sensitivity check, then the fit test is passed.

C. Quantitative Fit Test (QNFT) Protocols

The following quantitative fit testing procedures have been demonstrated to be acceptable: Quantitative fit testing using a non-hazardous test aerosol (such as corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl hexyl sebacate [DEHS], or sodium chloride) generated in a test chamber, and employing instrumentation to quantify the fit of the respirator; Quantitative fit testing using ambient aerosol as the test agent and appropriate instrumentation (condensation nuclei counter) to quantify the respirator fit; Quantitative fit testing using controlled negative pressure and appropriate instrumentation to measure the volumetric leak rate of a facepiece to quantify the respirator fit.

1. General

(a) The employer shall ensure that persons administering QNFT are able to calibrate equipment and perform tests properly, recognize invalid tests, calculate fit factors properly and ensure that test equipment is in proper working order.
(b) The employer shall ensure that QNFT equipment is kept clean, and is maintained and calibrated according to the manufacturer's instructions so as to operate at the parameters for which it was designed.

2. Generated Aerosol Quantitative Fit

Testing Protocol
(a) Apparatus.
(1) Instrumentation. Aerosol generation, dilution, and measurement systems using particulates (corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl hexyl sebacate [DEHS] or sodium chloride) as test aerosols shall be used for quantitative fit testing.
(2) Test chamber. The test chamber shall be large enough to permit all test subjects to perform freely all required exercises without disturbing the test agent concentration or the measurement apparatus. The test chamber shall be equipped and constructed so that the test agent is effectively isolated from the ambient air, yet uniform in concentration throughout the chamber.
(3) When testing air-purifying respirators, the normal filter or cartridge element shall be replaced with a high efficiency particulate air (HEPA) or P100 series filter supplied by the same manufacturer.
(4) The sampling instrument shall be selected so that a computer record or strip chart record may be made of the test showing the rise and fall of the test agent concentration with each inspiration and expiration at fit factors of at least 2,000. Integrators or computers that integrate the amount of test agent penetration leakage into the respirator for each exercise may be used provided a record of the readings is made.
(5) The combination of substitute air-purifying elements, test agent and test agent concentration shall be such that the test subject is not exposed in excess of an established exposure limit for the test agent at any time during the testing process, based upon the length of the exposure and the exposure limit duration.
(6) The sampling port on the test specimen respirator shall be placed and constructed so that no leakage occurs around the port (e.g., where the respirator is probed), a free air flow is allowed into the sampling line at all times, and there is no interference with the fit or performance of the respirator. The inmask sampling device (probe) shall be designed and used so that the air sample is drawn from the breathing zone of the test subject, midway between the nose and mouth and with the probe extending into the facepiece cavity at least 1⁄4 inch.
(7) The test setup shall permit the person administering the test to observe the test subject inside the chamber during the test.
(8) The equipment generating the test atmosphere shall maintain the concentration of test agent constant to within a 10 percent variation for the duration of the test.
(9) The time lag (interval between an event and the recording of the event on the strip chart or computer or integrator) shall be kept to a minimum. There shall be a clear association between the occurrence of an event and its being recorded.

(10) The sampling line tubing for the test chamber atmosphere and for the respirator sampling port shall be of equal diameter and of the same material. The length of the two lines shall be equal.
(11) The exhaust flow from the test chamber shall pass through an appropriate filter (i.e., high efficiency particulate filter) before release.
(12) When sodium chloride aerosol is used, the relative humidity inside the test chamber shall not exceed 50 percent.
(13) The limitations of instrument detection shall be taken into account when determining the fit factor.
(14) Test respirators shall be maintained in proper working order and be inspected regularly for deficiencies such as cracks or missing valves and gaskets.
(b) Procedural Requirements.
(1) When performing the initial user seal check using a positive or negative pressure check, the sampling line shall be crimped closed in order to avoid air pressure leakage during either of these pressure checks.
(2) The use of an abbreviated screening QLFT test is optional. Such a test may be utilized in order to quickly identify poor fitting respirators that passed the positive and/ or negative pressure test and reduce the amount of QNFT time. The use of the CNC QNFT instrument in the count mode is another optional method to obtain a quick estimate of fit and eliminate poor fitting respirators before going on to perform a full QNFT.
(3) A reasonably stable test agent concentration shall be measured in the test chamber prior to testing. For canopy or shower curtain types of test units, the determination of the test agent's stability may be established after the test subject has entered the test environment.
(4) Immediately after the subject enters the test chamber, the test agent concentration inside the respirator shall be measured to ensure that the peak penetration does not exceed 5 percent for a half mask or 1 percent for a full facepiece respirator.
(5) A stable test agent concentration shall be obtained prior to the actual start of testing.
(6) Respirator restraining straps shall not be over-tightened for testing. The straps shall be adjusted by the wearer without assistance from other persons to give a reasonably comfortable fit typical of normal use. The respirator shall not be adjusted once the fit test exercises begin.
(7) The test shall be terminated whenever any single peak penetration exceeds 5 percent for half masks and 1 percent for full facepiece respirators. The test subject shall be refitted and retested.
(8) Calculation of fit factors.
(i) The fit factor shall be determined for the quantitative fit test by taking the ratio of the average chamber concentration to the concentration measured inside the respirator for each test exercise except the grimace exercise.
(ii) The average test chamber concentration shall be calculated as the arithmetic average of the concentration measured before and after each test (i.e., 7 exercises) or the arithmetic average of the concentration measured before and after each exercise or the true average measured continuously during the respirator sample.
(iii) The concentration of the challenge agent inside the respirator shall be determined by one of the following methods:
(A) Average peak penetration method means the method of determining test agent penetration into the respirator utilizing a strip chart recorder, integrator, or computer. The agent penetration is determined by an average of the peak heights on the graph or by computer integration, for each

exercise except the grimace exercise. Integrators or computers that calculate the actual test agent penetration into the respirator for each exercise will also be considered to meet the requirements of the average peak penetration method.
(B) Maximum peak penetration method means the method of determining test agent penetration in the respirator as determined by strip chart recordings of the test. The highest peak penetration for a given exercise is taken to be representative of average penetration into the respirator for that exercise.
(C) Integration by calculation of the area under the individual peak for each exercise except the grimace exercise. This includes computerized integration.
(D) The calculation of the overall fit factor using individual exercise fit factors involves first converting the exercise fit factors to penetration values, determining the average, and then converting that result back to a fit factor. This procedure is described in the following equation: Overall Fit Factor Number of exercises = + + + + + + ff ff ff ff ff ff ff Where ff1, ff2, ff3, etc. are the fit factors for exercises 1, 2, 3, etc.
(9) The test subject shall not be permitted to wear a half mask or quarter facepiece respirator unless a minimum fit factor of 100 is obtained, or a full facepiece respirator unless a minimum fit factor of 500 is obtained.
(10) Filters used for quantitative fit testing shall be replaced whenever increased breathing resistance is encountered, or when the test agent has altered the integrity of the filter media.

3. Ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol.

The ambient aerosol condensation nuclei counter (CNC) quantitative fit testing (PortaCount®) protocol quantitatively fit tests respirators with the use of a probe. The probed respirator is only used for quantitative fit tests. A probed respirator has a special sampling device, installed on the respirator, that allows the probe to sample the air from inside the mask. A probed respirator is required for each make, style, model, and size that the employer uses and can be obtained from the respirator manufacturer or distributor. The primary CNC instrument manufacturer, TSI Incorporated, also provides probe attachments (TSI mask sampling adapters) that permit fit testing in an employee's own respirator. A minimum fit factor pass level of at least 100 is necessary for a half-mask respirator (elastomeric or filtering facepiece), and a minimum fit factor pass level of at least 500 is required for a full-facepiece elastomeric respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.
(a) PortaCount® Fit Test Requirements. (1) Check the respirator to make sure the sampling probe and line are properly attached to the facepiece and that the respirator is fitted with a particulate filter capable of preventing significant penetration by the ambient particles used for the fit test (e.g., NIOSH 42 CFR 84 series 100, series 99, or series 95 particulate filter) per manufacturer's instruction.
(2) Instruct the person to be tested to don the respirator for five minutes before the fit test starts. This purges the ambient particles trapped inside the respirator and permits the wearer to make certain the respirator is comfortable. This individual shall already have been trained on how to wear the respirator properly.
(3) Check the following conditions for the adequacy of the respirator fit: Chin properly placed; Adequate strap tension, not overly tightened; Fit across nose bridge; Respirator of proper size to

span distance from nose to chin; Tendency of the respirator to slip; Selfobservation in a mirror to evaluate fit and respirator position.
(4) Have the person wearing the respirator do a user seal check. If leakage is detected, determine the cause. If leakage is from a poorly fitting facepiece, try another size of the same model respirator, or another model of respirator.
(5) Follow the manufacturer's instructions for operating the PortaCount® and proceed with the test.
(6) The test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.
(7) After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried.
(b) PortaCount® Test Instrument.
(1) The PortaCount® will automatically stop and calculate the overall fit factor for the entire set of exercises. The overall fit factor is what counts. The Pass or Fail message will indicate whether or not the test was successful. If the test was a Pass, the fit test is over.
(2) Since the pass or fail criterion of the PortaCount® is user programmable, the test operator shall ensure that the pass or fail criterion meet the requirements for minimum respirator performance in this Appendix.
(3) A record of the test needs to be kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style, and size of respirator used; and date tested.

4. Modified ambient aerosol condensation

nuclei counter (CNC) quantitative fit testing protocol for full-facepiece and halfmask elastomeric respirators.
(a) When administering this protocol to test subjects, employers shall comply with the requirements specified in Part I.C.3 of this appendix (ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol), except they shall use the test exercises described below in paragraph (b) of this protocol instead of the test exercises specified in section I.C.3(a)(6) of this appendix.
(b) Employers shall ensure that each test subject being fit tested using this protocol follows the exercise and duration procedures, including the order of administration, described in Table A-1 of this appendix.

TABLE A-1 - MODIFIED AMBIENT AEROSOL CNC QUANTITATIVE FIT TESTING PROTOCOL FOR FULL-FACEPIECE AND HALF-MASK ELASTOMERIC RESPIRATORS

Exercises	Exercise procedure	Measurement procedure
Bending Over	The test subject shall bend at the waist, as if going to touch his/her toes for 50 seconds and inhale 2 times at the bottom.	A 20 second ambient sample, followed by a 30 second mask sample.
Jogging-in-Place	The test subject shall jog in place comfortably for 30 seconds.	A 30 second mask sample.

Head Side-to-Side	The test subject shall stand in place, slowly turning his/her head from side to side for 30 seconds and inhale 2 times at each extreme.	A 30 second mask sample.
Head Up-and-Down	The test subject shall stand in place, slowly moving his/her head up and down for 39 seconds and inhale 2 times at each extreme.	A 30 second mask sample followed by a 9 second ambient sample.

1 Exercises are listed in the order in which they are to be administered.
2 It is optional for test subjects to take additional breaths at other times during this exercise.

5. Modified ambient aerosol condensation

nuclei counter (CNC) quantitative fit testing protocol for filtering facepiece respirators.
(a) When administering this protocol to test subjects, employers shall comply with the requirements specified in Part I.C.3 of this appendix (ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol), except they shall use the test exercises described below in paragraph (b) of this protocol instead of the test exercises specified in section I.C.3(a)(6) of this appendix.
(b) Employers shall ensure that each test subject being fit tested using this protocol follows the exercise and duration procedures, including the order of administration, described in Table A-2 of this appendix.

TABLE A-2 - MODIFIED AMBIENT AEROSOL CNC QUANTITATIVE FIT TESTING PROTOCOL FOR FILTERING FACEPIECE RESPIRATORS

Exercises	Exercise procedure	Measurement procedure
Bending Over	The test subject shall bend at the waist, as if going to touch his/her toes for 50 seconds and inhale 2 times at the bottom.	A 20 second ambient sample, followed by a 30 second mask sample.
Talking	The test subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor for 30 seconds. He/she will either read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song.	A 30 second mask sample.
Head Side-to-Side	The test subject shall stand in place, slowly turning his/her head from side to side for 30 seconds and inhale 2 times at each extreme.	A 30 second mask sample.
Head Up-and-Down	The test subject shall stand in place, slowly moving his/her head up and down for 39 seconds and inhale 2 times at each extreme.	A 30 second mask sample followed by a 9 second ambient sample.

1 Exercises are listed in the order in which they are to be administered.
2 It is optional for test subjects to take additional breaths at other times during this exercise.

6. Controlled negative pressure (CNP)

quantitative fit testing protocol. The CNP protocol provides an alternative to aerosol fit test methods. The CNP fit test method technology is based on exhausting air from a temporarily sealed respirator facepiece to generate and then maintain a constant negative pressure inside the facepiece. The rate of air exhaust is controlled so that a constant negative pressure is maintained in the respirator during the fit test. The level of pressure is selected to replicate the mean inspiratory pressure that causes leakage into the respirator under normal use conditions. With pressure held constant, air flow out of the respirator is equal to air flow into the respirator. Therefore, measurement of the exhaust stream that is required to hold the pressure in the temporarily sealed respirator constant yields a direct measure of leakage air flow into the respirator. The CNP fit test method measures leak rates through the facepiece as a method for determining the facepiece fit for negative pressure respirators. The CNP instrument manufacturer Occupational Health Dynamics of Birmingham, Alabama also provides attachments (sampling manifolds) that replace the filter cartridges to permit fit testing in an employee's own respirator. To perform the test, the test subject closes his or her mouth and holds his/her breath, after which an air pump removes air from the respirator facepiece at a pre-selected constant pressure. The facepiece fit is expressed as the leak rate through the facepiece, expressed as milliliters per minute. The quality and validity of the CNP fit tests are determined by the degree to which the in-mask pressure tracks the test pressure during the system measurement time of approximately five seconds. Instantaneous feedback in the form of a real time pressure trace of the in-mask pressure is provided and used to determine test validity and quality. A minimum fit factor pass level of 100 is necessary for a half-mask respirator and a minimum fit factor of at least 500 is required for a full facepiece respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.
(a) CNP Fit Test Requirements.
(1) The instrument shall have a non-adjustable test pressure of 15.0 mm water pressure.
(2) The CNP system defaults selected for test pressure shall be set at -15 mm of water (-0.58 inches of water) and the modeled inspiratory flow rate shall be 53.8 liters per minute for performing fit tests.

NOTE: CNP systems have built-in capability to conduct fit testing that is specific

to unique work rate, mask, and gender situations that might apply in a specific workplace. Use of system default values, which were selected to represent respirator wear with medium cartridge resistance at a lowmoderate work rate, will allow inter-test comparison of the respirator fit.)
(3) The individual who conducts the CNP fit testing shall be thoroughly trained to perform the test.
(4) The respirator filter or cartridge needs to be replaced with the CNP test manifold. The inhalation valve downstream from the manifold either needs to be temporarily removed or propped open.
(5) The employer must train the test subject to hold his or her breath for at least 10 seconds.
(6) The test subject must don the test respirator without any assistance from the test administrator who is conducting the CNP fit test. The respirator must not be adjusted once the fit-test exercises begin. Any adjustment voids the test, and the test subject must repeat the fit test.
(7) The QNFT protocol shall be followed according to section I. C. 1. of this appendix with an exception for the CNP test exercises.

(b) CNP Test Exercises.
(1) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally for 1 minute. After the normal breathing exercise, the subject needs to hold head straight ahead and hold his or her breath for 10 seconds during the test measurement.
(2) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply for 1 minute, being careful not to hyperventilate. After the deep breathing exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during test measurement.
(3) Turning head side to side. Standing in place, the subject shall slowly turn his or her head from side to side between the extreme positions on each side for 1 minute. The head shall be held at each extreme momentarily so the subject can inhale at each side. After the turning head side to side exercise, the subject needs to hold head full left and hold his or her breath for 10 seconds during test measurement. Next, the subject needs to hold head full right and hold his or her breath for 10 seconds during test measurement.
(4) Moving head up and down. Standing in place, the subject shall slowly move his or her head up and down for 1 minute. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling). After the moving head up and down exercise, the subject shall hold his or her head full up and hold his or her breath for 10 seconds during test measurement. Next, the subject shall hold his or her head full down and hold his or her breath for 10 seconds during test measurement.
(5) Talking. The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song for 1 minute. After the talking exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement.
(6) Grimace. The test subject shall grimace by smiling or frowning for 15 seconds.
(7) Bending Over. The test subject shall bend at the waist as if he or she were to touch his or her toes for 1 minute. Jogging in place shall be substituted for this exercise in those test environments such as shroud-type QNFT units that prohibit bending at the waist. After the bending over exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement.

(8) Normal Breathing. The test subject shall remove and re-don the respirator within a one-minute period. Then, in a normal standing position, without talking, the subject shall breathe normally for 1 minute. After the normal breathing exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement. After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of a respirator shall be tried.
(c) CNP Test Instrument.
(1) The test instrument must have an effective audio-warning device, or a visual-warning device in the form of a screen tracing, that indicates when the test subject fails to hold his or her breath during the test. The test must be terminated and restarted from the beginning when the test

subject fails to hold his or her breath during the test. The test subject then may be refitted and retested.
(2) A record of the test shall be kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style and size of respirator used; and date tested.

7. Controlled negative pressure (CNP)

REDON quantitative fit testing protocol.
(a) When administering this protocol to test subjects, employers must comply with the requirements specified in paragraphs (a) and (c) of part I.C.6 of this appendix (‘‘Controlled negative pressure (CNP) quantitative fit testing protocol,") as well as use the test exercises described below in paragraph (b) of this protocol instead of the test exercises specified in paragraph (b) of part I.C.6 of this appendix.
(b) Employers must ensure that each test subject being fit tested using this protocol follows the exercise and measurement procedures, including the order of administration described in Table A-3 of this appendix.

TABLE A-3 - CNP REDON QUANTITATIVE FIT TESTING PROTOCOL

Exercises	Exercise procedure	Measurement procedure
Facing Forward	Stand and breathe normally, without talking, for 30 seconds.	Face forward, while holding breath for 10 seconds.
Bending Over	Bend at the waist, as if going to touch his or her toes, for 30 seconds.	Face parallel to the floor, while holding breath for 10 seconds.
Head Shaking	For about three seconds, shake head back and forth vigorously several times while shouting.	Face forward, while holding breath for 10 seconds.
REDON 1	Remove the respirator mask, loosen all facepiece straps, and then redon the respirator mask.	Face forward, while holding breath for 10 seconds.
REDON 2	Remove the respirator mask, loosen all facepiece straps, and then redon the respirator mask again.	Face forward, while holding breath for 10 seconds.

1 Exercises are listed in the order in which they are to be administered.
(c) After completing the test exercises, the test administrator must question each test subject regarding the comfort of the respirator. When a test subject states that the respirator is unacceptable, the employer must ensure that the test administrator repeats the protocol using another respirator model.
(d) Employers must determine the overall fit factor for each test subject by calculating the harmonic mean of the fit testing exercises as follows:
Overall Fit Factor = N 1/FF ... 1 + + [ ] / / FF FFN

Where:
N = The number of exercises; FF1 = The fit factor for the first exercise; FF2 = The fit factor for the second exercise; and FFN = The fit factor for the nth exercise.

PART II. NEW FIT TEST PROTOCOLS

A. Any person may submit to OSHA an application for approval of a new fit test protocol. If the application meets the following
criteria, OSHA will initiate a rulemaking proceeding under section 6(b)(7) of the OSH Act to determine whether to list the new protocol as an approved protocol in this appendix A.

B. The application must include a detailed
description of the proposed new fit test protocol. This application must be supported by either:

1. A test report prepared by an independent
government research laboratory (e.g., Lawrence Livermore National Laboratory, Los Alamos National Laboratory, the National Institute for Standards and Technology) stating that the laboratory has tested the protocol and had found it to be accurate and reliable; or

2. An article that has been published in a
peer-reviewed industrial hygiene journal describing the protocol and explaining how test data support the protocol's accuracy and reliability.

C. If OSHA determines that additional information is required before the Agency
commences a rulemaking proceeding under this section, OSHA will so notify the applicant and afford the applicant the opportunity to submit the supplemental information. Initiation of a rulemaking proceeding will be deferred until OSHA has received and evaluated the supplemental information.

APPENDIX B-1

APPENDIX B-1 TO § 1910.134

USER SEAL CHECK PROCEDURES (MANDATORY)

Source: Official eCFR text for 29 CFR 1910.134

The individual who uses a tight-fitting respirator is to perform a user seal check to ensure that an adequate seal is achieved each time the respirator is put on. Either the positive and negative pressure checks listed in this appendix, or the respirator manufacturer's recommended user seal check method shall be used. User seal checks are not substitutes for qualitative or quantitative fit tests.

I. FACEPIECE POSITIVE AND/OR NEGATIVE PRESSURE CHECKS

A. Positive pressure check. Close off the exhalation valve and exhale gently into the facepiece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece without any evidence of outward leakage of air at the seal. For most respirators this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.

B. Negative pressure check. Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the facepiece collapses slightly, and hold the breath for ten seconds. The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove.

If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

II. MANUFACTURER'S RECOMMENDED USER SEAL CHECK PROCEDURES

The respirator manufacturer's recommended procedures for performing a user seal check may be used instead of the positive and/or negative pressure check procedures provided that the employer demonstrates that the manufacturer's procedures are equally effective.

APPENDIX B-2

APPENDIX B-2 TO § 1910.134

RESPIRATOR CLEANING PROCEDURES (MANDATORY)

Source: Official eCFR text for 29 CFR 1910.134

These procedures are provided for employer use when cleaning respirators. They are general in nature, and the employer as an alternative may use the cleaning recommendations provided by the manufacturer of the respirators used by their employees, provided such procedures are as effective as those listed here in appendix B-2.

Equivalent effectiveness simply means that the procedures used must accomplish the objectives set forth in appendix B-2, i.e., must ensure that the respirator is properly cleaned and disinfected in a manner that prevents damage to the respirator and does not cause harm to the user.

I. PROCEDURES FOR CLEANING RESPIRATORS

A. Remove filters, cartridges, or canisters. Disassemble facepieces by removing speaking diaphragms, demand and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.

B. Wash components in warm (43 °C [110 °F] maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.

C. Rinse components thoroughly in clean, warm (43 °C [110 °F] maximum), preferably running water. Drain.

D. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in one of the following:

1. Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 43 °C (110 °F); or,

2. Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6-8 grams ammonium and/or potassium iodide/100 cc of 45% alcohol) to one liter of water at 43 °C (110 °F); or,

3. Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.

E. Rinse components thoroughly in clean, warm (43 °C [110 °F] maximum), preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on facepieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.

F. Components should be hand-dried with a clean lint-free cloth or air-dried.

G. Reassemble facepiece, replacing filters, cartridges, and canisters where necessary.

H. Test the respirator to ensure that all components work properly.

APPENDIX C

APPENDIX C TO § 1910.134

OSHA RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE (MANDATORY)

Source: Official eCFR text for 29 CFR 1910.134

To the employer: Answers to questions in Section 1, and to question 9 in Section 2 of part A, do not require a medical examination.

To the employee:

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Part A. Section 1. (Mandatory)

The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's date:

2. Your name:

3. Your age (to nearest year):

4. Sex (circle one): Male/Female

5. Your height: __ ft. __ in.

6. Your weight: __ lbs.

7. Your job title:

8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code): ___

9. The best time to phone you at this number: __

10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes/No

11. Check the type of respirator you will use (you can check more than one category):

a. __ N, R, or P disposable respirator (filter-mask, non-cartridge type only).

b. __ Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).

12. Have you worn a respirator (circle one): Yes/No

If yes, what type(s):

Part A. Section 2. (Mandatory)

Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle yes or no).

1. Do you currently smoke tobacco, or have you smoked tobacco in the last month: Yes/No

2. Have you ever had any of the following conditions?

a. Seizures: Yes/No

b. Diabetes (sugar disease): Yes/No

c. Allergic reactions that interfere with your breathing: Yes/No

d. Claustrophobia (fear of closed-in places): Yes/No

e. Trouble smelling odors: Yes/No

3. Have you ever had any of the following pulmonary or lung problems?

a. Asbestosis: Yes/No

b. Asthma: Yes/No

c. Chronic bronchitis: Yes/No

d. Emphysema: Yes/No

e. Pneumonia: Yes/No

f. Tuberculosis: Yes/No

g. Silicosis: Yes/No

h. Pneumothorax (collapsed lung): Yes/No

i. Lung cancer: Yes/No

j. Broken ribs: Yes/No

k. Any chest injuries or surgeries: Yes/No

l. Any other lung problem that you've been told about: Yes/No

4. Do you currently have any of the following symptoms of pulmonary or lung illness?

a. Shortness of breath: Yes/No

b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes/No

c. Shortness of breath when walking with other people at an ordinary pace on level ground: Yes/No

d. Have to stop for breath when walking at your own pace on level ground: Yes/No

e. Shortness of breath when washing or dressing yourself: Yes/No

f. Shortness of breath that interferes with your job: Yes/No

g. Coughing that produces phlegm (thick sputum): Yes/No

h. Coughing that wakes you early in the morning: Yes/No

i. Coughing that occurs mostly when you are lying down: Yes/No

j. Coughing up blood in the last month: Yes/No

k. Wheezing: Yes/No

l. Wheezing that interferes with your job: Yes/No

m. Chest pain when you breathe deeply: Yes/No

n. Any other symptoms that you think may be related to lung problems: Yes/No

5. Have you ever had any of the following cardiovascular or heart problems?

a. Heart attack: Yes/No

b. Stroke: Yes/No

c. Angina: Yes/No

d. Heart failure: Yes/No

e. Swelling in your legs or feet (not caused by walking): Yes/No

f. Heart arrhythmia (heart beating irregularly): Yes/No

g. High blood pressure: Yes/No

h. Any other heart problem that you've been told about: Yes/No

6. Have you ever had any of the following cardiovascular or heart symptoms?

   a. Frequent pain or tightness in your chest: Yes/No

   b. Pain or tightness in your chest during physical activity: Yes/No

   c. Pain or tightness in your chest that interferes with your job: Yes/No

   d. In the past two years, have you noticed your heart skipping or missing a beat: Yes/No

   e. Heartburn or indigestion that is not related to eating: Yes/No

   f. Any other symptoms that you think may be related to heart or circulation problems: Yes/No

7. Do you currently take medication for any of the following problems?

   a. Breathing or lung problems: Yes/No

   b. Heart trouble: Yes/No

   c. Blood pressure: Yes/No

   d. Seizures: Yes/No

8. If you've used a respirator, have you ever had any of the following problems? (If you've never used a respirator, check the following space and go to question 9:)

   a. Eye irritation: Yes/No

   b. Skin allergies or rashes: Yes/No

   c. Anxiety: Yes/No

   d. General weakness or fatigue: Yes/No

   e. Any other problem that interferes with your use of a respirator: Yes/No

9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: Yes/No

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you ever lost vision in either eye (temporarily or permanently): Yes/No

11. Do you currently have any of the following vision problems?

   a. Wear contact lenses: Yes/No

   b. Wear glasses: Yes/No

   c. Color blind: Yes/No

d. Any other eye or vision problem: Yes/No

12. Have you ever had an injury to your ears, including a broken ear drum: Yes/No

13. Do you currently have any of the following hearing problems?

a. Difficulty hearing: Yes/No

b. Wear a hearing aid: Yes/No

c. Any other hearing or ear problem: Yes/No

14. Have you ever had a back injury: Yes/No

15. Do you currently have any of the following musculoskeletal problems?

a. Weakness in any of your arms, hands, legs, or feet: Yes/No

b. Back pain: Yes/No

c. Difficulty fully moving your arms and legs: Yes/No

d. Pain or stiffness when you lean forward or backward at the waist: Yes/No

e. Difficulty fully moving your head up or down: Yes/No

f. Difficulty fully moving your head side to side: Yes/No

g. Difficulty bending at your knees: Yes/No

h. Difficulty squatting to the ground: Yes/No

i. Climbing a flight of stairs or a ladder carrying more than 25 lbs: Yes/No

j. Any other muscle or skeletal problem that interferes with using a respirator: Yes/No

Part B

Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire.

1. In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen: Yes/No

If yes, do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions: Yes/No

2. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals: Yes/No

If yes, name the chemicals if you know them:

3. Have you ever worked with any of the materials, or under any of the conditions, listed below:

a. Asbestos: Yes/No

b. Silica (e.g., in sandblasting): Yes/No

c. Tungsten/cobalt (e.g., grinding or welding this material): Yes/No

d. Beryllium: Yes/No

e. Aluminum: Yes/No

f. Coal (for example, mining): Yes/No

g. Iron: Yes/No

h. Tin: Yes/No

i. Dusty environments: Yes/No

j. Any other hazardous exposures: Yes/No

If yes, describe these exposures:

4. List any second jobs or side businesses you have:

5. List your previous occupations:

6. List your current and previous hobbies:

7. Have you been in the military services? Yes/No

If yes, were you exposed to biological or chemical agents (either in training or combat): Yes/No

8. Have you ever worked on a HAZMAT team? Yes/No

9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications): Yes/No

If yes, name the medications if you know them:

10. Will you be using any of the following items with your respirator(s)?

a. HEPA Filters: Yes/No

b. Canisters (for example, gas masks): Yes/No

c. Cartridges: Yes/No

11. How often are you expected to use the respirator(s) (circle yes or no for all answers that apply to you)?:

a. Escape only (no rescue): Yes/No

b. Emergency rescue only: Yes/No

c. Less than 5 hours per week: Yes/No

d. Less than 2 hours per day: Yes/No

e. 2 to 4 hours per day: Yes/No

f. Over 4 hours per day: Yes/No

12. During the period you are using the respirator(s), is your work effort:

a. Light (less than 200 kcal per hour): Yes/No

If yes, how long does this period last during the average shift: _____ hrs. _____ mins.

Examples of a light work effort are sitting while writing, typing, drafting, or performing light assembly work; or standing while operating a drill press (1-3 lbs.) or controlling machines.

b. Moderate (200 to 350 kcal per hour): Yes/No

If yes, how long does this period last during the average shift: _____ hrs. _____ mins.

Examples of moderate work effort are sitting while nailing or filing; driving a truck or bus in urban traffic; standing while drilling, nailing, performing assembly work, or transferring a moderate load (about 35 lbs.) at trunk level; walking on a level surface about 2 mph or down a 5-degree grade about 3 mph; or pushing a wheelbarrow with a heavy load (about 100 lbs.) on a level surface.

c. Heavy (above 350 kcal per hour): Yes/No

If yes, how long does this period last during the average shift: _____ hrs. _____ mins.

Examples of heavy work are lifting a heavy load (about 50 lbs.) from the floor to your waist or shoulder; working on a loading dock; shoveling; standing while bricklaying or chipping castings; walking up an 8-degree grade about 2 mph; climbing stairs with a heavy load (about 50 lbs.).

13. Will you be wearing protective clothing and/or equipment (other than the respirator) when you're using your respirator: Yes/No

If yes, describe this protective clothing and/or equipment:

14. Will you be working under hot conditions (temperature exceeding 77 °F): Yes/No

15. Will you be working under humid conditions: Yes/No

16. Describe the work you'll be doing while you're using your respirator(s):

17. Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (for example, confined spaces, life-threatening gases):

18. Provide the following information, if you know it, for each toxic substance that you'll be exposed to when you're using your respirator(s):

Name of the first toxic substance:

Estimated maximum exposure level per shift:

Duration of exposure per shift:

Name of the second toxic substance:

Estimated maximum exposure level per shift:

Duration of exposure per shift:

Name of the third toxic substance:

Estimated maximum exposure level per shift:

Duration of exposure per shift:

The name of any other toxic substances that you'll be exposed to while using your respirator:

19. Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and well-being of others (for example, rescue, security):

APPENDIX D

APPENDIX D TO § 1910.134

INFORMATION FOR EMPLOYEES USING RESPIRATORS WHEN NOT REQUIRED UNDER THE STANDARD (MANDATORY)

Source: Official eCFR text for 29 CFR 1910.134

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker.

Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

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

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

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

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

APPENDIX E

Appendix A to § 1910.147—Typical Minimal Lockout Procedure

General

The following simple lockout procedure is provided to assist employers in developing their procedures so they meet the requirements of this standard. When the energy isolating devices are not lockable, tagout may be used, provided the employer complies with the provisions of the standard which require additional training and more rigorous periodic inspections.
When tagout is used and the energy isolating devices are lockable, the employer must provide full employee protection (see paragraph (c)(3)) and additional training and more rigorous periodic inspections are required. For more complex systems, more comprehensive procedures may need to be developed, documented and utilized.

Lockout Procedure

Lockout procedure for

_____

(Name of Company for single procedure or identification of equipment if multiple procedures are used)

Purpose

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

Compliance With This Program

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

_____

Type of compliance enforcement to be taken for violation of the above.

Sequence of Lockout

(1) Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance.

_____

Name(s)/Job Title(s) of affected employees and how to notify.

(2) The authorized employee shall refer to the company procedure to identify the type and magnitude of the energy that the machine or equipment utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy.

_____

Type(s) and magnitude(s) of energy, its hazards and the methods to control the energy.

(3) If the machine or equipment is operating, shut it down by the normal stopping procedure (depress stop button, open switch, close valve, etc.).

_____

Type(s) and location(s) of machine or equipment operating controls.

(4) De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s).

_____

Type(s) and location(s) of energy isolating devices.

(5) Lock out the energy isolating device(s) with assigned individual lock(s).

(6) Stored or residual energy (such as that in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.

_____

Type(s) of stored energy - methods to dissipate or restrain.

(7) Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other normal operating control(s) or by testing to make certain the equipment will not operate. Caution: Return operating control(s) to neutral or "off" position after verifying the isolation of the equipment.

_____

Method of verifying the isolation of the equipment.

(8) The machine or equipment is now locked out.

Restoring Equipment to Service

When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps shall be taken.

(1) Check the machine or equipment and the immediate area around the machine or equipment to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.
(2) Check the work area to ensure that all employees have been safely positioned or removed from the area.
(3) Verify that the controls are in neutral.
(4) Remove the lockout devices and reenergize the machine or equipment.
Note: The removal of some forms of blocking may require reenergization of the machine before safe removal.
(5) Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.

Source: Occupational Safety and Health Administration, 29 CFR 1910.147 Appendix A.