

Respiratory Protection Program

For

The University of Rhode Island

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UNIVERSITY OF RHODE ISLAND

**University of Rhode Island
Environmental Health and Safety**

Respiratory Protection Program

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University of Rhode Island Environmental Health and Safety

Respiratory Protection Program

1. Introduction

This document establishes the University of Rhode Island's written compliance program for respiratory protection, as required by the Occupational Safety and Health Administration (OSHA) under Title 29 Code of Federal Regulations Part 1910.134 (see Appendix A). This Respiratory Protection Program addresses the use of respiratory protection as a method to protect University employees from hazardous exposures to airborne biological, chemical, and physical agents. Whenever feasible, engineering controls and work practice controls will first be used to maintain worker exposures below exposure limits and at a safe level. It is understood that respiratory protection shall only be required if these controls are not feasible or are not able to reduce exposures adequately. No employee of the University of Rhode Island shall be issued or required to wear a respirator until the need for such protection has been validated by the Department of Environmental Health and Safety, and the affected employee has met the criteria set forth by OSHA.

The Coordinator in Environmental Health and Safety in the Department of Public Safety is the Respirator Program Administrator.

2. Responsibilities

Various University departments and employees have responsibilities under this program, including:

- (a) Environmental Health and Safety – Respirator Program Administrator
 - Preparing, reviewing, and periodically revising this program
 - Providing and/or overseeing respirator fit-testing and training
 - Monitoring and evaluating respirable hazards in the workplace
 - Providing guidance to supervisors in the selection and purchase of approved respirators
 - Developing a medical surveillance program for approved respirator users
 - Maintaining records of exposure assessments, training, and respirator fit testing
 - Coordinating recordkeeping
- (b) URI Occupational Health Nurse
 - Conducting medical clearance of staff/students via the OSHA questionnaire found in the Standard and following up with any medical related concerns.
 - Maintaining medical records and informing EH&S whether staff/student may safely wear a respirator.
- (c) Supervisors

- Providing new employees and other users with information about potential respirable hazards, personal protective equipment requirements, and this Program
 - Notifying the Department of Environmental Health and Safety and Human Resources about workplace conditions and potentially affected employees
 - Making information and training materials available to potentially affected employees
 - Implementing a medical surveillance program for approved respirator users and ensuring that affected employees receive medical surveillance
 - Maintaining medical surveillance records
 - Ensuring that affected employees receive respirator training, with annual re-training thereafter, and fit-testing prior to working with the respirator
 - Supplying approved respirators and cartridges to affected employees
 - Requiring affected employees to wear respirators
- (d) Affected Employees/Respirator Users
- Observing the procedures and requirements outlined in this Program
 - Attending training sessions and obtaining medical surveillance
 - Wearing approved respirators as required
 - Notifying supervisors of changes in the workplace that could change exposures
 - Notifying supervisors of changes in medical condition that may require a re-evaluation of affected employee's ability to safely use a respirator

3. Exposure Assessments

Potential exposures to hazardous materials and conditions at the University are routinely evaluated through regular workplace inspections. The University takes all practical efforts to ensure that engineering or other controls are available and implemented to eliminate the need for respiratory protection. Nevertheless, certain situations and operations continue to require the use of respirators where exposures cannot be otherwise managed below the applicable permissible exposure limit. Also, respirators may be required or desired because of the odor or irritation associated with chemical exposures, even though they may be well below all applicable exposure limits. Respirators (N-95s) may also be required by hospitals and other healthcare settings for students during their clinical rotations. Lastly, respirators may also be necessary for veterinary students that handle animals due to hair or dander which may cause an existing allergy to worsen or create a new sensitivity.

In the absence of a regulatory exposure limit, commonly accepted guidelines will be used to evaluate the exposure hazard from a particular operation or environment. Airborne concentrations of hazardous agents may be predicted on the basis of past experience at the University, mathematical calculations, published results for similar work, or actual air sampling. Predicted airborne concentrations will be extended to all members of the same job title or function unless specific information indicates that exposures vary substantially, in which case more cross-sectional data will be obtained. Where air sampling is needed, measurements will be made with calibrated equipment operated by trained safety and health personnel from or under the direction

of Environmental Health and Safety. Monitoring will be repeated when changes occur that could render respiratory protective equipment inadequate or require new employees to be included in this Program.

4. Respirator Selection

Respirators are selected on the basis of workplace hazard assessments, as well as guidance from 29 CFR 1910.134, the American National Standard *Practices for Respiratory Protection Z88.2-1992*, the NIOSH Guide to Industrial Respiratory Protection, and the latest version of the NIOSH *Pocket Guide to Chemical Hazards*. Final selection of any respiratory protective device must be made in consultation with Environmental Health and Safety. Only NIOSH-approved respirators may be used.

Respirators are selected on the basis of anticipated health hazard(s), considering the following factors:

- Chemical, physical, or biological agent(s) in the work environment
- Physical state of contaminants, i.e., gas, vapor, dust, aerosol, etc.
- OSHA's Permissible exposure limit (PEL) and immediately dangerous to life and health (IDLH) levels¹ for the agent
- Anticipated airborne concentration of agent(s) based upon either past experience, mathematical predictions, published results from similar operations, or actual air sampling.
- Assigned protection factor (NIOSH) for the respirator type
- Potential for skin absorption or severe eye irritation
- Nature and duration of the activity requiring respiratory protection
- Requirements of the hospital or healthcare setting for students in clinical rotations

Only respirators that can provide protection in excess of the anticipated airborne concentration will be selected. The respirator selection and use worksheet (Appendix B) can be used as a decision guideline for ensuring the adequacy of selected equipment.

At the University, negative-pressure air-purifying respirators (APR), positive-pressure powered air-purifying respirators (PAPR) or disposable filtering facepiece respirators (also known as dust masks) are typically sufficient for routine work operations requiring respiratory protection. Cartridge selection for air-purifying respirators are made in accordance with the filtration capabilities; the appropriate cartridge or filter can be verified by the Respirator Program Administrator. Cartridges for gases and vapors must have an end-of-service-life indicator (ESLI), or be changed in accordance with the cartridge change schedule described in Appendix C.

¹ Levels: in the absence of a published OSHA PEL, other suitable exposure guidelines, such as ACGIH Threshold Limit Value (TLV), NIOSH Recommended Exposure Limit (REL), or the State of California's OSHA PELs may be used

5. Restrictions

Clothing, jewelry, or other personal items worn that prevent making an effective facial seal must be removed so that the respirator can be properly worn. Respirators requiring a tight face seal for proper performance may not be worn if certain physical or health conditions prevent obtaining the tight seal. These may include glasses (with tight fitting full facepiece respirators), missing dentures, facial hair, punctured eardrum, or other physical, health, or prosthetic conditions that interrupt or preclude an effective respirator fit. Certain conditions may be remedied as follows:

- Eyeglass temple pieces – Where a full-face respirator must be worn, a spectacle kit that fit the respirator must be provided to the employee. The employee will then need to visit an optometrist to arrange for the lens to be fabricated to the required prescription. Although the practice is strongly discouraged, contact lenses may be worn provided the respirator is of full-face design.
- Facial Hair Impeding Effective Seal – Where an employee is required to wear a negative-pressure respirator, and facial hair impedes an effective facial seal, the hair must be removed before the respirator can be worn.
- A positive pressure PAPR equipped with a loose fitting facepiece, hood or helmet may be an acceptable substitute. This would be acceptable with the written recommendation of a physician or other licensed health care professional (PLHCP).

6. Equipment Acceptance Criteria

Respiratory protection devices, including cartridges for air-purifying respirators, must be approved by NIOSH. Currently, only 3M air purifying respirators and cartridges are stocked and are available for use by University of Rhode Island employees. Contact the Respirator Program Administrator if a different respirator brand is under consideration.

7. Fit-Testing

Fit-testing is required for all employees using negative- or positive-pressure tight-fitting respirators, as required by OSHA or by the University. A fit-test must be performed before the respirator is used in the workplace. It must be repeated at least annually and whenever a different respirator facepiece is used or a change in the employee's physical condition (such as facial scarring or dentures) could affect respirator fit.

Qualitative fit-testing, as described in Appendix E, shall be used to fit-test half-face and full-face, negative-pressure APRs as well as positive-pressure tight fitting respirators (positive pressure PAPR equipped with loose fitting facepiece, hoods or helmets are exempted from the fit test requirement).

A respirator seal check should be conducted prior to each use. User seal check procedures as mandated by OSHA are outlined in Appendix D.

8. Training

Employees and supervisors required to wear respirators during employment at the University receive initial and annual training in the proper use, care, and limitations of the selected respirator, details of the Respirator Program, and OSHA's requirements under 29 CFR 1910.134. At a minimum, the following items will be covered during the training session:

- The nature of the respiratory hazard, i.e., what specific chemical substances or microbiological species are present, in what areas, during which operations, or under conditions involving potentially hazardous exposures, and what effects (symptoms) may result, if respirators are not used.
- An explanation of why engineering controls are not immediately possible and a discussion of what efforts are being made to eliminate or minimize the need for respirators
- An explanation of why the respirator type selected is the proper one and what factors affect selection
- A discussion and demonstration on how to use the respirator, i.e., how to inspect, put on, check seals, and remove the respirator
- Instruction on the proper techniques and importance of cleaning, disinfecting, inspecting, maintaining and storing of the respirator
- A discussion of the capabilities and limitations of respirators, i.e., in what environments or under what circumstances the respirator does not offer adequate protection (e.g., oxygen deficient atmospheres)
- A discussion of the warning sign(s) that may indicate the respirator is not functioning properly or the respirator cartridges are spent (e.g., fumes or vapors entering the facepiece as detected by taste or olfactory senses).
- How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions
- How to recognize medical signs and symptoms that may limit or prevent the effective use of the respirators
- The general requirements of the OSHA's respirator standard

See Appendix F for an outline of the respirator training program.

9. Voluntary Use

Those employees who are not required to wear respirators but do so on a voluntary basis are provided with information required by OSHA's Respiratory Protection Standard (29 CFR 1910.134 Appendix D) and are invited to attend annual respirator training. See Appendix G of this Program for a copy of the required information given to voluntary respirator wearers, which they must read, sign and date. Contact the Respirator Program Administrator for a copy of this required information. Medical surveillance is required for all voluntary respirator wearers (with the exception of voluntary users of filtering facepiece "dust mask" type respirators), however, annual fit-testing is not required.

10. Equipment Inspection

Employees must inspect their respirator before and after each use, including face seals and shield (full face units), cartridge receptacles, straps, and inhalation and exhalation diaphragms. Components made of rubber, silicone, or another elastomer must be inspected for pliability and any signs of deterioration. If any parts are damaged, the unit must be immediately taken out of service and the employee's supervisor notified so that a replacement respirator can be provided. Replacement respirators must be the same brand and size as the original respirator.

11. Equipment Use

When donning a respirator, hair must be pulled back and away from the seal area, and negative and/or positive pressure seal checks conducted to evaluate the facial fit and unit integrity. If an airtight seal cannot be made by adjusting the tightening straps, then the respirator must be inspected for damage and either repaired or replaced.

When using a respirator, employees must immediately stop work and leave the area if they:

- Detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece
- Develop any signs or symptoms of over-exposure
- Need to wash their face and respirator facepiece as necessary to prevent eye or skin irritation associated with respirator use
- Need to replace the respirator or the filter, cartridge, or canister elements

In the event any of these conditions occur during respirator use, notify the area supervisor, for assistance and possible medical follow-up. Remove the respirator from service and inspect it for damage or other problems. If the cause cannot be identified and corrected, contact the Respirator Program Administrator for guidance.

12. Equipment Maintenance and Storage

Respirators should be cleaned with a mild detergent (such as a gentle dish soap) and water after each use and then air-dried before storing. See Appendix H for respirator cleaning procedures. Respirators shall not be shared between employees. Store respirators in sealable plastic bags away from sources of potential contamination and never stack them under heavy items that could deform the elastomer facepiece.

Air purifying cartridges and canisters should be removed from the respirator after use and stored separately in an impermeable plastic bag and reused at a later date.

Cartridges can be reused until an end-of-service life indicator on the side of the cartridge (ESLI) activates, the time period indicated in the cartridge change schedule has elapsed, breakthrough has occurred (i.e., odor detected), or resistance to breathing is detected, whichever comes first. When storing cartridges for reuse, a written record showing the date, contaminant(s), and duration of use must be kept with the cartridges. Discard N-95 or N-99 and other disposable respirators and dust masks at the end of your shift, or after use.

Repairs to respirators may only be made by the manufacturer, authorized equipment service contractor, or by University staff trained in such repair. No adjustments or modifications can be made beyond the manufacturer's recommendations. Damaged respirators shall be turned in to a supervisor or Respirator Program Administrator for a replacement. The entire respirator, including all parts, must be NIOSH or MSHA approved. The approval is for the entire unit, and any mixing of brands (i.e., North cartridges on an MSA respirator) is prohibited.

13. Medical Surveillance

Before wearing a respirator (including fit testing), employees must first be medically evaluated using the mandatory medical questionnaire (See Appendix I). The employee's supervisor will arrange for the medical evaluation.

The requirements of the medical evaluation and for using the questionnaire are provided below:

- The affected employee must complete a medical evaluation using the medical questionnaire in Appendix C of OSHA's Respiratory Protection standard or a medical examination that obtains the same information as identified by URI's Health Services Occupational nurse, a physician or other licensed health care professional (PLHCP).
- The medical evaluation must obtain the information requested in Sections 1 and 2, Part A of Appendix C of the medical questionnaire. The questions in Part B of Appendix C may be added at the discretion of the health care professional.
- A follow-up medical examination may be provided for any employee who gives a positive response to any question among questions 1 through 8 in Part A Section 2, of Appendix C of the questionnaire, or whose initial medical examination demonstrates the need for a follow-up medical examination. The University must provide the employee with an opportunity to discuss the questionnaire and examination results with the PLHCP.
- The medical questionnaire and examinations must be administered confidentially during the employee's normal working hours or at a time and place convenient to the employee and in a manner that ensures that he or she understands its content. EH&S will not review the employee's responses, and the questionnaire will be reviewed by URI's Health Services Occupational Nurse or other PLHCP.

The University will obtain a written recommendation regarding the employee's ability to use the respirator from the URI Occupational Nurse or PLHCP. The recommendation shall provide only the following information: (1) Any limitations on respirator use related to the medical condition of the employee, or relating to the workplace conditions in which the respirator will be used, including whether or not the employee is medically able to use the respirator; (2) The need, if any, for follow-up medical evaluations; and (3) A statement that the URI Occupational Nurse or

PLHCP has provided the employee with a copy of the PLHCP's written recommendation.

14. Respirator Program Evaluation

Workplace evaluations will be conducted during normal area walkthroughs and during respirator training classes. The Respirator Program Administrator will continually evaluate the work areas to ensure that this program is being properly implemented and that it continues to be effective. This evaluation will include reviewing a list of departments and job titles that require or use respiratory protection. Affected employees shall be regularly consulted about the effectiveness of the respirator program during walkthroughs and during annual respirator training. This program shall be updated as needed.

15. Recordkeeping

The following records will be kept:

- A copy of this completed Respiratory Protection Program
- Employees' most recent fit-testing results
- Employees' most recent training records
- Written recommendations and/or limitations from a physician or other licensed health care professional (PLHCP).

The records will be maintained by the Respirator Program Administrator.

Abbreviations:

APR	Air purifying respirators
ESLI	End-of-service-life
IDLH	Immediately dangerous to life and health
MSHA	Mine Safety and Health Administration
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PAPR	Powered air purifying respirators
PEL	Permissible exposure limit
PLHCP	Physician or licensed health care professional
TLV	Threshold limit value
REL	Recommended exposure limit

Appendix A - OSHA's Respiratory Protection Standard (29 CFR 1910.134)

1. Respiratory Protection Program-1910.134(c)(1): A written respiratory protection program is required when necessary to protect the health of the employee from workplace contaminants or when the employer requires the use of respirators. A limited written program is also required when respirators (other than filtering facepieces) are being voluntarily worn by employees. The program must include workplace specific procedures and contain all applicable program elements. Where respirators are required, respirators (and their associated requirements such as fit-testing and maintenance), training and medical evaluations must be provided at no cost to the employee. It is the intent of the standard that the employer would not be required to incur any costs associated with voluntary use of filtering facepieces other than providing a copy of Appendix D to each user. If employers allow the voluntary use of respirators other than filtering facepieces, the costs associated with ensuring the respirator itself does not create a hazard, such as medical evaluations and maintenance must be provided at no cost to the employee.
2. Inspection Guidelines. During inspections of workplaces and tasks where respirators are used, the EH&S Coordinator is to evaluate the respiratory program and determine if the written program is adequate and complete for that particular site.

The program must be tailored to cover the specific work operations and practices in the workplace. The provisions listed in paragraph (c)(1)(i) thru (ix) of the standard must be included in the written program unless it is determined they are not applicable.

These provisions are to be considered when evaluating a written program:

- (i) procedures for selecting respirators
- (ii) medical evaluations for users
- (iii) fit-testing procedures for tight-fitting respirators
- (iv) procedures for proper use during routine and emergency situations
- (v) procedures for cleaning, storing, disinfecting, etc.
- (vi) procedures to ensure adequate air quality and flow for atmosphere-supplying respirators
- (vii) training on respiratory hazards, training on proper use, donning and removing the respirator etc.
- (viii) procedures for regularly evaluating the effectiveness of the program.

Compliance with the program should be verified during the walkaround by personal observation and employee interviews.

3. Citation Guidelines. If respirators are required to be worn in the workplace or respirators other than dust masks are worn by voluntary users, a written program is required. An overexposure is not required to cite this paragraph. If the CSHO determines that specific provisions are lacking or deficient in the written program, the CSHO should cite section (c)(1) with the specific element(s) that are missing. Discrepancies between the written program and implemented work practices at the worksite should be cited by the appropriate paragraph in the standard that requires the work practice. If overexposures are found and no program at all exists, paragraph (a)(2) should be cited.

4. (c)(2) Voluntary Use: Normally, respirators that are voluntarily used by employees will be filtering facepieces (dust masks). NIOSH-approved respirators are strongly recommended, but they are not required for voluntary use. This voluntary use of dust masks alone does not require the employer to have a written program. For filtering facepiece respirator use, the employer needs only ensure that dust masks are not dirty or contaminated, that their use does not interfere with the employee's ability to work safely, and that a copy of Appendix D is provided to each voluntary wearer. Merely posting Appendix D is not considered adequate.

Use of elastomeric or supplied-air respirators, even when voluntary on the part of the employee, will require the employer to include all elements in a written program that will ensure use of these respirators does not create a hazard.

5. Inspection Guidelines Even though employees may be voluntarily using respirators, adverse health conditions can be caused by the wearing of a respirator itself. Examples include, but are not limited to;
 - a. (1) an employee's health being jeopardized by the wearing of a respirator (e.g., employee has a cardiac and/or pulmonary disorder that could be aggravated by respirator use),
 - b. (2) the wearing of a dirty respirator that can cause dermatitis or ingestion of a hazardous chemical;
 - c. (3) the sharing of a respirator that leads to transmittal of disease.
6. Citation Guidelines Maintenance (h) and medical evaluation (e) violations should be considered for all situations where employees have elected to use a respirator, other than a dust mask, for personal comfort. If overexposures are found, then all other applicable subparagraphs should be cited.
7. (c)(3) Program Administrator: A "respiratory protection program administrator" is required to oversee and evaluate the respirator program.

This individual must be suitably trained and have the appropriate accountability and responsibility to manage the full respiratory protection program.

Companies with multiple worksites may have a program administrator at each worksite, as long as this person is qualified and retains the accountability and responsibility for the day-to-day operation of the specific program for that site. Alternatively, a company may opt to have one program administrator for several sites and/or one program for several similar sites as long as the program contains the necessary elements and addresses the hazards at those sites.

8. Inspection Guidelines. The extent of training or experience required for the program administrator will vary based on the complexity of the respiratory hazards in the workplace. Where significant program deficiencies are discovered, compliance officers should discuss questions about the program with the program administrator to determine how familiar she or he is with respirators, the hazards in the workplace, respirator use in the facility, the respirator standard and the company's respirator program.

Appendix B - Respirator Selection and Use Worksheet

Department, Unit:		Responsible Supervisor:	
Date Completed:	Name of Person to Contact:	Contact's Phone and /or E-mail:	EH&S approval date:

Supervisor: Complete separate entry for each job, work activity, air contaminant and/or type of respirator used. Air contaminant should be determined by reviewing safety data sheets.

Worksheet must be approved by EH&S prior to use. Send copy to EH&S via e-mail at srm@etal.uri.edu.

[illegible]

Appendix C - Cartridge Change Schedule

Where available, respirator cartridges equipped with an End of Service Life Indicator (ESLI) shall be purchased and used. The University of Rhode Island purchases and stocks the following 3M cartridges with ESLI.

- Organic vapor (OV) and Organic vapor/P100 Filter

These respirators have an indicator, located under a sticker of each cartridge which shows when the cartridge should be replaced. As shown in the images below, a red vertical stripe in a green field will extend from top to bottom as the carbon within the filter is spent. When the red vertical stripe has extended three-quarters to the bottom, replace the respirator cartridge. Refer to the following images below:



Images courtesy of 3M

A Respirator Cartridge Change Schedule must be developed for cartridges or canisters used with air purifying respirators that do not have an End of Service Life Indicator (ESLI). The purpose of this is to prevent contaminants from breaking through the respirator's sorbent cartridge(s), and thereby over-exposing employees. If supervisors or employees, based on the Respirator Selection and Use Worksheet (included in Appendix B) opine that they require a respirator cartridge other than the types listed above, please contact the Respirator Program Administrator. The Respirator Program Administrator will prepare a Respirator Cartridge Change Schedule based on the following criteria:

- Contaminants;
- Concentration;
- Frequency of use (e.g., continuously, intermittently) throughout the shift;
- Temperature;
- Humidity;
- Work rate; and,
- The presence of potentially interfering chemicals.

The worst case conditions will be assumed to avoid early breakthrough. The development of a Respirator Cartridge Change Schedule shall be documented in the Facility/Project-Specific Respiratory Protection Plan.

Appendix D - User Seal Check-Air Purifying Respirators

Persons using tight-fitting respirators must 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 must be used. User seal checks are not substitutes for qualitative or quantitative fit tests.

I. Facepiece Positive and 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.

Cover inlets
and try to inhale



Negative pressure fit check

Cover exhalation
valve and try to
exhale



Negative pressure fit check

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.

User Seal Check for Filtering Facepieces (N-95s)

Check the Seal of Your Filtering Facepiece Respirator Each Time You Don the Respirator.



Positive Pressure User Seal Check **For Non-Valved Respirators**

Place both hands completely over the respirator and exhale. The respirator should bulge slightly. If air leaks between the face and facesel of the respirator, reposition it and readjust the nose clip for a more secure seal. If you cannot achieve a proper seal, do not enter the contaminated area. See your supervisor.



Negative Pressure User Seal Check **For Valved Respirators**

Place both hands over the respirator and inhale sharply. The respirator should collapse slightly. If air leaks between the face and facesel of the respirator, reposition it and readjust the nose clip for a more secure seal. If you cannot achieve a proper seal, do not enter the contaminated area. See your supervisor.

Appendix E - Respirator Fit Testing Exercises and Record Sheet

Respirator Fit Test Exercises:

The test subject shall perform exercises, in the 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., tilting the head up and 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.
- (6) Bending Over: the test subject shall bend at the waist as if he/she were to touch his/her toes.
- (7) Normal Breathing: same as exercise (1)

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. If the wearer smells the test odor, taste the flavoring, or experiences irritation, the fit is faulty and another size or style respirator must be obtained, or the unit adjusted until a fit is obtained.

Appendix F - Respirator Training Program Outline

1. Engineering Controls vs. PPE
2. Routes of Exposure
3. OSHA's Respirator Standard 29 CFR 1910.134
4. Air Purifying Respirators – Use, Limitations, Cartridge/Filter Selection, Protection Factors
5. Cartridge/Filter Selection
6. Cartridge Change Out Schedule: Appendix C (handout)
7. Maintenance and Cleaning
8. Inspection of Respirator
9. Storage
10. Medical Surveillance
11. Seal Checks
12. Fit-Testing Conducted

This training is modified for users of filtering facepieces (N-95s)

Appendix G - Voluntary Use of Respirators or Dust Masks (N-95s)

Information for employees using respirators when not required under the OSHA 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. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the level of hazardous substance does not exceed the limits set by OSHA standards. If the University 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 and is effective.

You should:

1. read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirator's limitations.
 2. choose respirators certified for use to protect against the contaminant of concern. NIOSH 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. 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. Keep it in a clean place, and discard or clean it when it becomes visibly dirty or you suspect it might be contaminated.
-

I have read and understand the above information on the voluntary use of respirators and dust masks (sign and date):

Appendix H - Respirator Cleaning Procedures

These procedures are provided for employer use when cleaning respirators (adapted from 29 CFR 1910.134 App B-2). 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.

I. Procedures for Cleaning Respirators

A. Remove filters, cartridges, or canisters.

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

C. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in one of the following: hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 43 deg. C (110 deg. F); or other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.

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

E. 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 allowed to air dry. If immediate use is necessary, hand-drying may be conducted with a clean lint-free cloth.

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

H. Inspect and test the respirator to ensure that all components work properly.

Appendix I - OSHA Respirator Medical Evaluation Questionnaire

This mandatory Medical Evaluation Questionnaire was adapted from 29 CFR 1910.134 Appendix C of the OSHA standard.

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
 - d. 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 deg. 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):
