Program Contact Person: Crista Hartman
Environmental Health and Safety
University of Nevada, Reno
Phone: 775-327-5055
# RESPIRATORY PROTECTION PROGRAM UNIVERSITY OF NEVADA, RENO

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RESPIRATORY PROTECTION PROGRAM

1.0 INTRODUCTION

1.1 Policy

It is the policy of the University of Nevada, Reno (UNR) to provide faculty, staff, students and visitors with a safe and healthy learning, research, and work environment. The UNR Environmental Health & Safety Department will provide guidance on the selection, use, care, and maintenance of respiratory protective equipment and develop procedures for their safe use.

All activities involving the use of respiratory protective equipment including but not limited to operations, maintenance and research activities in all facilities controlled by the University of Nevada, Reno shall be conducted in compliance with the provisions of this program.

This policy is intended to meet the requirements of the U.S. Occupational Safety and Health Administration’s Respiratory Protection Standard 29 CFR 1910.134.

1.2 Purpose

The purpose of the Respiratory Protection Program is to protect employees against harmful dusts, fogs, fumes, mists, gases, smokes, sprays, bioaerosols, and vapors, through the use of personal protective equipment (PPE). If effective engineering or administrative controls are not feasible, respirators shall be provided by the University when such equipment is necessary to protect the health of the employee.

This program will be implemented to ensure there are specific practices and procedures in place to safeguard employees who, during their normal duties, are or could be, exposed to hazardous airborne contaminants.

1.3 Scope

This program applies to, but is not limited to, any individual whose work requires the use of respiratory protection.

Where effective engineering controls are not feasible, or when they are being used but they do not adequately control exposures below permissible exposure limits personal protective equipment shall be used.

Respiratory protective equipment is required for work in environments with radioactive or chemical exposure levels exceed acceptable limits, when a risk assessment determines that airborne exposure to infectious agents is likely, and during some emergency response situations such as clean-up of
some hazardous materials spills. Respiratory protective equipment may also be required for work in confined spaces or for short-term projects where engineering controls are not practical.

2.0 RESPONSIBILITIES

Each department that requires, is required to use, or has voluntary use of respirators, is responsible for implementing the respiratory protection program. Each department is responsible for scheduling department employees for annual fit-testing and medical evaluation as needed.

2.1 Supervisors, Managers, and Principal Researchers

Each person in charge of a research project or in charge of a craft or maintenance crew engaged in activities where respiratory protective equipment is, or may be, required, is responsible for:

2.1.1 Requesting assistance from the Environmental Health & Safety Department (EH&S) in evaluating new or non-routine operations that may present respiratory health and safety hazards.

2.1.2 Notifying EH&S of the need for the use of respiratory protective equipment, including any voluntary use of respiratory protection.

2.1.3 Identifying, with the assistance of the Environmental Health & Safety Department, those employees who may need respiratory protective equipment.

2.1.4 Ensuring that all employees who will use respiratory equipment complete the Medical Questionnaire and are scheduled for and complete any required medical evaluations.

2.1.5 Ensuring that all employees who use respiratory protection receive training and fit testing on an annual basis.

2.1.6 Obtaining assistance of the Environmental Health & Safety Department in selecting appropriate respiratory protection devices before they are purchased.

2.1.7 Enforcing the use of respiratory protective equipment when required by regulations or other requirements, as outlined in the standard operating procedures of this program.
2.2 Employees

Employees are responsible for:

2.2.1 Utilizing issued respiratory protection in accordance with instructions and training provided by EH&S and in accordance with the standard operating procedures of this program.

2.2.2 Notifying supervisors and/or EH&S of any voluntary use of respiratory protection.

2.2.3 Completing the Medical Questionnaire accurately and submitting it to an approved on-line evaluation physician service or to a qualified physician or other licensed health care professional (PLHCP).

2.2.4 Attending training and receiving fit-testing on an annual basis.

2.2.5 Informing supervisor of any personal health problems that may arise which could be aggravated by the use of respiratory protective equipment.

2.2.6 Preventing damage to respirators insuring that respirators are not modified or altered in any way.

2.2.7 Reporting any observed or suspected malfunctioning respirator to the supervisor.

2.2.8 Using only specific respiratory protective devices for which they have received training and fit testing.

2.2.9 Checking the respirator for good fit before each use.

2.2.10 Checking for deterioration of the respirator before each use.

2.2.11 Recognizing indications that cartridges and/or filters are at the end of their service life.

2.2.12 Cleaning and sanitizing reusable respirators after use.

2.2.13 Storing the respirator in a protected location.

2.2.14 Discarding disposable respirator as directed.

2.2.15 Notifying supervisors and EH&S when they have a condition that may interfere with face-piece sealing such as:
   (1) A weight change of 20 lbs. or more
   (2) Significant facial scarring in the area of the face piece seal.
   (3) Significant dental changes, i.e., multiple extractions without prosthesis, or dentures.
   (4) Reconstructive or cosmetic surgery.
2.3 EH&S Department

EH&S personnel are responsible for:

2.3.1 Determining individuals and associated operations which require respirator usage.

2.3.2 Providing assistance in reviewing purchases of respiratory protective equipment when requested.

2.3.3 Providing instruction and training on respirator selection criteria, fit testing, use and maintenance.

2.3.4 Conducting fit tests for employees who utilize respiratory protective equipment.

2.3.5 Notifying the employee's supervisor of any required referrals for medical evaluation.

2.3.6 Maintaining medical clearance, training, and fit testing records.

2.3.7 Providing consulting services for respiratory protection matters.
3.0 MEDICAL EVALUATION

3.1 Medical Questionnaire

Each employee who is required to wear a respirator must complete a medical questionnaire. There are two approved ways to complete the questionnaire; either go to a doctor and have them complete the medical questionnaire that is attached in Appendix D or complete the online 3M questionnaire.

3.2 Medical Clearance

Any employee who uses respiratory equipment must receive a signed medical clearance from a licensed physician or other licensed health care professional before being fitted for, and issued a respirator. The medical clearance shall be updated in accordance with the following criteria:

3.2.1 If the employee reports medical signs or symptoms that are related to the ability to use a respirator.

3.2.2 If the designated medical professional, supervisor or respirator program supervisor informs the department that the employee needs to be reevaluated.

3.2.3 If information from the respiratory protection program, including observations made during fit testing or program evaluation indicates the need for reevaluation.

3.2.4 If a change occurs in workplace conditions that may result in a substantial increase in the physiological burden placed upon the employee.

3.3 Medical Examinations

Medical examinations are required for the following persons:

3.3.1 Employees who work or may potentially work with asbestos containing materials.

3.3.2 Individuals whose Medical Questionnaire evaluation indicates that examination by a physician is required.

3.3.3 Individuals who have a known health problem that could be aggravated by the use of respiratory protective equipment.

3.3.4 Individuals who the designated medical professional has determined require a medical examination for any reason before assignment to activities requiring the use of respiratory protective equipment.
4.0 EDUCATION AND TRAINING

The Environmental Health & Safety Department shall provide instruction on:

4.0.1 Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator.

4.0.2 What the limitations and capabilities of the respirator are.

4.0.3 How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions.

4.0.4 How to inspect, put on and remove the respirator.

4.0.5 How to perform seal checks of the respirator.

4.0.6 Procedures for maintenance and storage of the respirator.

4.0.7 How to recognize medical signs and symptoms that may limit or prevent the effective use of the respirator.

4.0.8 General requirements of the OSHA Respiratory Protection standard.
5.0 RESPIRATOR SELECTION AND USE

Proper selection and use of a respirator is critical to avoid impairment to an individual's health, including certain delayed lung diseases such as silicosis, pneumoconiosis, or asbestosis.

5.1 Respirator Selection

Select the proper type of respirator using the Respiratory Equipment Selection Guides in Appendices A and B.

5.2 Respirator Use

N95 respirators and air purifying respirators (the respirator type most commonly used at UNR) are not designed to be used in an atmosphere:

5.2.a. That is immediately dangerous to life or health (IDLH).

5.2.b. From which escape cannot occur without the aid of the respiratory equipment.

5.2.c. Containing less than 19.5% oxygen.

5.2.d. With unknown contaminants.

- Under such conditions, air supplied respiratory protective equipment or self-contained breathing apparatus is required.

5.2.1 DO NOT wear a respirator if you have:

5.2.1.a. Not completed the Medical Questionnaire and obtained written medical clearance from the designated physician.

5.2.1.b. Not been trained by an Environmental Health & Safety Representative in the use of the respirator.

5.2.1.c. Not successfully completed initial fit testing.

5.2.1.d. Gone more than 12 months since your last fit test.

5.2.1.e. Facial hair that comes between the sealing surface of the facepiece and the face or that interferes with valve function.

5.2.2. DO NOT modify or alter your respirator in any manner, unless specified in the instruction manual.

5.2.2.a. Use only MSHA/NIOSH or NIOSH approved components and replacement parts for your specific respirator. Failure to use MSHA/NIOSH or NIOSH components and replacement parts VOIDS the MSHA/NIOSH or NIOSH approval of the entire
respirator, invalidates all manufacturers' warranties, and may result in lung disease or exposure to other hazardous or life threatening conditions.

5.2.3 Inspect all components of your respirator system before use for signs of damage or wear that may reduce the protection provided.

5.2.3.a. Immediately replace any worn or damaged components with MSHA/NIOSH or NIOSH approved components or remove the respirator from service. See the MAINTENANCE section for proper directions for inspecting, cleaning, and storing your respirator.

5.3. Respirator User Seal Checks:

For all tight-fitting respirators, the user shall perform user seal checks according to the following directions:

5.3.1 Negative Pressure User Seal Check

This test must be performed before each use and should be performed periodically during use.

This test is performed by closing off the inlets of the canister, cartridges or filters by covering with the palms of the hands, by placing seals over the canister or cartridge inlets, or by squeezing breathing tubes so that air cannot pass. Inhale gently so the face piece collapses slightly and hold breath for ten seconds. If the face piece remains slightly collapsed and inward leakage is not detected, the respirator is assumed tight and the exhalation valve and face piece are not leaking.

5.3.2 Positive Pressure User Seal Check

This test must be performed before each use and should be performed periodically during use.

This test is performed by closing off the exhalation valve and exhaling gently into the face piece. The fit is considered satisfactory if a slight positive pressure can be built up inside the face piece without any evidence of outward leakage. For some respirators, the exhalation valve cover must be removed. Carefully replace it after the test.
6.0  RESPIRATORY EQUIPMENT

This section contains operating instructions and limitations for respiratory equipment that may be used at UNR. The following use limitations apply to all use of respiratory protective devices used at UNR:

6.0.1. Facial hair that interferes with face to mask fit shall not be permitted.

6.0.2. The Medical Questionnaire must be completed.

6.0.3. Written medical clearance from a designated physician must be obtained.

6.0.4. Training and fit testing must be successfully completed prior to use and annually thereafter.

6.0.5. If an employee exhibits/experiences difficulty in breathing (that is unrelated to respirator function) during testing or use, he/she shall be referred to a physician to determine fitness to use such equipment while performing assigned duties.

Not everyone can wear respirators. Individual with impaired lung function, due to asthma or emphysema for example, may be physically unable to wear a respirator. Individuals who cannot get a good facepiece fit, including those individuals whose beards or sideburns interfere with the facepiece seal, will be unable to wear tight fitting respirators.

Respirators may also present communication problems, vision problems, fatigue and reduced work efficiency. Nonetheless, it is sometimes necessary to use respiratory protection as the means of control.
6.1 **Filtering Face-pieces** (N95 respirators)

6.1.1. **Availability and types for use.** N95 respirators of various kinds, including disposable types, may be used for protection against low concentrations of certain nuisance dusts (such as dust generated while sweeping floors or sanding wood). Only the N95 respirators which incorporate a surgical mask are designed to be fluid resistant to splash and spatter of blood and other infectious materials.

6.1.2. **Limitations.** N95 respirators provide no protection against gases, vapors or toxic contaminants. They will not protect the user in atmospheres containing oil aerosols. Since they supply no oxygen, they cannot be used in oxygen deficient atmospheres. These masks must not be used for work involving hazardous particulates such as asbestos.

6.1.3. **Procedure.** When a N95 respirators is required for a job situation, the user should:

6.1.3.a. Put on the N95 respirators and adjust it for proper fit. Some masks have adjustable face sealing areas.

6.1.3.b. Discard an N95 respirator upon observation of damaged or missing parts, if the mask becomes contaminated with dust or fluids and/or if excessive clogging of the respirator causes breathing difficulty. If the N95 respirator has a replaceable dust filter, replace the dust filter with a new one when normal breathing becomes difficult.
6.2 Air-Purifying Half Mask Respirators

6.2.1 Availability and types for use. Half mask respirators are the most widely used types of respirators; several brands and sizes are available on the market to assure employee comfort and a satisfactory fit. Various types of filters, chemical cartridges and combination filter cartridges are available for employee protection.

6.2.2 Limitations. Since this type of respirator does not supply air, it cannot be used in oxygen deficient atmospheres, in IDLH atmospheres or in untested confined spaces. It can only be used for protection against the contaminants and the concentration limits listed on the cartridge. The wearer should leave an area immediately if gas/vapor is smelled inside the mask or if breathing resistance increases. An air purifying respirator should not be used for contaminants which do not display adequate odor or other warning properties without implementation of a cartridge change-out schedule that is based on the specific air contaminants and expected exposure. Cartridges shall be changed in accordance with the chemical break-through information contained in Appendix B. A half mask respirator shall not be worn when facial hair extends under the face mask sealing area.

6.2.3 Procedure to put on and adjust the half mask respirator:

6.2.3.a. Hold the mask so the narrow nose cup points upward.

6.2.3.b. Grasp both lower mask straps and hook them behind the neck, allowing the chin to fit in first.

6.2.3.c. Grasp both top straps and hook them behind the head and above the ears, making sure of a proper fit on the nose.

6.2.3.d. Adjust the straps so the fit is snug but comfortable by pulling both straps simultaneously to the rear and not outward.
6.2.3.e. Check for leaks by performing a qualitative negative/positive pressure user seal check. (See qualitative fit testing section.)

6.2.3.f. Each user of respiratory protective equipment must inspect, clean, and maintain the respirator after each use. Any parts showing wear must be replaced at this time with parts approved for the specific respirator.
6.3 Air-Purifying Full Face Mask Respirators

6.3.1 Availability and types for use. Full face mask respirators provide more protection than half masks because their shape allows a better mask-to-face seal. They also protect the eyes from irritating chemicals or particulate atmospheres. Full face masks may be equipped with the various types of air purifying filters, chemical cartridges, combination filter cartridges, chin canisters and gas mask canisters depending upon the protection required. Additionally, full face masks may be used in conjunction with supplied air systems such as SCBA units (see Sections 7.5 & 7.6).

6.3.2 Limitations. Air purifying full face mask respirators has the same limitations as air purifying half mask respirators. Additionally, standard eye glasses interfere with the mask to face seal; therefore contact your supervisor and/or the Environmental Health & Safety Department for more information on obtaining proper eyeglasses inserts.

6.3.3 Procedure. To put on a full face mask:

6.3.3.a Loosen all straps, pull the harness over the head, and place the chin in the chin cup.

6.3.3.b Pull the head harness well down on the back of the head.

6.3.3.c Tighten the harness gently, starting with the bottom straps and then the middle and top straps.

6.3.3.d Check for leaks by performing a qualitative negative/positive pressure user seal check. (See qualitative fit testing section.)

6.3.3.e Each user of respiratory protective equipment must inspect, clean, and maintain the respirator after each use. Any parts showing wear must be replaced at this time with parts approved for the specific respirator.
6.4 Powered Air-Purifying Respirators (PAPR)

6.4.1 Availability and types for use. Special work projects (BSL-3 labs, extensive asbestos abatement, unusual painting jobs, etc.) may require additional levels of respiratory protection or comfort not supplied by conventional negative pressure air-purifying respirators. Unlike the previously described half face mask and full face mask air purifying respirators which depend on the wearer's own ability to draw air in through the respirator cartridges, PAPRs use a battery powered blower to force filtered air into the face mask under positive pressure. The feature permits the equipment to be used in atmospheres with chemical concentrations exceeding the protection factor limitations of more conventional negative pressure air purifying respiratory equipment. PAPRs will force air to the outside of the mask at any face seal failure point.

6.4.1 Limitations. If powered airflow into the facemask fails (such as in the event of a battery failure), PAPRs become negative pressure air-purifying respirators, providing a reduced level of protection. These units are subject to similar limitations as negative pressure air purifying respiratory protective equipment. Contaminants should possess good warning properties, cartridges should be changed out in accordance with the information contained in Appendix B, and ambient oxygen concentrations must be adequate to support life.

6.4.2 Procedure. Equipment use requirements will vary depending upon individual case circumstances and equipment. Contact the Environmental Health & Safety Department to evaluate individual case circumstances.
6.5 Self Contained Breathing Apparatus (SCBA)

No SCBA equipment is known to exist on campus. SCBA usage requires special approval. Specialized training equipment and procedures are required. In the event of an emergency requiring emergency egress into a building or room where an unknown or IDLH respiratory hazard exists, local fire or emergency rescue authorities, or hazardous materials contractors, are to be contacted to make all required entries.

6.6 Airline (Supplied Air) Respirators

No airline respirator equipment is known to exist on campus. Airline respirators require special approval. Specialized training equipment and procedures are required. In the event of an emergency requiring emergency egress into a building or room where an unknown or IDLH respiratory hazard exists, local fire or emergency rescue authorities, or hazardous materials contractors, are to be contacted to make all required entries.
7.0 MAINTENANCE AND CARE OF RESPIRATORS

The primary responsibility for maintaining the respirator in proper and clean condition rests with the employee. Minor repair and/or adjustment may be made on the spot; major repairs require removing respirator from service.

7.1 Inspection for Defects

7.1.1. Examine the face piece for:

7.1.1.a. Excessive dirt

7.1.1.b. Cracks, tears, holes, or physical distortion of shape

7.1.1.c. Inflexibility of the face piece

7.1.1.d. Cracked or badly scratched lenses in full face pieces

7.1.1.e. Missing mounting clips, badly worn threads or missing gaskets, if required.

7.1.2. Examine the head straps or head harness for:

7.1.2.a. Breaks

7.1.2.b. Loss of elasticity

7.1.2.c. Broken or malfunctioning buckles in attachments

7.1.2.d. Excessive wear on attachments

7.1.2.e. Excessive wear on head harness which might permit slippage

7.1.3. Examine the exhalation valve for the following after removing its cover:

7.1.3.a. Foreign material such as detergent residue, dust, or human hair

7.1.3.b. Cracks, tears, pinholes, or distortions in the valve material

7.1.3.c. Improper insertion of valve body in face piece

7.1.3.d. Missing or defective valve cover

7.1.3.e. Improper installation of valve in the valve body
7.1.4. **Examine the air purifying element for:**

7.1.4.a. Correct cartridge, canister, or filter for the hazard.

7.1.4.b. Incorrect installation, loose connections, missing or worn gasket or cross threading in the holder.

7.1.4.c. Expired shelf life date on the cartridge or canister.

7.1.4.d. Cracks or dents in the outside case of the filter, cartridge, or canister.

7.1.5. **If the device has a corrugated breathing tube, examine it for:**

7.1.5.a. Broken or missing end connectors.

7.1.5.b. Missing or loose hose clamps.

7.1.5.c. Deterioration, determined by stressing the tube and looking for cracks.

7.1.6. **Examine the harness of the front or back mounted gas mask for:**

7.1.6.a. Damage or wear to the canister holder.

7.1.6.b. Broken harness straps for fastening.

7.2 **Cleaning**

7.2.1. Respirators, whether used routinely or for emergencies, must be cleaned and disinfected by the employee on a regular basis. As a minimum, respirator cleaning should take place on a weekly basis following use, and more frequently as conditions of use warrant. Remove filters, cartridges, or canisters.

7.2.2. Disassemble facepieces by removing speaking diaphragms, valve assemblies, hoses, or other components.

7.2.3. Wash components in warm (110° F maximum) water with a mild detergent or with a cleaner recommended by the manufacturer.

7.2.4. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.

7.2.5. Rinse components thoroughly in clean, warm, preferably running water. Drain. It is important to thoroughly rinse because detergents that dry on facepieces may result in dermatitis or may cause deterioration of rubber if not completely removed.
7.2.6. Components should be hand-dried with a clean lint-free cloth or air-dried in a clean place free from contamination.

7.2.7. Reassemble the face piece and place the respirator in a sealed container for storage.

7.3 Storage

Respirators shall be stored to protect against dust, sunlight, heat, extreme cold, excessive moisture or damaging chemicals.

7.3.1 Respirators must be placed in sealed plastic bags or other suitable containers and stored in a location that prevents damage and/or contamination.

7.3.2 Respirators should be packed or stored so that the face piece and exhalation valve will rest in a normal position and function will not be impaired by either of these setting in an abnormal position.
8.0 QUANTITATIVE FIT TESTING PROCEDURES

Quantitative fit testing is the preferred testing method. The ambient aerosol condensation nuclei counting (CNC) method, using a Portacount® Plus instrument, has been selected as the quantitative fit test protocol of choice for UNR. This instrument counts the number of particles inside and outside the mask and calculates a fit factor, consisting of the ratio of the inside air concentration to the outside air concentration, for each exercise. Once the test exercise series is complete, the instrument calculates an overall fit factor. A respirator with a half mask facepiece must achieve an overall fit factor of 100 and a respirator with a full-face mask must achieve an overall fit factor of 500 to be deemed acceptable for use.

Quantitative fit testing must be repeated at least annually. In addition, quantitative fit testing shall be repeated immediately if the test subject has:

8.0.1. A weight change of 20 lbs. or more;
8.0.2. Significant facial scarring in the area of the face piece seal;
8.0.3. Significant dental changes, i.e., multiple extractions without prosthesis, or dentures;
8.0.4. Reconstructive or cosmetic surgery; or
8.0.5. Any other condition that may interfere with face piece sealing.

8.1 Negative Pressure User Seal Check

This test must be performed before each use and should be performed periodically during use.

This test is performed by closing off the inlets of the canister, cartridges or filters by covering with the palms of the hands, by placing seals over the canister or cartridge inlets, or by squeezing breathing tubes so that air cannot pass. Inhale gently so the face piece collapses slightly and hold breath for ten seconds. If the face piece remains slightly collapsed and inward leakage is not detected, the respirator is assumed tight and the exhalation valve and face piece are not leaking.

8.2 Positive Pressure User Seal Check

This test must be performed before each use and should be performed periodically during use.

This test is performed by closing off the exhalation valve and exhaling gently into the face piece. The fit is considered satisfactory if a slight positive pressure can be built up inside the face piece without any evidence of outward leakage. For some respirators, the exhalation valve cover must be removed. Carefully replace it after the test.

8.3 Quantitative Fitting Procedures

8.3.1. The selected respirator must be equipped with the appropriate probed adaptor and a HEPA/P100 filter prior to commencing the fit test.
8.3.2. The test subject shall be shown how to put on a respirator, the proper position on the face and how to set strap tension. Respirator straps should not be over tightened for testing and should be adjusted by the wearer to give a reasonably comfortable fit typical of normal use.

8.3.3. The test subject shall conduct negative and positive pressure user seal checks until an acceptable fit is obtained with the selected respirator.

8.3.4. Prior to performing a quantitative fit test, the test subject shall be given complete instructions regarding the test procedures and shall wear the face piece for at least five minutes.

8.3.5. The Portacount® instrument's air sampling tubes will be connected to the facepiece and the test subject's personal data will be entered into the data base.

8.3.6. The test subject shall perform the exercises as posted on the monitor screen, in the given order. Following each individual test exercise, the Portacount® will calculate and display a fit factor for that exercise. Failure to achieve the appropriate fit factor for any single exercise will invalidate the entire fit test. In such a case, the test subject will be required to choose another respirator or adjust the fit of the already selected respirator, repeat the user seal checks, and repeat the fit test process.

8.3.6.a. **Normal breathing.** Without talking, the subject shall breathe normally for at least one minute.

8.3.6.b. **Deep breathing.** The subject shall do slow deep breathing for at least one minute, pausing so as not to hyperventilate.

8.3.6.c. **Turning head side to side.** The subject shall slowly turn his/her head from side to side between the extreme positions to each side for at least one minute. The head shall be held at each extreme position for at least five seconds. Perform for at least three complete cycles.

8.3.6.d. **Moving head up and down.** The subject shall slowly move his head up and down between the extreme position straight up and the extreme position straight down (take care not to dislodge the respirator against the chest) for at least one minute. The head shall be held at each extreme position for at least five seconds. Perform for at least three complete cycles.

8.3.6.e. **Reading.** The subject shall read the Rainbow Passage (Appendix G) out loud so as to be heard clearly by the test monitor.

8.3.6.f. **Grimace.** The subject shall alternate between smiling and frowning.

8.3.6.g. **Exercise.** The subject shall either jog in place or bend at the waist for at least one minute to simulate work activity.

8.3.6.h. **Normal breathing.** Without talking, the subject shall breathe normally for at least one minute.
8.3.7. Upon successful completion of the final test exercise, the Portacount® will calculate an overall fit factor and display a pass message.

8.3.8. A copy of the fit test record will be printed and signed by both the test subject and the qualified individual conducting the fit test. The individual should take this form to their supervisor as documentation of completing the fit testing.

9.0 QUALITATIVE FIT TEST REQUIREMENTS

Qualitative fit testing is limited to protection factors of 10 (i.e. ten times the PEL). Although full face respirators and PAPRs may be able to provide greater protection, protection factors can only be verified to a maximum of 10 when using qualitative fit testing.

Qualitative fit testing must be repeated at least annually. In addition, qualitative fit testing shall be repeated immediately if the test subject has:

9.0.a. A weight change of 20 lbs. or more.

9.0.b. Significant facial scarring in the area of the face piece seal.

9.0.c. Significant dental changes, i.e., multiple extractions without prosthesis, or dentures.

9.0.d. Reconstructive or cosmetic surgery.

9.0.e. Or any other condition that may interfere with face piece seal.

9.0.1. The test subject shall be shown how to put on a respirator, proper positioning on the face, and how to set strap tension. Respirator straps should not be over tightened for testing and should be adjusted by the wearer to give a reasonably comfortable fit typical of normal use.

9.0.2. The test subject shall conduct negative and positive pressure user seal checks until an acceptable fit is obtained with the selected respirator.

9.0.3. Prior to performing a qualitative fit test, the test subject shall be given complete instructions regarding the test procedures and shall wear the face piece for at least five minutes.

9.1 Bitrex™ (Denatonium Benzoate) Solution Aerosol Qualitative Fit Test Protocol

9.1.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.
9.1.a.(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.

9.1.a.(2) The test enclosure shall have a \( \frac{3}{4} \) inch (1.9 cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

9.1.a.(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.

9.1.a.(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.

9.1.a.(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.

9.1.a.(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.

9.1.a.(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.

9.1.a.(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.

9.1.a.(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.

9.1.a.(10) The test conductor will take note of the number of squeezes required to solicit a taste response.

9.1.a.(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.

9.1.a.(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.
9.1.a.(13) Correct use of the nebulizer means that approximately 1 ml of liquid is used at a time in the nebulizer body.

9.1.a.(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.

9.1.b  **Bitrex Solution Aerosol Fit Test Procedure**

9.1.b.(1) The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.

9.1.b.(2) The fit test uses the same enclosure as that described in 4. (a) above.

9.1.b.(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).

9.1.b.(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.

9.1.b.(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.

9.1.b.(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.

9.1.b.(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.

9.1.b.(8) After generating the aerosol, the test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.

9.1.b.(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).

9.1.b.(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.

9.1.b.(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).
10.0 RECORD KEEPING

The Environmental Health & Safety Department will maintain the following records:

10.0.1 Training records (Appendix E)

10.0.2 Physician's written medical clearance

10.0.3 Qualitative fit test form (Appendix F) or quantitative fit test certificate.
11.0 GLOSSARY

**Aerosol:** A system consisting of particles, solid or liquid, suspended in air.

**Air-purifying respirator:** A respirator with an air-purifying filter, cartridge or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

**Assigned protection factor (APF):** The workplace level of respiratory protection that a respirator or class of respirators is expected to provide.

**Atmosphere-supplying respirator:** A respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

**Canister (Air Purifying):** A container filled with sorbents and catalysts that remove gases and vapors from air drawn through the unit. Usually connected to the facepiece with a hose. The canister may also contain an aerosol (particulate) filter to remove particulates.

**Cartridge:** A small container filled with air-purifying media, attached directly to the respirator facepiece that is designed to remove gases, vapors and/or particulates.

**Contaminant:** A harmful, irritating or nuisance material that is foreign to the normal atmosphere.

**Demand respirator:** An atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

**Emergency situation:** Any occurrence such as but not limited to equipment failure, rupture of containers or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

**Employee exposure:** Exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.

**End-of-service-life indicator (ESLI):** A system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

**Escape-only respirator:** A respirator intended to be used only for emergency exit.

**Exhalation Valve:** A one-way device that permits exhaled air to be discharged from the respirator facepiece.

**Facepiece:** That portion of a respirator that covers the wearer's nose, mouth and possibly eyes. It is designed to make a gas-tight or dust-tight fit with the face and includes the headbands, exhalation valve(s) and connections for an air-purifying device.
Filter: A fibrous medium used in respirators to remove solid or liquid particles from the airstream entering the respiratory enclosure. There are now three particulate filter series available for air purifying respirators;

(1) **N100, N99** and **N95** filters (99.97%, 99% and 95% efficient non-oil filters) to be used with any solid non-oil containing particulate.

(2) **R100, R99** and **R95** filters (99.97%, 99% and 95% efficient oil resistant filters) to be used for any particulate contaminant. If used for an oil containing contaminant, filter use is limited to one work shift only.

(3) **P100, P99** and **P95** filters (99.97%, 99% and 95% efficient oil proof filters) to be used for any particulate contaminant.

Filtering Facepiece (Dustmask): A negative pressure particulate respirator with a filter (N95) as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.

Fit factor: A quantitative estimate of respirator fit which typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

Fit test: The use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual.

High efficiency particulate air (HEPA) filter: A filter that is at least 99.97% efficient in removing monodispersed particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

Hood: A respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

Immediately dangerous to life or health (IDLH): An atmosphere immediately dangerous to life or health (IDLH). An IDLH atmosphere poses an immediate hazard to life, such as an oxygen deficient atmosphere (containing less than 19.5 percent oxygen), contains explosive or flammable atmospheres, and/or concentrations of toxic substances or produces an irreversible debilitating effect on health.

Inhalation Valve: A one-way device that allows purified air to enter the facepiece.

Loose-fitting facepiece: A respiratory inlet covering that is designed to form a partial seal with the face.

Lower Explosive Limit (LEL): The lower limit of flammability of a gas or vapor at ordinary ambient temperatures expressed by a percentage of the gas or vapor in air by volume.

Maximum use concentration (MUC): The maximum atmospheric concentration of a hazardous substance from which an employee can be expected to be protected when wearing a respirator. It is determined by the assigned protection factor of the respirator or class of respirators and the
exposure limit of the hazardous substance. The MUC can be determined mathematically by multiplying the assigned protection factor specified for a respirator by the required OSHA permissible exposure limit, short-term exposure limit or ceiling limit.

Mine Safety and Health Administration (MSHA): A federal agency that, along with NIOSH, tested, approved and certified respiratory protection equipment under the previous 30 CFR Part 11 standard.

National Institute for Occupational Safety and Health (NIOSH): A federal agency that tested, approved and certified respiratory protection equipment along with MSHA under the old 30 CFR Part 11 standard. NIOSH is now the sole source of approval under the new 42 CFR Part 84 standard.

Negative pressure respirator (tight fitting): A respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

Oxygen deficient atmosphere: An atmosphere with oxygen content below 19.5% by volume.

Permissible Exposure Limit (PEL): Maximum permitted airborne chemical concentrations established by OSHA, for compliance purposes, under 29 CFR 1910. The limits are normally published as denoting an 8 hour time weighted average (TWA) value but may also be designated with "C" denoting a ceiling value that is not to be exceeded.

Physician or other licensed health care professional (PLHCP): An individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required by paragraph (e) of this section.

Positive pressure respirator: A respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

Powered air-purifying respirator (PAPR): An air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Pressure demand respirator: A positive pressure atmosphere-supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.

Protection Factor (PF): The minimum anticipated protection provided by a properly functioning respirator or class of respirators to a given percentage of properly fitted and trained users.

Rainbow passage: When the sunlight strikes raindrops in the air, they act as 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 his reach, his friends say he is looking for the pot of gold at the end
of the rainbow.

**Resistance:** Opposition to the flow of air, as through a canister, cartridge or particulate filter.

**Respirator:** A device designed to protect the wearer from inhalation of harmful atmospheres.

**Respiratory inlet covering:** That portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source or both. It may be a facepiece, helmet, hood, suit or a mouthpiece respirator with nose clamp.

**Self-contained breathing apparatus (SCBA):** An atmosphere-supplying respirator for which the breathing air source is carried by the user.

**Service life:** The period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

**Supplied-air respirator (SAR) or airline respirator:** An atmosphere-supplying respirator for which the source of breathing air is not carried by the user.

**Threshold Limit Value (TLV):** A list published the American Conference of Governmental Industrial Hygienists (ACGIH) as a recommended guide for exposure concentrations that a healthy individual normally can tolerate for eight hours a day, five days a week over the duration of a normal working career without harmful effects. Airborne particulate concentrations are generally listed as milligrams per cubic meter of air (mg/m³), and gaseous concentrations are listed as parts per million (ppm) by volume.

**Tight-fitting facepiece:** A respiratory inlet covering that forms a complete seal with the face.

**Warning Properties:** A given chemical's ability to be smelled, tasted or exhibit irritation effects at airborne concentrations below the PEL or TLV.
APPENDIX A
Guide to Respirator Selection and Use
APPENDIX B
CHEMICAL CARTRIDGE TYPES AND COLOR CODING and TABLE OF EXPERIMENTAL VS CALCULATED 10% BREAKTHROUGH TIMES

<table>
<thead>
<tr>
<th>Atmospheric contaminants to be Protected Against</th>
<th>Colors Assigned*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acid Gases</td>
<td>White</td>
</tr>
<tr>
<td>Hydrocyanic Acid Gas</td>
<td>White with 1/2-inch green stripe completely around the canister near the bottom</td>
</tr>
<tr>
<td>Chlorine Gas</td>
<td>White with 1/2-inch yellow stripe completely around the canister near the bottom</td>
</tr>
<tr>
<td>Organic vapors</td>
<td>Black</td>
</tr>
<tr>
<td>Ammonia Gas</td>
<td>Green</td>
</tr>
<tr>
<td>Acid Gases &amp; Ammonia Gas</td>
<td>Green with 1/2-inch white stripe completely around the canister near the bottom</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>Blue</td>
</tr>
<tr>
<td>Acid Gases &amp; Organic vapors</td>
<td>Yellow</td>
</tr>
<tr>
<td>Hydrocyanic Acid Gas &amp; Chloropicrin vapor</td>
<td>Yellow with 1/2-inch blue stripe completely around the canister near the bottom</td>
</tr>
<tr>
<td>Acid Gases, Organic vapors &amp; Ammonia Gases</td>
<td>Brown</td>
</tr>
<tr>
<td>Radioactive Materials, Excepting Tritium and Noble Gases</td>
<td>Purple (Magenta)</td>
</tr>
<tr>
<td>Particulates (Dusts, Fumes, Mists, Fogs, or Smokes) in combination with any of the above gases or vapors</td>
<td>canister color for contaminant, as designated above, with 1/2-inch gray stripe completely around the canister near the top</td>
</tr>
<tr>
<td>All of the above atmospheric contaminants</td>
<td>Red with 1/2-inch gray stripe completely around the canister near the top</td>
</tr>
</tbody>
</table>

*Gray shall not be assigned as the main color for a canister designed to remove acids or vapors. Note: Orange shall be used as a complete body or stripe color to represent gases not included in this table. The user will need to refer to the canister label to determine the degree of protection the canister will afford.

The table on the following pages is to aid in the selection of appropriate respiratory protection for organic vapors. Particularly, the appropriate use of organic vapor cartridges with regard for their intended use.

Organic vapor cartridges typically use activated charcoal as a sorbent (air purifying agent) for removing the organic compounds from the air drawn in through the respirator during inspiration by the respirator wearer. Since there is a finite quantity of charcoal in the cartridges, there is a finite amount of organic vapors that will be collected. Since there is no warning device on the respirator to warn the wearer when the cartridge has reached capacity, the wearer must rely upon his sense of smell when the organic compound breaks through. Thus it is very important that the organic compound(s) have good warning properties (i.e., the average person can smell them at levels well below the permissible exposure limits).
The limited capacity of the organic vapor cartridges is affected by temperature, humidity, concentration of organic compound(s) in the air and the wearer's breathing rate (how much contaminated air the wearer breathes in through the respirator). Although the standard organic vapor cartridges have been certified based on a 1000 ppm ($\text{CCl}_4$) test, its performance will vary greatly with the specific organic compound. The table is based on tests of the standard organic vapor cartridge during which the cartridges were exposed to 1000 ppm of the listed organic compounds at a flow rate approximately twice the breathing rate of an individual at rest. The timed test was ended when a 10% breakthrough occurred.

Although you may not use a respirator with organic cartridges under any of the conditions listed, the table provides an idea of their performance which may be helpful in evaluating your special use conditions. If you have any questions about the use of the table or if your particular organic compound is not found on the list, ask the Environmental Health & Safety Department for additional help.
## APPENDIX C

COMPARISON OF EXPERIMENTAL AND CALCULATED 10% BREAKTHROUGH TIMES FOR VARIOUS CLASSES OF GASES AND SOLVENT VAPORS¹

10% Breakthrough Time

<table>
<thead>
<tr>
<th>Solvent</th>
<th>BP (°C)</th>
<th>Experimental (Min)</th>
<th>Calculated (Min)</th>
<th>Deviation from Observed (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calc. From</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aromatics²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benzene</td>
<td>80.1</td>
<td>88.6</td>
<td>101.0</td>
<td>+14.0</td>
</tr>
<tr>
<td>Toluene</td>
<td>110.6</td>
<td>114.0</td>
<td>121.0</td>
<td>+6.1</td>
</tr>
<tr>
<td>Ethyl Benzene</td>
<td>136.2</td>
<td>105.0</td>
<td>115.0</td>
<td>+9.5</td>
</tr>
<tr>
<td>M-Xylene</td>
<td>138.4</td>
<td>116.0</td>
<td>121.0</td>
<td>+4.3</td>
</tr>
<tr>
<td>Cumene</td>
<td>152.4</td>
<td>103.0</td>
<td>105.0</td>
<td>+1.9</td>
</tr>
<tr>
<td>Methylene</td>
<td>164.7</td>
<td>105.0</td>
<td>106.0</td>
<td>+1.0</td>
</tr>
<tr>
<td>P-Cymene</td>
<td>176.7</td>
<td>92.9</td>
<td>64.1</td>
<td>+1.3</td>
</tr>
<tr>
<td>Alcohols²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methanol</td>
<td>64.7</td>
<td>3.2</td>
<td>8.5</td>
<td>+16.6</td>
</tr>
<tr>
<td>Ethanol</td>
<td>78.4</td>
<td>45.3</td>
<td>84.8</td>
<td>+87.0</td>
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<tr>
<td>Isopropanol</td>
<td>82.3</td>
<td>81.8</td>
<td>109.0</td>
<td>+33.0</td>
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<tr>
<td>Allyl Alcohol</td>
<td>97.0</td>
<td>105.0</td>
<td>130.0</td>
<td>+24.0</td>
</tr>
<tr>
<td>Propanol</td>
<td>97.1</td>
<td>111.0</td>
<td>141.0</td>
<td>+27.0</td>
</tr>
<tr>
<td>Sec Butanol</td>
<td>99.5</td>
<td>121.0</td>
<td>131.0</td>
<td>+19.9</td>
</tr>
<tr>
<td>Butanol</td>
<td>117.7</td>
<td>141.0</td>
<td>148.0</td>
<td>+5.0</td>
</tr>
<tr>
<td>2-Pentanol</td>
<td>119.9</td>
<td>111.0</td>
<td>130.0</td>
<td>+17.0</td>
</tr>
<tr>
<td>3-Methyl 1-Butanol</td>
<td>131.2</td>
<td>121.0</td>
<td>134.0</td>
<td>+11.0</td>
</tr>
<tr>
<td>4-Methyl 2-Pentanol</td>
<td>131.8</td>
<td>96.1</td>
<td>114.0</td>
<td>+19.0</td>
</tr>
<tr>
<td>Pentanol</td>
<td>137.9</td>
<td>130.0</td>
<td>137.0</td>
<td>+5.4</td>
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<tr>
<td>2-Ethyl 1-Butanol</td>
<td>146.8</td>
<td>101.0</td>
<td>120.0</td>
<td>+19.0</td>
</tr>
<tr>
<td>Monochlorides²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methyl Chloride</td>
<td>-24.2</td>
<td>0.7</td>
<td>0.8</td>
<td>+14.0</td>
</tr>
<tr>
<td>Vinyl Chloride</td>
<td>-13.9</td>
<td>6.6</td>
<td>5.4</td>
<td>-18.0</td>
</tr>
<tr>
<td>Ethyl Chloride</td>
<td>12.3</td>
<td>10.7</td>
<td>19.4</td>
<td>+81.0</td>
</tr>
<tr>
<td>2-Chloropropane</td>
<td>35.2</td>
<td>35.9</td>
<td>46.8</td>
<td>+30.0</td>
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<tr>
<td>Allyl Chloride</td>
<td>44.5</td>
<td>44.6</td>
<td>53.5</td>
<td>+20.0</td>
</tr>
<tr>
<td>1-Chloropropane</td>
<td>46.7</td>
<td>34.8</td>
<td>55.5</td>
<td>+58.0</td>
</tr>
<tr>
<td>2-Chloro-2-Methylpropane</td>
<td>50.8</td>
<td>52.3</td>
<td>66.9</td>
<td>+28.0</td>
</tr>
<tr>
<td>1-Chlorobulane</td>
<td>77.5</td>
<td>88.1</td>
<td>89.6</td>
<td>+1.7</td>
</tr>
<tr>
<td>2-Chloro-2-Methylbutane</td>
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Revision 2/2/2015
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**Note:** BP = Boiling Point ¹Test parameters were: flow rate - 53.3 liters/minute, concentration - 1000 ppm, relative humidity - 50 percent, temperature - 20 to 22 degrees C. The cartridge pair was preconditioned statically at 50 percent relative humidity before testing.

²Type 1 cartridge Pair
³Type 2 cartridge Pair
APPENDIX D

29 CFR 1910.134 Respiratory Protection Standard

Mandatory OSHA Medical Questionnaire for Respirator Use

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: Can you read (circle one): Yes/No

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).

Today’s date ________________________________
Your Name: ______________________________________________________
Your age (to nearest year): ________________________________
Sex (circle one): Male / Female   Your height: _______ft. _______in.
Your weight: _______lbs. Your job title: _______________________________________
A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code): _______________________________
The best time to phone you at this number: ___________________________
Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes / No
Check the type of respirator you will use (you can check more than one category):   _______ N, R, or P disposable respirator (filter-mask, non-cartridge type only).   _______ Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).
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 (fits): 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 arrhythmias (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 problems?
   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 (fits): 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. Heart trouble: 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

Question 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.

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

2. 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

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

2. 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

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

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

   a. Weakness in 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:______________________________________

3. List any second jobs or side businesses you have: ______________________

4. List your previous occupations: ______________________________

5. 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 medication, 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. __minutes

   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; sanding while bricklaying or chipping castings; walking up an 8-degree grade about 2 mph; climbing stairs with a heavy load (about 50 lbs.).

1. 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: ___________

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

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

4. Describe the work you’ll be doing while you’re using your respirator(s):
5. Describe any special or hazardous conditions you might encounter when you’re using your respirator(s) (for example, confined spaces, life-threatening gases):

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:

_______________________________________________________

6. 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, etc.):
APPENDIX E

RESPIRATORY PROTECTION PROGRAM TRAINING RECORDS

BEFORE SIGNING, BE SURE YOU UNDERSTAND EACH OF THE FOLLOWING:

1. Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator.
2. What the limitations and capabilities of the respirator are.
3. How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions.
4. How to inspect the respirator
5. How to put on and remove the respirator.
6. How to perform seal checks of the respirator
7. Procedures for maintenance and storage of the respirator.
8. How to recognize medical signs and symptoms that may limit or prevent the effective use of the respirator.
9. General requirements of the OSHA Respiratory Protection standard.

I understand the use, care, and inspection of the respirator(s) I have been assigned to use.

User Signature: _________________________________ Date: _________________

Trainer Signature: ______________________________
APPENDIX F

QUALITATIVE RESPIRATOR FIT-TEST CERTIFICATION

This document is provided by the PORTACOUNT® Plus fit testing equipment. The Fit Test operator and the employee will sign the document. Make a copy for the employee and keep one for the program.
APPENDIX G

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.
APPENDIX H
RESPIRATORY PROTECTION PROGRAM
FOR VOLUNTARY USE OF
AIR PURIFYING RESPIRATORS

This program is provided for those individuals who wish to wear respiratory protection, but are not required to do so under any OSHA standard or by UNR as the work conditions do not warrant the use of a respirator.

OSHA requires the following information be provided to anyone considering the voluntary use of a respirator.

29 CFR 1910.134 Appendix D (Mandatory) Information for Employees Using Respirators When Not Required Under the Standard

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 respirator’s 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.

In Addition, voluntary respirator users should understand the following:

If voluntary respirator use involves any type of respirator beyond that of an N95 filtering facepiece respirator, you must be medically evaluated prior to its use (if uncertain, contact EH&S).
Respirator Cleaning, Storage, and Maintenance

- The following procedure is for the use of an N95 filtering facepiece respirator. Discard the mask upon observation of damaged or missing parts or if the mask becomes contaminated with dust or fluids. This may need to be done at the end of each shift (if you are uncertain, contact EH&S). If the mask is taken off and will be stored for further use, the respirator must be stored properly and not left out in the work area. Store in clean, dry, air tight container.

- The following procedure is to be used when cleaning and disinfecting respirators that have replaceable cartridges and/or filters:
  - Disassemble respirator, removing any filters, canisters, or cartridges.
  - Wash the facepiece and associated parts in a mild detergent with warm water. Do not use organic solvents.
  - Rinse completely in clean warm water.
  - Air dry in a clean area.
  - Reassemble the respirator and replace any defective parts.
  - Place in a clean, dry plastic bag or other air tight container.
  - Do not use the respirator if it is damaged or is missing parts.

Employee Certification:

I understand and certify that my use of an air-purifying respirator for work conducted during my employment at the University of Nevada, Reno is solely at my discretion and is voluntary.

I have read and understand the information contained in Appendix D of Title 29 Code of Federal Regulations, Section 1910.134, “(Mandatory) Information for Employees Using Respirators When Not Required Under the Standard”.

Department: ________________________

Print Name ___________________________ Sign Name ___________________________ Date ____________

Supervisor Notification:

Provide the signed form to your supervisor and fax a copy of it to Crista Hartman at EH&S Fax #784-4553.