Respiratory Protection Program
Occupational Health, Safety & Injury Prevention

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1.0 INTRODUCTION

1.1 The Cornell University Respiratory Protection Program is intended to outline the correct use of respiratory protection by employees and students who could be exposed to hazardous substances or atmospheres. This program is in compliance with The Occupational Health and Safety Administration (OSHA) Respiratory Protection Standard (29 CFR 1910.134).

1.2 Whenever possible, respiratory exposures will be controlled by implementing engineering, work practice, and administrative controls.

1.3 Respiratory protection will be provided to employees and students to be utilized when it has been determined that engineering, work practice, and administrative controls are not feasible and do not provide sufficient protection.

1.3.1 Respiratory protection program includes the following respiratory styles: disposable half face respirators that are NIOSH (National Institute for Occupational Safety and Health) approved, tight fitting half face respirators, tight fitting full face respirators, powered air purifying respirators (PAPR), self-contained breathing apparatus (SCBA).

1.3.2 Respiratory protection program excludes the following: surgical masks and any respirator that is not NIOSH Approved.

2.0 OBJECTIVES AND METRICS

2.1 The Cornell University Respiratory Protection Program establishes the procedures and requirements necessary to be compliant with established standards, rules and regulations for the use of respiratory protection equipment. It also provides the necessary health and safety protection to those employees falling within the jurisdiction of the program.

2.2 Program evaluation will be conducted on an annual basis

2.2.1 Metrics showing compliance with annual fit testing and training requirements will be collected and reviewed as part of the annual program evaluation.

3.0 SCOPE

3.1 The Cornell University Respiratory Protection Program applies to all faculty, staff and students who are required to use respiratory protection as part of their normal work duties.

3.1.1 All activities, including protection against the sudden onset of an aerosol transmissible disease (e.g., pandemic influenza, measles, unidentified emerging disease), involving the use of respiratory protection equipment, as defined in this written program, will be conducted in compliance with OSHA 1910.134.

3.1.2 Those voluntarily wearing respirators will comply with section 5.7 of this program.

3.2 Applies to all United States Cornell University facilities with exception of Cornell Weill Medical College

4.0 ROLES AND RESPONSIBILITIES

4.1 University Administration

4.1.1 University Administrators are to provide senior management support for the implementation of this Respiratory Protection Program.

4.1.2 Will have resources that are allocated for timely and efficient implementation of this program.
program.

4.2 Department of Environmental, Health and Safety

4.2.1 The Department of Environmental, Health and Safety develops, supports and oversees the implementation of the Respiratory Protection Program, by:

a. Providing workplace assessments to determine the need for respiratory protection.
   • *Note: The majority of OSHA established exposure limits are over 50 years old and do not reflect the current medical and toxicological information. Consequently, Cornell University will follow the American Conference of Governmental Industrial Hygienists (ACGIH) established limits to safeguard employees and students*

b. Provide recommendations on engineering and administrative controls
c. Ensure the proper selection of respiratory protection
d. Confirm that medical clearance has been obtained prior to conducting the initial fit test
   • Medical clearance is received and filed from an approved medical provider confirming clearance for specific respirator(s)
e. Schedule the initial fit test
f. Conduct/Develop the required respiratory protection training
g. Train department representatives on quantitative and/or qualitative fit testing procedures
h. Coordinating with departments to schedule annual fit testing

4.3 Occupational Medicine

4.3.1 The Occupational Medicine Department within Cornell Health Services supports the Respiratory Protection Program by:

a. Medically clearing respirator users prior to the use of respiratory protection equipment and as needed based on health status changes in accordance with OSHA 1910.134

b. Maintain medical clearance records
c. Send a copy of medical clearance to the respirator user and their supervisor, and EHS
d. Conduct annual fit tests for Cornell Health Services staff
e. Ensure that all Cornell Health Services staff receive annual respirator training
f. Identify medical resources to conduct medical surveillance for remote facilities

4.3.2 Approved Occupational Medicine Providers outside of Cornell University

a. Medically clearing respirator users prior to the use of respiratory protection equipment

b. Maintain medical clearance records
c. Send a copy of medical clearance to the respirator user, Cornell Health Occupational Medicine, and Cornell EHS

4.4 Department Managers/Supervisors and Principal Investigators (P.I.)

4.4.1 Cornell University Department Managers, Supervisors, and P.I. support the Respiratory Protection Program by:
a. Identify, with the assistance of EHS, those employees and students who may need respiratory protection
b. Request assistance from EHS in evaluating new operations that may present respiratory hazards
c. Ensure that all employees and students enrolled in the Respiratory Protection Program comply with annual training and fit testing requirements
d. Provide the required respiratory protection equipment at no cost to the respirator user
e. Provide time so an employee can fulfill medical, training and fit testing requirements
f. Enforce the use of respiratory protection when applicable
g. Provide resources to properly clean and store respiratory protection

4.5 Respirator Users

4.5.1 Respirator users who participate in the Respiratory Protection Program are responsible for:

a. Obtain medical clearance prior to using a respirator
b. Comply with training and fit testing requirements
c. Utilize the issued respiratory protection equipment in accordance with the Cornell University Respiratory Protection Program
d. Comply with cartridge and filter change-out requirements
e. Proper inspection, cleaning, and storage of respiratory protection equipment
f. Clean shaven when required for use and/or fit testing
g. Use assigned respirator to his or her exclusive use
   • Exceptions: full face and PAPR (Powered Air Purifying Respirator) respirators may be assigned to multiple users
h. Inform his/her supervisor of any health related concerns that could be aggravated by the use of respiratory protection equipment
   • Reporting changes in health status may require the re-evaluation of medical clearance and/or fit testing

5.0 PROCEDURES

5.1 Selection and Use of Respiratory Protection

5.1.1 Respiratory protection equipment may be used in the following situations:

a. For activities that cannot be safely controlled by engineering controls, such as for pesticide applications regulated by FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and the EPA (Environmental Protection Agency) Worker Protection Standard or hazardous exposures to carcinogenic, mutagenic, teratogenic or other toxic materials
b. Working in confined spaces where toxic atmosphere are present
c. Airborne allergens, radioactive or toxic materials could exceed recommended exposure limits
d. Protection against exposures to sudden and known onset of aerosol transmissible disease
e. Emergency use when loss of life or serious property loss or damage may be involved
f. When the working atmosphere is or may be oxygen deficient, air-supplied respirators will be utilized
5.2 Requesting a Respirator for Required Tasks

5.2.1 Each employee and student whose duties require the use of a respirator will complete the following items prior to the purchase and use of respiratory protection:

a. Complete and submit the Respirator Request Form (HS12F_001) to EHS.

b. Complete the online virtual appoint for the Medical Clearance Questionnaire through Cornell Health Occupational Medicine.
   • If completing medical surveillance outside of the Ithaca Campus refer to guidance document: Initial Medical Clearance for Remote Facilities Guidance Document

c. Cornell Health Occupational Medicine with review the medical clearance form. Upon complete review the results will be sent to the individual requesting the respirator, their supervisor, and EHS.
   • Persons will be
     ➢ Approved with no restrictions
     ➢ Approved with restrictions. These restrictions will be laid out
     ➢ Denied respirator use
       o Those who are denied, will not continue with this process

d. Individuals will complete assigned respirator training.
   • See Section 6.2 for course numbers on CU-Learn

e. Once medical clearance has been granted:
   • EHS will check training records
   • EHS will contact the employee and supervisor to:
     ➢ Notify that training will need to be completed
     ➢ Schedule a fit test with the employee, upon completion of training
   • Attend scheduled fit test appointment and be fitted for the requested respirator(s)
     ➢ EHS does not charge for fit testing or review of required paperwork

f. Upon completion of the requirements listed above
   • The employee or student will be authorized to obtain respiratory protection. Respiratory protection can be purchased on e-Shop through Airgas, VWR, and Fisher Scientific (Form HS12F_006)
   • The employee or student will only obtain the type of respiratory protection equipment for which they have been medically cleared, trained, and fitted.
   • All costs associated with the procurement of respiratory protection will be paid for by the employee’s or student’s department.

5.2.2 Styles of Respirators

a. N95 Dust Mask or Disposable Mask
   • Disposable respirators can be used for protection against nuisance level dusts.
     ➢ Disposable respirators are also used for protection against biological contaminants such as: agents encountered in patients seen at the Cornell Health Center or used in BSL-3 (Biosafety Level -3) laboratories
Departments should contact EHS for a hazard assessment prior to the use of disposable respirators.

- Protection factor of 10
  - Limitations
    - Most disposable respirators do not offer chemical protection.
    - Cannot be used in oxygen-deficient atmospheres or Immediately Dangerous to Life or Health (IDLH) atmospheres
    - Will not be worn when facial hair that interfere with the seal or valves of the respirator
    - Cannot be reused

b. Tight Fitting (Air Purifying) Half Face Respirator
   - Half-face air-purifying respirators are the most widely used types of respirators.
     - Half-face respirator is equipped with cartridges which purify the air as the wearer breathes.
     - Different types of cartridges are available for filtering various air contaminants.
     - Has a protection factor of 10
   - Limitations
     - Cannot be used in oxygen-deficient atmospheres or IDLH atmospheres
     - Can only be used for protection against the contaminants listed on the cartridge
     - Not recommended for use against chemicals that possess poor warning properties
     - Wearer will leave an area immediately if the smell of gas or vapor is detected inside the mask or if the breathing resistance increases
     - Will not be worn when facial hair that interfere with the seal or valves of the respirator

c. Tight Fitting (Air Purifying) Full Face Respirator
   - Full-face respirators provide more protection than half-face respirators because their shape allows a better mask-to-face seal.
     - Protect the eyes from irritating chemicals or particulate atmospheres.
     - Different types of cartridges are available for filtering various air contaminants.
     - Has a protection factor of 50
   - Limitations
     - Air-purifying full-face respirators have the same limitations for use as half-face respirators
     - Standard eyeglasses interfere with the mask-to-face seal; therefore, respirator wearers should obtain an additional pair of glasses through their department for installation into a mask. Contact EHS for additional information on spectacle kits

d. Powered Air Purifying Respirator (PAPR)
   - PAPR units typically consist of a battery-powered blower unit with attached filters or cartridges, a breathing hose, and a face-piece, hood, or helmet. Contaminated air is drawn through the filters or cartridges and a constant supply of purified air is supplied to the face-piece, hood, or
helmet.
- The positive pressure of air flowing out from the face-piece, hood, or helmet protects the wearer from having contaminants come into the breathing area.
- PAPR units equipped with helmets or hoods can be worn by an employee with a beard since this unit does not require a good seal between the face and the respirator.
- Helmet and hood type PAPR units are exempt from OSHA fit testing requirements.
- PAPRs with helmets/hoods are to be treated as loose-fitting face piece respirators and have a protection factor of 25
  - With manufacture information a hood can have a protection factor of 1000
- User will check for proper airflow with the provided or purchased flow check device before donning the unit.
  - Note this is dependent upon the manufacturer/model recommendations

• Limitations
  - PAPR units cannot be used in oxygen deficient or IDLH atmospheres.
  - Can only be used for contaminants listed on the cartridge.
  - Batteries are to be fully charged prior to use.

c. Self-Contained Breathing Apparatus (SCBA) Emergency Use ONLY
- SCBA units may be necessary when responding to emergencies at Cornell facilities and properties.
  - SCBA units provide the user with a Grade D supply of breathing air and can be used in oxygen deficient and IDLH atmospheres.
  - They are only offered to the EHS HazMat (Hazardous Materials) Spill Response Team and Emergency Services Team and require specialized training and medical clearances.
  - With approval from EHS, designated departmental staff may be outfitted with and trained in the use of SCBA as technical specialists to support HazMat response.

• Limitations
  - The use of SCBA units requires specialized medical clearance and training compared to air-purifying respirators.

5.3 Medical Clearance

5.3.1 Each employee and student whose duties require the use of a respirator will be required to complete and submit a Medical Clearance Questionnaire.

a. Cornell Health Occupational Medicine Services is utilizing a secure online system to complete this process. Cornell will set the requestor up with a virtual appointment, in which the individual will log into the secure computer system to complete.
   - Additional referrals and medical surveillance may be required following the review of the Medical Evaluation Questionnaire form. Cornell Health Occupational Medicine services has a fee for any follow ups that may occur on the discretion of the Professional Medical Provider.

b. Professional Medical Providers outside of the Ithaca Campus will be vetted.
through Cornell Health Occupational Medicine prior to persons visiting them for medical clearance for respirator use.

- Refer to Initial Medical Clearance for Remote Facilities Guidance Document

5.3.2 If there is a need for a respirator fitness reevaluation an official request detailing the reasons for the request must be submitted to Cornell Health Occupational Medicine for approval. If approval is granted the employee will be offered a reevaluation examination and should be restricted from use of the respirator while on duty pending the Occupational Medicine recommendation.

a. The following are the criteria for requesting a respirator fitness reevaluation:

- An employee reports medical signs or symptoms that are related to their ability to use a respirator, such as a heart condition, lung disease, or claustrophobia
- A physician or licensed healthcare professional, the employee’s supervisor, or the respirator program administrator determines a reevaluation is warranted
- Information from the respiratory protection program, including observations made during fit testing and program evaluation, indicates the employee needs to be reevaluated
- A change occurs in workplace conditions that increases the physical or respiratory burden on the employee while they are using the respirator. (i.e. performing more physically demanding duties, a requirement to wear additional protective clothing, or work in environments with extreme temperatures)
- OSHA does provide guidance on respirator reevaluations in the document MEDICAL EVALUATIONS FOR WORKERS WHO USE RESPIRATORS. https://www.osha.gov/video/respiratory_protection/medevaluations_transcript.html

5.4 Fit Testing

5.4.1 All campus personnel required to utilize respiratory protection equipment will be fit tested prior to use of the respirator.

5.4.2 Respirator fit tests will be conducted by EHS or by a department designee from the employee’s/student’s department.

5.4.3 Departments choosing to conduct their own respirator fit tests will receive training from EHS on fit testing equipment and fit testing protocols.

5.4.4 Respirator fit testing will be conducted at an annual basis.

a. In addition, because the seal of the respirator may be affected, fit testing will be repeated immediately if the program member has:

- A weight change of 20 pounds or more.
- Significant facial scarring in the area of the face-piece seal.
- Significant dental changes, i.e., multiple extractions without prosthesis, or dentures.
- Reconstructive cosmetic surgery.
- Any other condition that may interfere with seal of the face-piece

5.4.5 Prior to the annual fit test, the employee/student will fill out the Annual Fit-Testing
form (HS12_F003). If the employee or student answers “Yes” to any of the questions on the form, the annual fit test will not be conducted and the employee will be re-evaluated medically. Re-evaluation can be accomplished by filling out and submitting another Medical Evaluation Questionnaire for Respirator Clearance form (HS12F_002) to Cornell Health Occupational Medicine.

5.5 User Seal Checks

5.5.1 Applicable to tight fitting half and full face respirators.

a. Each time the tight fitting half face or full face respirator is donned, the wearer will perform seal checks prior to entering the work area.
   
   • Positive Pressure Check
     ➢ Cover the exhalation valve opening with the palm of the hand and exhale gently into the face-piece. A slight positive pressure should build up inside the face-piece and no outward air leakage should be detected at the seal.
     ➢ If outward leakage is detected the user should adjust the position of the respirator, check the tightness of the straps, and perform the seal check again.

   • Negative Pressure Check
     ➢ Close off the inlet opening of the cartridges or filters by covering with the palm of the hands and inhale gently so that the face-piece collapses slightly. Upon inhaling, the face piece should remain in a collapsed position and no inward air leakage should be detected.
     ➢ If inward air leakage is detected, the user should adjust the respirator position, check the tightness of the straps, and perform the seal check again.

5.5.2 Applicable for Disposable Respirators

a. Each time the disposable respirator is donned, the wearer will perform seal checks prior to entering the work area.

   • Positive Pressure Check
     ➢ Place your hands over the facepiece, covering as much surface area as possible. Exhale gently into the facepiece. The face fit is considered satisfactory if a slight positive pressure is being built up inside the facepiece without any evidence of outward leakage of air at the seal. Examples of such evidence would be the feeling of air trickling onto the your face along the seal of the facepiece, fogging of your glasses, or a lack of pressure being built up inside the facepiece. If outward leakage is detected the user should adjust the position of the respirator, check the tightness of the straps, and perform the seal check again.

     o If the particulate respirator has an exhalation valve, then performing a positive pressure check may be impossible. If so, then do a negative pressure check.
• Negative Pressure Check
  ➢ Cover the filter surface with your hands as much as possible and then inhale. The facepiece should collapse on your face and you should not feel air passing between your face and the facepiece.

5.5.3 Loose Fitting Powered Air Purifying respirators and surgical masks are excluded user seal checks

5.6 Care and Maintenance of Respirator

5.6.1 Inspection procedure: All types of respiratory protection equipment will be inspected prior to donning to confirm that the equipment is in good working condition.
  a. Examine the respirator face-piece for dirt, debris, cracks, tears, holes, or cracked lenses (full-face)
  b. Examine the head and neck straps for tears, broken buckles, and loss of elasticity
  c. Examine the inhalation and exhalation valves for cracks, debris, and proper installation
  d. Check for missing cartridge gaskets
  e. Do not use until the cracked, broken or missing item has been replaced with model specific pieces
  f. Verify that the proper filter or cartridge is being used for the hazard

5.6.2 Cleaning Procedure: Respiratory protection equipment will also be kept clean and stored properly.
  a. Remove the filters or cartridges and disassemble the respirator by removing the cartridge holders, inhalation and exhalation valves, and head strap.
  b. For basic cleaning, all parts can be wiped using a non-alcohol based respirator cleaning wipe.
  c. For a more thorough cleaning, wash components in warm water (110 degrees F max.) with a mild detergent or with a cleaner recommended by the manufacturer.
  d. Rinse all components with warm running water and allow all parts to air dry
  e. If disinfection is required, the respirator parts can be immersed for 2 minutes in either of the following solutions:
     • Hypochlorite solution (50 ppm chlorine) made by adding one milliliter of household bleach to one liter of 110 degree F. water

5.6.3 Filter and Cartridge Change out Schedule
  a. Particulate filters should be replaced any time there is an increase in breathing resistance, damage to the filter, or if the filter becomes soiled.
  • Respirator cartridges should be changed at a minimum after 8 hours of cumulative use.
    ➢ Check with EHS to determine if the cartridge being used has a shorter change out schedule based on the chemical exposure
  • EHS will be consulted to develop a specific cartridge change out schedule if the chemicals you are working with have boiling points below 70 degrees Centigrade.
➢ Contaminants with low boiling points (<70 C) have a tendency to migrate through cartridge sorbents during periods of storage. This tendency can shorten cartridge breakthrough times and lead to additional exposure to the respirator user. Users should change their cartridges anytime there is an abnormal odor or irritation.

b. When possible, users will be issued cartridges equipped with ESLIs (End of Service Life Indicators).
   - Cartridges equipped with ESLIs will have a color indicator that changes color when the cartridge approaches the end of its service life

c. Respirator user will check the expiration date of the respirator cartridge package prior to use. Do not use an expired cartridge.

5.7 Voluntary Use

5.7.1 In some cases respirators may be used voluntarily when exposures are below the permissible limit to provide an additional level of comfort and protection for workers.

5.7.2 If a respirator is used improperly or not kept clean, the respirator itself can become a hazard, even if the amount of hazardous substance does not exceed the limits set by OSHA or ACGIH standards.

5.7.3 All employees who use a respirator voluntarily will read and sign the Voluntary Use of Respirators form (HS12_F004).

   a. The following is a list of OSHA requirements and recommendations that apply to voluntary use of respirators:
      - Read and follow all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirator limitations.
      - For voluntary use of elastomeric half and full-face respirators, employees will be medically cleared and trained prior to the use of the respirator. * Voluntary use of disposable respirators (N95) does not require medical clearance.
      - Do not wear your respirator in atmospheres containing contaminants which your respirator is not designed to protect. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, very small solid particles, fume or smoke.
      - Keep track of your respirator so that you do not mistakenly use someone else’s respirator.

6.0 TRAINING

6.1 Requirements

6.1.1 All employees who are required to wear respiratory protection will attend respiratory protection training prior to using a respirator. Annually thereafter employees will complete respiratory protection refresher training and have a respirator fit test. EHS will provide in-person and on-line training options to meet this requirement. Education and training of employees in the use of respirators will include:

   a. A description of the different types of respiratory hazards
   b. A description of the different types of respiratory protection
c. Respirator limitations
d. Respirator cartridge and filter selection
e. Respirator inspection procedures
f. Respirator donning and doffing procedures
g. Respirator seal check procedures
h. Respirator cleaning and storage
i. A review of the OSHA Respiratory Protection Standard requirements

6.2 Class Names and Course Numbers

6.2.1 Web based training is available on Cornell University’s Learning Management System

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Name</th>
<th>Users</th>
<th>Availability</th>
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<td>Initial</td>
<td>Web-base and</td>
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<td>5015</td>
<td>Respirator Training PAPR</td>
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<td>2386</td>
<td>Voluntary Respirator Use Sign Off</td>
<td>Voluntary Use</td>
<td>Web and Form</td>
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7.0 RECORDS AND DOCUMENT CONTROL

7.1 EHS will maintain respirator fit test and respirator training records for each employee enrolled in the Respiratory Protection Program.

7.2 Respirator training records are maintained in the Learning Management System.

7.3 Cornell Health Services retains records pertaining to respirator medical clearance performed at Cornell

   a. Medical Records at other approved medical providers will be maintained in accordance with Cornell Policy and Federal Regulations

7.4 The following forms are part of this program:

<table>
<thead>
<tr>
<th>Form Name/Number</th>
<th>Retention Policy</th>
<th>Maintain Location</th>
</tr>
</thead>
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<tr>
<td>HS12F_001</td>
<td>Duration of Employment + 30 years</td>
<td>EHS</td>
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<tr>
<td>Respirator Request</td>
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<td></td>
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<tr>
<td>HS12F_002</td>
<td>Duration of employment + 30 years</td>
<td>Cornell Health Occupational Medicine</td>
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<td>Medical Clearance Form</td>
<td>In accordance with Cornell Policy, OSHA and HIPAA</td>
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<td>Voluntary Use Form</td>
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<td>CU Learn Course Number 2386</td>
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<tr>
<td>HS12F_005</td>
<td>Refer to: Purchasing policy for department</td>
<td>Department</td>
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<tr>
<td>Respirator Purchase Form</td>
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8.0 DEFINITIONS

8.1 Biosafety Level (BSL) - A biosafety level is a level of the biocontainment precautions required to isolate biological agents in an enclosed laboratory facility. The levels of containment range from the lowest biosafety level 1 (BSL-1) to the highest at level 4 (BSL-4), based on the risk to both individual and community health risks and impacts.
8.2 **Breakthrough** - is when a harmful chemical aerosol touches the outside of the filter or cartridge and can be smelled through the respirator.

8.3 **Cartridge** - A small container filled with air-purifying media

8.4 **Donning** – putting the respirator on

8.5 **Doffing** – removing the respirator

8.6 **Exhalation Valve** - A device that allows exhaled air to leave a respiratory device and prevents outside air from entering through the valve.

8.7 **End of Service Life Indicator (ESLI)** - Breathing apparatuses are equipped with end of service life indicators to indicate when the filtering capacity of the apparatus has reached its limit.

8.8 **Facepiece** - That portion of a respirator that covers the wearer's nose, mouth and eyes in a full face piece. It is designed to make a gas-tight fit with the face and includes the headbands, exhalation valve(s), and connections for an air purifying device.

8.9 **Filter** - A fibrous medium used in respirators to remove solid or liquid particles from the air stream entering the respiratory enclosure.

8.10 **HazMat** – Hazardous Materials

8.11 **IDLH (Immediately Dangerous to Life or Health) Atmosphere** - An IDLH atmosphere poses an immediate hazard to life, such as being oxygen deficient (containing less than 19.5% oxygen), or produces an irreversible debilitating effect on health.

8.12 **Inhalation Valve** - A device that allows respirable air to enter the face piece and prevents exhaled air from leaving the face piece through the intake opening.

8.13 **Pesticide** – is any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest or pathogen. Insecticides, herbicides, fungicides and disinfectants are all considered pesticides.

8.14 **PAPR (Powered Air Purifying Respirator)** - is a positive pressure air purifying device incorporating a half facepiece, full facepiece or head covering which provides the wearer with air filtered through a powered filtering unit, comprising a filter or filters, and an electrically operated blower unit. This respirator is referred to as a PAPR

8.15 **Protection Factor (PF)** - The overall protection afforded by a certain type of respirator as defined by the ratio of the concentration of contaminant outside a face mask or hood to that inside the equipment under conditions of use. For example, if a half-mask respirator has a protection factor of 10, it may be used for protection in atmospheres with a contaminant concentration up to 10 times the permissible exposure limit.

8.16 **Qualitative Fit Test** - A test procedure to determine the effectiveness of the seal between the face mask and the wearer's face, using an irritant smoke during the fit testing process.

8.17 **Quantitative Fit Test** - The measurement of the effectiveness of a respirator seal in the ambient atmosphere. This test, using a PORTACOUNT or similar measuring device, is performed by dividing the measured concentration of the dust particles in the ambient atmosphere by the measured concentration of the particles inside the respirator face piece.

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

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

8.20 **Respirator User** - Persons assigned or required to wear a respirator as part of their job duties or
assigned tasks

8.21 **Self-Contained Breathing Apparatus (SCBA)** - For the purpose of this manual, a unit designed to provide to the wearer a respirable atmosphere independent of the ambient air. A supply of approved compressed air contained in a gas cylinder is carried by the wearer. SCBA units are generally restricted to types equipped with pressure-demand regulators that maintain positive pressure in a full face mask.

8.22 **Tight fitting facepiece** is a respirator inlet covering that forms a complete seal with the face. Typically, this is half-face piece or full-face piece respirators

8.23 **User Seal Check** – A positive or negative pressure check conducted by the wearer to determine if the respirator is properly seated to the face

8.24 **Vapor** - The gaseous state of a substance that is solid or liquid at ordinary temperature and pressure.

### 9.0 REFERENCES

- Cornell University Biosafety Manuals
## 10.0 DOCUMENT HISTORY

<table>
<thead>
<tr>
<th>Date</th>
<th>Revision Number</th>
<th>Purpose of Revision</th>
<th>Explanation of Revisions</th>
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</table>
| 3/24/2015  | 2               | Reformatting to OHSIP Program Template and Naming conventions | • Changed Requirements to Procedures  
• Removed Operating Procedures from Training and placed in Procedures  
• Removed forms from program last revised 6/10/2009  
• Updated the procedures to reflect the current work flows for requesting a respirator.  
• Added the form numbers, as they are no longer appendices |
| 10/14/2015 | 3               | Requested revisions                                      | • Corrected spelling issues  
• Combined students and employees as Respirator Users  
• Added Donning and Doffing to Definitions  
• Removed formaldehyde example from filter change out schedule area  
• Removed iodine cleaning procedure |
| 02/16/2016 | 4               | Training Course Numbers                                 | • Added and updated training course numbers  
• Added additional definitions |
| 5/20/2016  | 5               | Medical Clearance Process                                | • Medical Questionnaire (HSF_002) is now a Virtual Appointment through the Cornell Health Occupational Medicine Secure Website |
| 9/21/2017  | 6               | Medical Re-evaluation                                   | • Added clarification from Cornell Health on the Re-evaluation Process  
Section 5.2.2 |
| 12/11/2017 | 7               | Training Course Numbers                                 | • Section 6.2, updated to reflect the course numbers in CU Learn. |