

RESPIRATORY PROTECTION PROGRAM

Updated January 28, 2013

I. PURPOSE. The purpose of this program is to ensure proper respiratory protection of individuals who may be exposed to an atmosphere that is contaminated with harmful dusts, fibers, fogs, fumes, mists, gases, smokes, sprays, or vapors and for which engineering controls are not feasible or adequate to control exposures.

A. Regulations. The Respiratory Protection Program for Virginia Commonwealth University (VCU) is written in accordance with:

1. American National Standards Institute "Practices for Respirator Protection," ANSI Z88.2-1969.
2. Code of Federal Regulations (CFR), Title 29, Part 1910.134, Occupational Safety and Health Standards.

B. Program. Engineering control measures are preferred where feasible. When respirators are necessary to protect employee health, equipment and training are provided by the employer at no cost to the employee. Once enrolled in the respirator program, the employee must use the respirator as instructed. The Respiratory Protection Program is updated annually. Guidance pertaining to the proper selection and purchase of respiratory protection equipment is provided by the Office of Environmental Health and Safety (OEHS). Respirators must be labeled as approved by the National Institute of Occupational Safety and Health (NIOSH) and bear the appropriate "TC" number.

C. Specific Programs. Other written programs from OEHS explain specific respiratory hazards in detail including the Asbestos Program, the Formaldehyde Program, and the Ethylene Oxide Program. Exposure levels and emergency situations where respiratory protection may be required are described. Respirators and other types of personal protective equipment (PPE) are also discussed in the Chemical Waste Program. This Respiratory Protection Program is itself a reference document for those laboratories required to have a written Chemical Hygiene Plan per OSHA's Laboratory Safety Standard.

D. Site-Specific Plan. A site-specific respiratory protection plan must be maintained by the section supervisor, laboratory, or department. A sample program template is available at the end of this document. Fill in all appropriate fields, print a copy, discuss with work area personnel, and store within the work area. A full copy of this respiratory program must be included with the site-specific plan. Appendix A contains a sample respiratory protection program which can be adapted to become a site-specific plan.

II. SELECTION. The following steps should be taken to assess a potential respiratory hazard and limit potential exposure:

A. Process:

1. Identify the hazard. Give consideration to chemical and physical properties, toxicity data, and concentration of hazardous constituents.

2. Assess the work environment. Appropriate aspects of the work environment (including space, ventilation, mobility, work rate, etc.) should be considered in developing the respiratory protection program.

3. Hazard. Select the respirator certified for use with that particular hazard's exposure limit and the level of the contaminant in the workplace. Maximum use concentration (MUC) for respirators is the upper limit at which the class of respirator chosen is expected to provide protection. Whenever the exposures approach the MUC, select the next higher class of respirators for employees. Maximum use concentration for respirators is used specifically in selecting proper respiratory protection equipment for non-immediately dangerous to life or health (IDLH) atmospheres.

4. Pressure test. Ensure that the device is functioning properly by performing positive and negative pressure checks each time the respirator is worn.

B. Types. The many different types of respirators available can be categorized into three basic types: air-purifying respirators, air-supplying respirators, and self-contained breathing apparatus (SCBA).

1. Air-Purifying Respirators. The purpose of air-purifying respirators is to remove limited concentrations of air contaminants from the breathing air; however, air purifying respirators do not affect oxygen content or supply oxygen. Under no circumstances; therefore, are air purifying respirators to be used in areas that are oxygen deficient atmosphere (<19.5%) or in atmospheres that are IDLH. Air-purifying respirators range from simple filtering facepieces to sophisticated positive pressure respirators. These respirators are generally composed of a soft, rubber facepiece and a replaceable filter or cartridge. Two major subcategories of air-purifying respirators are the mechanical filter type and the chemical cartridge type filter. The mechanical filter is used for protection against particulates such as dust, while the chemical cartridge type is used to protect against light concentrations of chemicals such as solvent vapors. Subcategories of air-purifying respirators are as follows:

a. **Single Use (Disposable) Respirator.** This type of respirator offers very limited protection and is intended for use by those working around simple dusts, dirt, or paint droplets. Painters, plasterers, carpenters, and movers are some of the classifications of employees who would benefit from its use. This respirator offers no protection from asbestos fibers, chemical vapors, nor can it be used in an oxygen-deficient atmosphere. The well known N-95 disposable respirator is an example of this type of respirator.

b. **Half-Mask Respirator.** This respirator is called "half-mask" because it covers half the face from under the chin to the bridge of the nose. Various cartridges for asbestos and different chemicals can be affixed to the facepiece. Because the eyes are not protected, care must be taken in determining whether this level of protection is adequate to prevent an

absorption hazard or irritation to the eyes. This respirator cannot be used in an oxygen-deficient atmosphere.

c. **Full-Facepiece Respirator.** The full-facepiece respirator extends from under the chin to the forehead. This broader coverage provides a better face fit, some eye protection, and a higher overall protective factor. Regardless of the number of straps which can vary with the make, the respirator is donned by placing the chin into the chin cup, pulling the facepiece over the head, and then tightening straps from the bottom to the top. While offering increased protection over the half-mask respirator, the configuration of this mask can contribute to reduced visibility and therefore create a hazard of its own. This respirator is not appropriate for oxygen-deficient atmospheres.

d. **Powered Air-Purifying Respirator (PAPR).** The respirators described in the foregoing sections rely on negative pressure created by the user to draw air in through the cartridge or filter. In contrast, a PAPR uses a battery-powered blower that passes the contaminated air through the cartridge or filter where the air is cleaned and forced through a hose to the facepiece. One advantage of using a PAPR is that it supplies air at a positive pressure within the facepiece, so that leaks are from inside to outside. PAPRs must deliver at least four cubic feet of air per minute (CFM) to a tight-fitting facepiece and at least seven CFM to a loose-fitting hood or helmet. The batteries will only last a limited amount of time and so must be recharged after use or during use depending upon the total work time and the particular model of the PAPR. This respirator is not appropriate for oxygen-deficient atmospheres.

2. Air-Supplied Respirator. Air-supplied respirators deliver breathing air from a clean air source through a supply hose connected to the worker's facepiece. If air-supplied respirators are to be used on any job(s) within the university, OEHS will provide specific instructions and training.

3. Self-Contained Breathing Apparatus (SCBA). SCBAs provide protection for varying periods of time depending upon the amount of breathing air (air pressure and tank size) and the breathing demands of the wearer. When using these devices, the worker is independent of his/her surrounding atmosphere; therefore, these respirators can be used in IDLH atmospheres. The self-contained respirators are heavy and awkward to wear. They also have a limited air supply (usually 30 to 60 minutes), thus requiring numerous air tanks on hand depending on the size of the job.

4. Alarms and End of Service Indicators. SCBA's and some canister-type gas masks contain warning devices such as signal alarms or gauges which allow the individual wearing the equipment to be aware of how much air or cartridge capacity is still available. However, most other gas masks and air-purifying respirators do not have such warning devices; therefore, their filters should be changed according to the manufacture's and OEHS's recommendations.

III. TRAINING. All individuals requiring respiratory protection equipment must be trained as to proper selection, fit, use, limitations, and maintenance. Perhaps the most important element of their training is to have a good understanding of the limitations of the equipment. Trainers also explain that improper use of respirators can result in irritation, discomfort, potential

overexposure, and that the consequences of overexposure can include acute injury, the development of chronic diseases, and even death. Training is conducted by OEHS and consists of the following elements:

A. Seal. Fitting and checking the facepiece to face seal.

B. Hazards. Nature of respiratory hazards involved and what may happen if proper respiratory equipment is not worn.

C. Controls. Controls being used (environmental, engineering, and administrative) and the need to provide extra protection through respirator use.

D. Selection. Criteria for selecting a respirator.

E. Limitations. Limitations of the respirator.

F. Method. Proper method for donning and doffing the respirator and checking its operation.

G. Maintenance. Respirator maintenance and storage.

H. Emergency. Recognizing/handling emergency situations.

IV. FIT TESTING. Individuals who use respirators must be instructed how to wear the respirator properly, to make adjustments, and to determine a proper fit. Aspects of these requirements are discussed below.

A. Seals. Proper seals between the wearer and the facepiece are essential for respirators to work at the maximum design efficiency. Having facial hair, lacking teeth, or wearing corrective lenses interfere with a proper fit may adversely affect the seal of the respirator. Contact lenses should not be worn while wearing a respirator in a contaminated area because if the integrity of the seal is breached and the contaminant is an eye irritant, injury to the eyes can be worsened by the contact lenses.

B. Participation. Fit testing is conducted by OEHS according to the VOSH Respiratory Protection Standard on a project-by-project basis and at departmental request. Supervisors who will oversee the project must participate. Periodic updates may be necessary, especially in the case of user weight gain or loss, or other changes in the shape of the face that may affect the seal.

C. Fit Test.

1. There are two types of fit tests: qualitative and quantitative. Qualitative tests are fast but not as accurate as the quantitative test. The quantitative test entails the use of bulky and expensive equipment. In qualitative tests, the positive pressure fit test and the negative pressure fit test can be used as a quick check of the fit of the respirator facepiece before beginning or during work in the hazardous atmosphere. These tests apply only to the air-purifying respirators.

The user tests the facepiece-to-face-seal of the respirator by wearing it in a test atmosphere where a known contaminant is present.

2. An additional fit test is required whenever the employee, supervisor, or program administrator reports visual observation of changes in the employee's physical condition that could affect respirator fit. Such conditions include facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight.

D. Qualitative Fit Test Methods. Qualitative tests are fast and easily performed. However, they rely on the wearer's sensitivity and are therefore not entirely reliable. The two major qualitative tests are described below.

1. Isoamyl Acetate Test. Isoamyl acetate is a low toxicity substance with a banana-like odor. It is widely used in testing the facepiece fit for organic vapor cartridge/canister respirators. The prospective user should don the respirator away from the isoamyl acetate, and then perform the following after isoamyl acetate is placed on a cotton wad nearby:

- a. Normal breathing.
- b. Deep breathing, as during heavy exertion.
- c. Side-to-side and up-and-down head movements.
- d. Talking.
- e. Other exercises, according to the VOSH standard.

2. Irritant Smoke Test. Irritant smoke is used to test the facepiece fit of particulate filter respirators. This test can be used for both air-purifying and air-supplying respirators, but an air-purifying respirator must have a high-efficiency particulate filter(s). The test substance is an irritant (stannic chloride or titanium tetrachloride). These irritant challenges are available in sealed glass tubes. The tube ends are broken and air is passed through them so that a dense irritating smoke is emitted. If the wearer detects the challenge, then the fit is defective. The likelihood of a false indication of proper fit is reduced using this test because individuals who detect the irritating smoke usually cough or sneeze.

3. Negative Pressure Test. This should be used only as a gross determination of fit. The wearer should use this test just before entering the hazardous atmosphere. In this test, the user closes off the inlets by covering them with the palms of the hands or by squeezing the breathing tube so that it does not pass air, inhales gently so that the facepiece collapses slightly, and holds breath for about ten seconds. The facepiece should remain slightly collapsed and no inward leakage should be detectable.

4. Positive Pressure Test. This test, similar to the negative pressure test, is conducted by closing off the exhalation valve(s) and exhaling gently into the facepiece. The fit is considered satisfactory if slight positive pressure can be built up inside the facepiece without any evidence

of outward leakage.

E. Quantitative Tests. Quantitative respirator performance tests involve placing the wearer in an atmosphere containing an easily detectable, relatively nontoxic gas, vapor, or aerosol. The atmosphere within the respirator is continuously sampled through a probe in the respirator inlet covering. The leakage is expressed as a percentage of the test atmosphere outside the respirator, called "penetration." The greatest advantage to quantitative fit testing is that it indicates respirator fit numerically and does not rely on a subjective response. Two materials used in the quantitative tests are sodium chloride and dioctyl phthalate.

V. MAINTENANCE. Respirators must be properly maintained if they are to continue to afford an acceptable level of protection. Equipment should be checked for signs of wear and deterioration before and after each use. Special attention should be given to rubber components which may become brittle and to connections, which are under the most stress. The following checklists outline potential problem areas that should be monitored frequently.

A. Air-Purifying Respirators (quarter-mask, half-mask, and full facepiece).

1. Rubber facepiece maintenance.

- a. Excessive dirt (clean all dirt from facepiece).
- b. Cracks, tears, or holes (obtain new facepiece).
- c. Distortion (allows facepiece to "sit" free from any constraints and see if distortion disappears; if not, obtain new facepiece).
- d. Cracked, scratched, or loose-fitting lenses (contact respirator manufacturer to see if replacement is possible; otherwise obtain new facepiece).

2. Head straps maintenance.

- a. Breaks or tears (replace head straps).
- b. Loss of elasticity (replace head straps).
- c. Broken or malfunctioning buckles or attachments (obtain new buckles).
- d. Facepiece slips (replace head straps).

3. Inhalation/Exhalation valves maintenance.

- a. Detergent residue, dust particles, or dirt on valve or valve seat (clean residue with soap and water).
- b. Cracks, tears, or distortion in the valve material or valve seat (contact manufacturer

for instructions).

- c. Missing or defective valve cover (obtain valve cover from manufacturer).

4. Filter element(s) maintenance.

- a. Filter appropriate to the hazard.
- b. Approval designation.
- c. Missing or worn gaskets (contact manufacturer for replacement).
- d. Worn filter or facepiece threads (replace filter or facepiece).
- e. Cracks or dents in filter housing (replace filter).
- f. Missing or loose hose clamps (obtain new clamps).

B. Air-Supplying Respirators. Check facepiece, head straps, valves, and breathing tube, as for air-purifying respirators.

1. Hood, helmet, blouse, or full suit maintenance (check if applicable).

- a. Headgear suspension (adjust properly for user).
- b. Cracks or breaks in face shield (replace face shield).
- c. Protective screen intact and fits correctly over the face shield, abrasive blasting hoods, and blouses (otherwise obtain new screen).

2. Air supply system maintenance.

- a. Breathing air quality.
- b. Breaks or kinks in air supply hoses and end fitting attachments (replace hose and/or fitting).
- c. Tightness of connections.
- d. Proper setting of regulators and valves (consult manufacturer's recommendations).
- e. Correct operation of air-purifying elements and carbon monoxide or high-temperature alarms.

3. Monthly Check. All self-contained breathing apparatus must be regularly inspected (monthly) and breathing air cylinders must be fully charged per manufacturer's specifications.

C. Maintenance All Respirators.

1. Cleaning. After each use, respirators are to be cleaned thoroughly with soap and water or alcohol wipes in order to provide the wearer with a sanitary respirator for the next use. This is particularly important when respirators are interchanged or shared among different workers.

2. Marking. Chemical cartridges and gas mask canisters must be marked appropriately when placed into service so that they can be replaced as suggested by the manufacturer.

3. Alert/Warning. All alert or warning devices have to be checked prior to use in order to ensure proper performance.

4. Filter Replacement. Respirator cartridge or filter change out schedule must be established to inform users regarding the frequency with which they must change filters.

5. Storage. Respiratory protection equipment must be stored in an area which protects the equipment from dust, moisture, chemicals, and other environmental elements. Respirators are stored with facepieces and exhalation valves resting in a position that will not cause malformation of the equipment. A specific area should be designated for placement of all respiratory protection equipment, not only for prevention of damage, but also for easy accessibility during emergencies.

6. Repair. Repairs of respiratory protection equipment must be conducted by qualified individuals. Timely inspections and recording of these inspections must follow any repair.

7. Respirator Cartridge Change Schedule. If there is no end-of-service-life indicator (ESLI), a cartridge/canister change out schedule is required for gas-and vapor-removing respirators and should be based upon objective information or data that will ensure that canisters and cartridges are changed before the end of their service life. The service life of a cartridge depends upon environmental conditions, breathing rate, cartridge filtering capacity, and the amount of contaminants in the air. More information is available in Appendix B.

VI. MEDICAL EXAMINATIONS. Employees assigned to tasks which require the use of a respirator must be certified by a licensed healthcare practitioner as physically able to work with the additional strain on heart and lungs that wearing a respirator entails.

A. Employee Health Service. An initial examination is conducted to determine fitness and periodic check-ups are also required. Individual departments can arrange for medical examinations with the university's Employee Health Service.

B. Exposure Occurrence. If there is a concern that an individual was exposed to an airborne contaminant while wearing a respirator, then appropriate clinical laboratory tests are provided for this individual to assess and document the exposure. These may include urine, blood, and/or fecal analyses to determine the level of exposure. Laboratory tests are also

conducted by the Employee Health Service.

C. Exposure Follow-up. Evidence of exposure of a worker will be followed up with work area exposure monitoring and surveillance to determine if additional engineering controls are necessary.

D. Medical Evaluation. A medical evaluation form should be completed to determine the employee's ability to use a respirator before the employee is fit tested or required to use the respirator in the workplace. Fit tests will not be provided to individuals who do not have current medical clearance to use respirators. The medical evaluation may be discontinued when the employee is no longer required to use a respirator. More information is available in Appendix C.

VII. WORK AREA SURVEILLANCE. Surveillance of work area conditions is conducted as required to assess worker exposure.

A. Procedural Changes. In the event of an employee exposure, workplace procedures will be examined to determine if there are opportunities for elimination or substitution of toxic materials or if there are engineering or administrative solutions which could reduce exposure potential. Depending upon the circumstances, the Chemical and Biological Safety Section (CBSS) may conduct exposure monitoring to document the exposure or to ensure that the protective factor of respirators is not being exceeded.

B. Records. Monitoring records are maintained by CBSS.

VIII. ADDITIONAL RESOURCES. Additional information and regulatory guidance can be found at the [OSHA Training and Reference Materials Library](#).

IX. APPENDICES.

Appendix A. Example Worksite-Specific Respiratory Protection Plan. Below is an example of a respiratory protection program document which may be filled in as indicated to form the basis of a departmental written program.

SITE-SPECIFIC RESPIRATORY PROTECTION PROGRAM

I. Purpose. This worksite-specific procedure describes the process for compliance with the policies and procedure described in Virginia Commonwealth University’s (VCU) Respiratory Protection Program. The following information is designed for specific departmental, division, or laboratory use. The following program applies to _____ (laboratory, department, division, etc).

The worksite-specific procedure is to be used in conjunction with the VCU’s Respiratory Protection Program and is not intended to substitute the complete Respiratory Protection Program.

This sample respirator program can be edited on a computer or by filling in the required information or by printing the sample program and filling the document out manually. Read the complete sample and ensure it complements your procedures. Some attached forms must be filled in by hand.

II. Scope and Respirator Selection. This program applies to all employees who are required to wear tight-fitting respirators to limit exposure to airborne impurities which may include biological, chemical, or allergen contaminants. This program does not cover the use of air supplying respirators in oxygen-deficient atmospheres.

Identify the work process, location, and type of respirator used for operations requiring the use of a tight fitting respirator.

Work Process and Location	Type of Hazard (be specific)	Type of NIOSH Approved Respirators	Frequency of Use (routinely, infrequently, or in emergencies)

For additional information on respirator selection for particular chemical or biological exposures, contact the Chemical/Biological Safety Section of OEHS at 828-1392 or consult Section II of VCU’s Respiratory Protection Program.

C. Fit testing must be conducted by CBSS following the medical evaluation. See Section IV of VCU’s Respiratory Protection Program for specifics. Fit testing must be conducted annually or as conditions change. Records concerning annual fit testing requirements must be maintained with this document. Provide the required information in the table below.

Name and Position of Employee	Date of Last Fit Test	Name and Position of Employee	Date of Last Fit Test

D. Respirator Storage, Cleaning and Maintenance. Consult Section V of VCU’s Respiratory Protection Program for maintenance and cleaning of your respirator. Fill in the required elements below.

1. Non-disposable respirators are stored in the following clean locations:

(a) _____

(b) _____

(c) _____

2. Respirators will be cleaned and sanitized every (____) days or whenever they are visibly dirty.

3. Repairs and adjustments to respirators are conducted by _____.

E. Training. Training will be provided by CBSS annually or as new personnel are required to wear tight fitting respirators. Elements associated with respiratory protection program training can be referenced in Section III of VCU’s Respiratory Protection Program. Documentation of training must be maintained for each employee. Training documents are stored here:_____.

F. Records and Documentation.

1. A complete copy of the respiratory protection plan is stored here:_____.

2. The employees’ latest fit test results are stored here:_____.

3. Employee training records are stored here:_____.

4. Written recommendations from the medical provider are stored here:_____.

Appendix B. Respirator Cartridge Change Schedule. The purpose of a change schedule is to establish the time period for replacing respirator cartridges and canisters. This helps to prevent filter or cartridge saturation and subsequent vapor breakthrough and thereby reduces the likelihood of employee overexposure.

I. OSHA Specific Standards. OSHA has mandatory change-out schedules for cartridges for certain substances including:

- A. Acrylonitrile 1910.1045: End-of-service life or end of shift (whichever occurs first).
- B. Benzene 1910.1028: End-of-service life or beginning of shift (whichever occurs first).
- C. Butadiene 1910.1051: Every 1, 2, or 4 hours dependent on concentration and at beginning of each shift.
- D. Formaldehyde 1910.1048: For cartridges, every three hours or end of shift; for canisters, every 2 or 4 hours according to the schedule in 1910.1048(g)(3)(iv).
- E. Vinyl chloride 1910.1017: End of service life or end of shift in which they are first used (whichever occurs first).
- F. Methylene chloride: Canisters may only be used for emergency escape and must be replaced after use.

II. Interactive Sources of Help.

A. Mathematical Models. OSHA provides guidance on using mathematical models to predict the service life of organic vapor respirator cartridges when used for protection against single contaminants. The following links lead to the OSHA interactive model. http://www.osha.gov/SLTC/etools/respiratory/change_schedule_mathmodel.html and http://www.osha.gov/SLTC/etools/respiratory/mathmodel_woodtable.html which is intended to protect against selected gases already calculated in a table.

B. Computer Programs. The OSHA Advisor Genius estimates breakthrough times for an activated carbon respirator cartridge using physical and environmental parameters specific to the contaminant and the workplace. This estimating model only applies to contaminants that are liquids at the workplace temperature. http://www.osha.gov/SLTC/etools/respiratory/mathmodel_advisorgenius.html.

III. Cartridge Service Life for Mixtures.

A. OSHA has no accepted way to determine a cartridge's service life when exposed to mixtures; however, computer models have been developed that can estimate service.

B. NIOSH developed a computer tool for estimating breakthrough times and service lives of air-purifying respirator cartridges manufactured to remove toxic organic vapors from breathed

air that can be used with the cartridge/canister manufacturer's recommendations for multi-gas use of the specific canister/cartridge being used. The link to the NIOSH tool is here: <http://www.cdc.gov/niosh/npptl/multivapor/multivapor.html>.

IV. Manufacturer's Recommendations. Most manufacturers provide information on their website to help in determining the appropriate change out schedule for their product. An example is the 3M website which is at this link: www.mmm.com/market/safety/ohes2/index.html.

V. Warning Properties. OSHA no longer allows the use of warning properties as the primary basis for changing respirator cartridges. The following factors should be considered when developing a respirator cartridge change schedule, which is required by OSHA.

- A. Contaminants.
- B. Concentration.
- C. Frequency of use (i.e., continuously, intermittently, etc.) throughout the shift.
- D. Temperature.
- E. Humidity.
- F. Wearer's work rate.
- G. The presence of potentially interfering chemicals.

Appendix C. OSHA Respirator Medical Evaluation Questionnaire

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, etc.), 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, and security):