Introduction
Clemson University will maintain a healthy work environment in an on going effort to protect each employee and student from potentially harmful agents. It is the goal of Clemson University to insure that employees and students will at no time suffer any adverse health effects related to their work environment.

In the on going control of occupational diseases and deaths caused by inhaling air that is deficient in oxygen and/or contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective of Clemson University is to first prevent atmospheric contamination and deficiencies. Whenever feasible, control of atmospheric contamination and deficiencies shall be accomplished by implementing accepted engineering and/or administrative controls, including: enclosure, isolation, local exhaust systems, general exhaust systems and material substitutions.

It is the philosophy of Clemson University to utilize respiratory protection only when effective engineering and/or administrative controls are not feasible, or while they are being implemented. A sound and effective respiratory protection program is an essential aspect in assuring that personnel using such equipment are adequately protected.

Purpose
The purpose of the Respiratory Protection Program (RPP) at Clemson University is to establish and maintain a program that will assure compliance with all applicable federal, state regulations concerning the selection, use and maintenance of respirators.

Objectives
The objectives of the RPP include:

• To ensure that respiratory protective equipment is utilized only when effective administrative and/or engineering controls are not feasible; or while they are being implemented.

• To ensure that the correct type of respiratory protective equipment is selected for each application.

• To ensure that respiratory protective equipment is clean and in good working order.

• To ensure that respiratory protective equipment properly fits the user.

• To ensure that users of respiratory protective equipment are adequately trained in the care, limitations, and proper application of the device.

• To ensure that regulatory documentation is established and maintained in a logical and accessible manner.

Regulations
Requirements/references pertaining respirator use, maintenance, selection, and associated training are found in the following publications:

• Occupational Safety and Health Standards for General Industry (29 CFR 1910.94).

• Occupational Safety and Health Standards for General Industry (29 CFR 1910.120).


• Mine Safety and Health Administration (30 CFR part 11).
• Public Health Service (42 CFR part 84).
• The United States Pharmacopoeia for medical or breathing oxygen.
• “American National Standard for Respiratory Protection” (ANSI Z88.2-1992), published by the American National Standards Institute, Inc.
• “Respiratory Protection-Respirator Use-Physical Qualifications for Personnel”, published by the American National Standards Institute, Inc.

Responsibilities

*Industrial Hygienist*

The IH is responsible for the development, implementation, and administration of the RPP. These responsibilities include:

• Reviewing and updating the respiratory protection written program.
• Conducting exposure and health hazard evaluations of the Clemson University work environment.
• Approving respiratory protection equipment for Clemson University employees.
• Providing instruction to personnel on the proper use, maintenance and storage of respirators.
• Providing a fit testing program for respirator wearers.
• Maintaining fit testing and training records.
• Evaluating the overall effectiveness of the respirator program.

*Occupational Health Nurse*

The Occupational Health Nurse will be responsible for:

• Developing and implementing a medical surveillance program for all personnel utilizing respiratory protection.
• Performing initial evaluations and physical examinations of the individuals using respiratory protection to determine if the individual is medically able to wear respiratory protective equipment.
• Conducting periodic evaluations (and physicals as necessary) of respirator users.

*Principal Investigators/Supervisors*

Principal investigators or supervisors have the primary responsibility for implementation of the respiratory protection program in their area of jurisdiction. The principal investigator/supervisor will be responsible for:

• Supervising staff to ensure that the respirator protection program guidelines are followed.
• Identifying and notifying Environmental Health and Safety of tasks/procedures which may require exposure/health assessments to determine if individuals need to utilize respiratory protection.
• Identifying personnel under their supervision required to utilize respirators to the IH.

**Respirator Wearers**

Respirator wearers will be responsible for:

• Using respirators in accordance with instructions and guidelines received during training courses.
• Storing, cleaning, maintaining, and protecting respirators from damage.
• Reporting any problems or malfunction with respiratory protective equipment to the supervisor/principal investigator.
• Informing the Occupational Health Nurse or contracted medical personnel of health changes that would effect the safe use of respirators.

**Other concerns**

Health, safety, medical, industrial hygiene consultants shall be utilized to support the Respiratory Protection Program as needed and if funding allows. Consultants may be utilized to provide independent data collection, assist in training programs and to assist in compliance audits.

**Respirator Selection/Use**

**Industrial Hygienist**

The IH is responsible for selecting respirators used for protection against exposure/health hazards. Selection of respirators will be based on applicable regulation/guidelines and the following factors:

• Approval of the respirator by the Mine Safety and Health Administration (MSHA) and the National Institute of Occupational Safety and Health (NIOSH).
• The substance present in the work environment for which respiratory protection is needed.
• The physical state of the contaminant (gas, vapor, dust, mist, etc.).
• The Permissible Exposure Limit (PEL) and toxicity of the substance.
• The concentrations of the air contaminants likely to be encountered.
• The fit factor listed for the respirator type.
• The possibility of skin absorption or eye irritation.
• The possibility of oxygen deficiency.
• The nature of the individuals task/procedure.

**Fit Factors**

At no time will a respirator with a lower fit factor than required be selected for utilization. The maximum concentration that is allowable for a particular respirator is determined by the following equation:
Fit Factor x PEL = Maximum Exposure Concentration Allowable

**Exclusive Respirator Usage**

All individuals who wear respiratory protective devices will be supplied with equipment for their exclusive use. An exception to this practice may be permitted for equipment utilized for emergency or rescue purposes (Self Contained Breathing Apparatus (SCBA) and Powered Air Purifying Respirators (PAPR)). Exclusive use respirators will be marked with the employees name or some other identification to prevent cross contamination.

**Training Requirements**

**Employee Training**

The Environmental Health and Safety Department is responsible for training individuals who wear respiratory protection to control exposure to hazardous agents. An exception to this practice may be permitted for equipment utilized for emergency or rescue purposes (SCBA). Courses related to emergency use equipment may be conducted by outside consultants or by qualified in-house personnel. Any individual who wears a respirator shall receive initial and periodic training in the proper use, care, and limitations of the selected respirator. This training shall include the following:

- The nature of the respiratory hazard - what specific chemical substances are present, what areas, operations, or conditions involve potentially hazardous exposures and what effects may result if respirators are not used.
- An explanation of why engineering controls are not immediately possible and a discussion of what efforts are being made to eliminate, and/or control the potentially hazardous agent.
- An explanation of why the specific type of respirator has been selected and the associated fit factors.
- A discussion and demonstration on how to properly use the respirator.
- Instruction on the proper techniques/importance of cleaning, disinfecting, inspecting, maintaining, and storing the selected respirator.
- A discussion of the capabilities, limitations and correct applications of the selected respirator.

**Respirator Fit Testing**

**Industrial Hygienist**

Any individual who wears a respirator shall be assured of having a proper fitting respirator. Proper fitting shall be assured through quantitative and qualitative fit testing performed by the IH or a qualified individual in the Environmental Health and Safety Department. An approval to wear a respirator will not be issued by the Environmental Health and Safety Department until a satisfactory qualitative or quantitative fit test has been performed. Fit testing will be performed at least annually for individuals utilizing respiratory protection.

**Conditions of Fit Testing**

The following conditions must be met before respiratory fit testing can be undertaken:
• Individuals must be medically certified to wear a respirator by the Occupational Health Nurse or by certified and approved outside medical personnel.

• Respirators that require a face-respirator seal shall not be worn when conditions prevent an effective seal. Conditions that may affect the respirator-face seal include: eye/safety glasses, missing dentures, and facial hair.

If any of these conditions are not met, respirator fit testing cannot be performed. An approval to wear a respirator will not be issued by the Environmental Health and Safety Department until the conditions of fit testing are met.

Respirator Inspection/Repair/Storage

Inspection Frequency
All respirators shall be inspected routinely before and after each use and during cleaning procedures to ensure that it is in proper working condition. Respirators designed for emergency use shall be inspected at least monthly. Principal investigators/supervisors are responsible for monthly inspections of emergency use respirators. Inspections of emergency use respirators shall be recorded and maintained as a permanent record of regulatory compliance. An exception to this practice may be allowed for departments who perform inspections on a more frequent basis and who establish and maintain a method of documenting these inspections. The Industrial Hygienist will audit departments who establish and maintain a personalized method of inspection/documentation annually.

Repair of Respirators
No repairs shall be made to air purifying respirators. If air purifying respirators are damaged or missing parts they should be discarded and a new respirator will be issued.

Repairs to SCBA or PAPR should only be performed by a trained individual and according to applicable manufacturer directions.

Storage of Respirators
All respirators shall be stored according to the following guidelines:

• Respiators must be protected from dust, sunlight, heat, extreme cold, excessive moisture, and damaging chemicals. Most air purifying respirators can be stored in a clean plastic bag until they are used.

• Emergency use respirators shall be stored in a cabinet or case located in a non-contaminated but readily accessible area.

Exposure/Health Assessment

Assessment of Areas Requiring Respiratory Protection
The IH will perform initial and periodic exposure monitoring in all areas requiring the use of respiratory protection. The frequency of periodic monitoring will be based upon applicable state and federal regulations and the judgment of the IH.

Medical Approval
When using air-purifying respirators, breathing can become difficult because a filter or cartridge device impedes the flow of air. The Occupational Health Nurse or an approved/certified outside medical consultant will make a determination if the employee is medically able to use a
respiratory protective device. The initial determination will consist of a questionnaire evaluation followed by a health exam (if needed). This assessment must be performed prior to fit testing and assigning a respirator to an employee. The evaluation (and follow-up exam) will be repeated periodically for all respirator wearers. Supervisors/principal investigators will be advised of employees/students with medical limitations regarding the use of respirators.

**Program Evaluation**

**External Audits**

Periodic evaluations will be made by the IH to assure continued effectiveness of the program. Such evaluation will determine whether or not all requirements of the program are being adhered to properly. Periodic feedback will be solicited from respirator users and their supervisor and/or primary investigator.

Frequent random inspections will be conducted by the IH to assure that: the proper respiratory protective equipment is being used, the equipment is being used correctly, users are certified to wear respirators, users are getting a good face-seal fit and that the equipment is being cleaned and stored properly.

**Internal Audits**

Every January, beginning 1997, the IH will audit the respiratory protection program. This audit will include a complete review the RPP manual and any necessary changes will be made promptly. The internal audit will include a review of all investigations and reports issued during the preceding year related to the RPP. Any inconsistencies or inaccuracies concerning these investigations and reports will be noted.

**Respiratory Protection Program Records**

**Data and Records**

OSHA regulations require that records pertaining to fit testing and respiratory training be retained in a format that allows easy and logical access. All original Industrial Hygiene data pertaining to fit testing and respirator training will be kept on file by the IH.

Duplicate computer files of fit testing/training records are maintained for efficient report writing and organizing.

**Records Retention**

Regulatory compliance data such as personal fit testing and respirator training will be retained indefinitely.

**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 respirators limitations.

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

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

4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.
OSHA Respirator Medical Evaluation Questionnaire (Mandatory)

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).

1. Today's date:_______________________________________________________
2. Your name:__________________________________________________________
3. Your age (to nearest year):_________________________________________
4. Sex (circle one): Male/Female
5. Your height: __________ ft. __________ in.
6. Your weight: ____________ lbs.
7. Your job title:_____________________________________________________
8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code): ____________________
9. The best time to phone you at this number: _________________________
10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes/No
11. Check the type of respirator you will use (you can check more than one category):
    a. ______ N, R, or P disposable respirator (filter-mask, non-cartridge type only).
    b. ______ Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).
12. Have you worn a respirator (circle one): Yes/No
    If "yes," what type(s):________________________________________________

Part A. Section 2. (Mandatory)

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

1. Do you currently smoke tobacco, or have you smoked tobacco in the last month? Yes/No
2. Have you ever had any of the following conditions?
   a. Seizures (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 arrhythmia (heart beating irregularly): Yes/No
g. High blood pressure: Yes/No
h. Any other heart problem that you’ve been told about: Yes/No

6. Have you **ever had** any of the following cardiovascular or heart symptoms?
   a. Frequent pain or tightness in your chest: Yes/No
   b. Pain or tightness in your chest during physical activity: Yes/No
   c. Pain or tightness in your chest that interferes with your job: Yes/No
   d. In the past two years, have you noticed your heart skipping or missing a beat: Yes/No
   e. Heartburn or indigestion that is not related to eating: Yes/No
   f. Any other symptoms that you think may be related to heart or circulation problems: Yes/No

7. Do you **currently** take medication for any of the following problems?
   a. Breathing or lung problems: Yes/No
   b. Heart trouble: Yes/No
   c. Blood pressure: Yes/No
   d. Seizures (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. Skin allergies or rashes: Yes/No
   c. Anxiety: Yes/No
   d. General weakness or fatigue: Yes/No
   e. Any other problem that interferes with your use of a respirator: Yes/No

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

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

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

11. Do you **currently** have any of the following vision problems?
    a. Wear contact lenses: Yes/No
    b. Wear glasses: Yes/No
    c. Color blind: Yes/No
    d. Any other eye or vision problem: Yes/No
12. Have you **ever had** an injury to your ears, including a broken ear drum: Yes/No

13. Do you **currently** have any of the following hearing problems?
   a. Difficulty hearing: Yes/No
   b. Wear a hearing aid: Yes/No
   c. Any other hearing or ear problem: Yes/No

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

15. Do you **currently** have any of the following musculoskeletal problems?
   a. Weakness in any of your arms, hands, legs, or feet: Yes/No
   b. Back pain: Yes/No
   c. Difficulty fully moving your arms and legs: Yes/No
   d. Pain or stiffness when you lean forward or backward at the waist: Yes/No
   e. Difficulty fully moving your head up or down: Yes/No
   f. Difficulty fully moving your head side to side: Yes/No
   g. Difficulty bending at your knees: Yes/No
   h. Difficulty squatting to the ground: Yes/No
   i. Climbing a flight of stairs or a ladder carrying more than 25 lbs: Yes/No
   j. Any other muscle or skeletal problem that interferes with using a respirator: Yes/No

**Part B**

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

1. In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen: Yes/No
   
   If "yes," do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions: Yes/No

2. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals: Yes/No
   
   If "yes," name the chemicals if you know them: ____________________________
   ______________________________________________________________________
   ______________________________________________________________________

3. Have you ever worked with any of the materials, or under any of the conditions, listed below:
   a. Asbestos: Yes/No
   b. Silica (e.g., in sandblasting): Yes/No
   c. Tungsten/cobalt (e.g., grinding or welding this material): Yes/No
   d. Beryllium: Yes/No
   e. Aluminum: Yes/No
   f. Coal (for example, mining): Yes/No
g. Iron: Yes/No
h. Tin: Yes/No
i. Dusty environments: Yes/No
j. Any other hazardous exposures: Yes/No
If "yes," describe these exposures:

_______________________________________________________________________
_______________________________________________________________________

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

_______________________________________________________________________

5. List your previous occupations:

_______________________________________________________________________

6. List your current and previous hobbies:

_______________________________________________________________________

7. Have you been in the military services? Yes/No
If "yes," were you exposed to biological or chemical agents (either in training or combat): Yes/No

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

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

10. Will you be using any of the following items with your respirator(s)?
   a. HEPA Filters: Yes/No
   b. Canisters (for example, gas masks): Yes/No
   c. Cartridges: Yes/No

11. How often are you expected to use the respirator(s) (circle "yes" or "no" for all answers that apply to you)?:
   a. Escape only (no rescue): Yes/No
   b. Emergency rescue only: Yes/No
   c. Less than 5 hours per week: Yes/No
   d. Less than 2 hours per day: Yes/No
   e. 2 to 4 hours per day: Yes/No
   f. Over 4 hours per day: Yes/No

12. During the period you are using the respirator(s), is your work effort:
   a. Light (less than 200 kcal per hour): Yes/No
If "yes," how long does this period last during the average shift: ________ hrs. ________ mins.
Examples of a light work effort are **sitting** while writing, typing, drafting, or performing light assembly work; or **standing** while operating a drill press (1-3 lbs.) or controlling machines.

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

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

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

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

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

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

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

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

____________________________________________________

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

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

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

_______________________________________________________________________
_______________________________________________________________________

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

_______________________________________________________________________
_______________________________________________________________________

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

Name of the first toxic substance: _________________________________________
Estimated maximum exposure level per shift: _________________________________
Duration of exposure per shift: _____________________________________________

Name of the second toxic substance: _______________________________________
Estimated maximum exposure level per shift: _________________________________
Duration of exposure per shift: _____________________________________________

Name of the third toxic substance: _________________________________________
Estimated maximum exposure level per shift: _________________________________
Duration of exposure per shift: _________________________________________________

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

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

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

____________________________________________________________________________