

NORTH CAROLINA
HAZARDOUS WASTE SECTION

RESPIRATORY PROTECTION
PROGRAM

Revised

May 18, 2004
February 4, 2005
January 18, 2006
January 8, 2007
January 25, 2008
January 18, 2009

NORTH CAROLINA HAZARDOUS WASTE SECTION: RESPIRATORY PROTECTION PROGRAM

I. PURPOSE

The purpose of this manual is to establish Standard Operating Guidelines (SOGs) for respiratory protection equipment (RPE) used by authorized personnel of the North Carolina Division of Waste Management- Hazardous Waste Section (DWM-HWS). This manual is intended to comply with the requirements of 29 CFR parts 1910.120 and 1910.134.

II. HWS RESPIRATORY PROTECTION PROGRAM POLICY

It shall be the policy of the NC Division of Waste Management- Hazardous Waste Section to provide a safe and healthful workplace free from all recognized hazards. The HWS management is fully committed to preventing occupational illnesses, injuries and accidents through awareness education and proper, appropriate use of PPE.

Total support is required of each employee in maintaining a safe work environment and complying with applicable CFR 29 1910 standards and SOGs established by the HWS. This includes proper training in the use, cleaning, storage and maintenance of PPE. Management will provide opportunities for employees to receive proper training by supporting the training policies and SOGs established by the Health and Safety Officer. The responsibilities of the Health and Safety Officer include insuring that HWS employees are trained in the use, limitations and maintenance of RPE and are able to recognize situations that may require the use of RPE. It is the responsibility of the HWS employee to learn HWS-SOGs, with regard to RPE use, and to report any concerns regarding deficiencies in training and support.

It shall be the responsibility of the Health and Safety Officer, as program administrator, to maintain this program with regard to law and changes in the workplace. On an annual basis the program shall be evaluated for its effectiveness.

TABLE OF CONTENTS

1.0 Occupational Hazard Assessment	5
2.0 Medical Evaluations	7
3.0 Procedures for the selection and use of Respiratory Protection Devices:	9
4.0 Respiratory Fit Testing	11
5.0 Maintenance and Cleaning procedures	15
6.0 Breathing Air Quality	16
7.0 Training	16
8.0 Program Evaluation and Effectiveness	16
9.0 Record Keeping	17

REFERENCES

Health and Safety Manual
Personal Protective Equipment Program

Terms Used in the Manual

Air-purifying respirator (APR)- a respirator with an air purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air atmosphere through the air purifying element

Assigned Fit Factor-

Canister or Cartridge- means a container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passes through the container.

Filter or Air-purifying element- means a component used in respirator with a filter to remove solid or liquid aerosols from the inspired air.

Fit Factor- a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

High Efficiency Particulate Air (HEPA) filter (P-100)- a filter that is at least 99.97% efficient in removing monodisperse particles of .3 micrometers in diameter.

Immediately Dangerous to Life and Health (IDLH)- an atmosphere deemed an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape.

National Institute of Occupation Safety and Health (NIOSH)- a governmental agency within the Centers for Disease Control responsible for carrying out and establishing, and testing with regards to the workplace.

Oxygen Deficient atmosphere- an atmosphere that contains less than 19.5% oxygen.

Qualitative fit test- a pass/fail fit test to assess the adequacy of the respirator fit that relies on the individual's response to the test agent.

Quantitative fit test- an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

Self-Contained Breathing Apparatus (SCBA)- an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

1.0 Occupational Hazard Assessment:

The Occupational Hazard Assessment in accordance with the Health and Safety Manual and Personal Protective Equipment Program, shall identify workplace hazards. When an Occupational Hazard Assessment shows that an employee may be exposed to a respiratory hazard, the Respiratory Protection Program shall apply.

1.1 Controlling Workplace Hazards:

Identified workplace hazards shall be first controlled through engineering practices and process controls; personal protective equipment is always a last resort. Respiratory hazards shall be controlled, as far as practical with:

1. Ventilation Systems
2. Area and/ or component isolation
3. Other controls as seemed practicable or appropriate.

When engineering and process controls are not practicable, respiratory protection equipment will be an acceptable alternative subject to the following recognized limitations:

1. Reduced field of vision
2. Reduced freedom of movement
3. Reduced ability to communicate
4. Human factor considerations

Table 1 identifies employees who participate in the Respiratory Protection Program along with the task(s) that may require respiratory protection in addition to the type of equipment they are permitted to wear.

TABLE 1: (DWM-HWS) Personnel in Respiratory Protection Program			
Name	Job Description	Work Procedure	Respirator
Mark Burnette	WMS	Environmental Sampling	SCBA/APR/5min
Sean Morris	WMS	Environmental Sampling	SCBA/APR/5min
Bobby Nelms	WMS	Environmental Sampling	SCBA/APR/5min
Phil Orozco	WMS	Environmental Sampling	SCBA/APR/5min
Robin Proctor	Environmental Chemist	Environmental Sampling	SCBA/APR/5min
Jenny Rankin	WMS	Environmental Sampling	SCBA/APR/5min
Ryan Gay	WMS	Environmental Sampling	SCBA/APR/5min
Elizabeth Stewart	Hydrogeologist	Environmental Sampling	SCBA/APR/5min
Brian Polk	Health and Safety	Environmental Sampling	SCBA/APR/5min
Mike Brailsford	Env Supervisor	Environmental Sampling	SCBA/APR/5min

2.0 Medical Evaluations

(See Health and Safety Manual for more information on Medical Monitoring)

The wearing of respirators may place a burden on existing health concerns. Therefore, HWS will provide, free of charge, physicals to ensure the employee is medical approved to wear the device. All communication between the Doctor and the employee is confidential, except the Health Recommendation Form, which will be kept on file with the Health and Safety Officer.

Employees who may wear RPE must participate in the HWS's Occupational Medical Monitoring Program. Employees are not permitted to engage in these types of field activities unless they have undergone a medical examination and have been cleared by a physician as being physically able to wear RPE.

2.1 Procedures

Duke Occupation and OCCU MED are both contracted to provide physicals to HWS employees. The facility shall use the provided medical questionnaire to obtain required information to make a determination for respiratory use. A follow up exam is provided if the employee provides a positive response to any question.

2.2 Supplemental Information

Additional information will be provided to both medical facilities discussing type of equipment, duration and frequency of use, work load, temperature and humidity extremeness that may be encountered.

2.3 Health Considerations

Conditions that may prevent an employee from wearing a respirator, and thus from working in a contaminated area include:

- | | |
|--|---|
| a. Diabetes | m. Coronary artery disease or cerebral blood vessel disease |
| b. Epilepsy | n. Severe or progressive hypertension |
| c. Alcoholism | o. Anemia |
| d. Use of certain medications | p. Pneumomediastinum |
| e. Punctured Ear Drum | q. Communication of sinus through upper jaw to oral cavity |
| f. Skin sensitivities | r. Experiences breathing difficulty when a respirator |
| g. Impaired or non-existent sense of smell | s. Experiences claustrophobia when wearing a respirator |
| h. Emphysema | t. Physician does not approve for use. |
| i. COPD | |
| j. Bronchial asthma | |
| k. X-ray evidence of pneumoconiosis | |
| l. Evidence of reduced pulmonary function | |

2.4 Limitations

Facial:

Facial deformities may prohibit wearing of certain types of respirator facepiece or mouthpiece, since the face-to-face seal may not be adequate or reliable.

Psychological:

While somewhat less clearly defined than physical limitations in respirator usage, psychological factors may prevent an employee from wearing a respirator. A physician is consulted for advice in the cases.

3.0 Procedures for the selection and use of Respiratory Protection Devices:

HWS employees will don RPE when entering an atmosphere that presents a respiratory hazard, as determined by the Program Administer and employee information. In accordance to the Occupation Hazard Assessment and Personal Protective Equipment Program, three types of respiratory hazards exist.

1. Exposure to chemical fumes and vapors
2. Airborne Particles
3. IDHL Atmospheres

3.1 Written Standard Operating Guidelines:

The Respiratory Protection Program establishes guidelines for the selection and use of respiratory protection equipment (RPE). If in the course of employment it becomes necessary to don RPE the employee and program administrator shall:

1. Determine if exposure to the respiratory hazard is warranted to complete the job task and if other methods will avoid exposure. The employee should examine labels, MSDS, signs, and other available resources to make this decision.
2. Determine if the respiratory hazard presents a dust, mist, chemical vapor, IDLH, exposure.
3. The two options for RPE are APR and SCBA. For an ARP to be selected the following must be ensured:
 - A. Oxygen content must be at least 19.5% Oxygen. The oxygen content must also remain at 19.5% for APR to be used.
 - B. All atmsostphere contaminants must be known and quantified. If the identity of the contaminates can not be ascertained, it shall be considered IDLH and APRs cannot be used.
 - C. If an APR is selected an appropriate change out schedule shall be used. The change out will be based on objective information from Scott Maximum Use Chart (Appendix 2). No APR shall be used for more than 60 minutes.

Special Note:

The human nose is capable of detecting odors in great ranges; however, in a phenomenon called “olfactory fatigue,” the olfactory nerve simply fills up and then is not capable of detecting. Because of this, the nose should not be use to detect the presence of chemical vapors. If however the employee detects chemical vapors while using an APR, the employee must be removed from work and cartridge changed out.

4. SCBAs are to be selected when there is less than 19.5% oxygen, IDLH atmospheres, or an unknown contaminate exists.

5. At least three persons must be present to don APRs. Four persons must be present to use SCBA (one must be used as a back up). The Health and Safety Officer must also be present.
6. The maximum use time for SCBA is 25 minutes while in a SCBA or when air level falls to less than 20% (indicated by heads up display or gauge).
7. If employee must enter an environment where no respiratory exist (determined after evaluation by knowledge and instruments), but there is potential for a respiratory hazard, the employee should select a 5 minute escape bottle.
8. On completion of tasks involving RPE, all equipment should be cleaned according to manufacturer instructions and HWS's H&S manual. All APRs no matter use, shall be discarded.

3.3 Full Face negative Air Purifying Respirator-

A. Scott Full Face (AV2000) with HEPA/Organic cartige (Scott)

The above respirator protects the wearer from airborne particles, dust, and mists and has an assigned protection factor of 10. This device will also protect from some hydrocarbon based substances.

3.4 Atmosphere Supplying Respirators

A. Scott 2216 self-contained breathing apparatus (30 minute)

This device will provide a finite amount of clean air to protect against low concentration of oxygen and other contaminants and has an assigned protection factor of 10,000. The device is limited to 25 minutes of use.

B. Scott Five Minute Escape Bottle

This device will provide a supply of air sufficient to escape an atmosphere should the need arise. When investigating abandon sites, this device can be used when no hazards can be detected by other means.

The length of time respirators are to be worn continuously should be kept to a minimum. Individuals wearing respirators must be given adequate relief from respirator use at reasonable intervals. Actual use intervals shall be established by the Program Administrator consistent with the circumstances surrounding the use of the device (i.e. work area temperature and humidity, type of respirator filter used, type of work being performed, and other protective equipment being worn).

4.0 Respiratory Fit Test using the Portacount System-

To maintain maximum protection when wearing an APR or SCBA, a qualitative fit test will be performed to ensure the RPE provides an acceptable level of protection. No employee should utilize RPE without being approved to do so by a physician or passing a fit test. Fit test will be conducted annually unless situations arise warranting an additional test (change of equipment, workplace conditions, or significant change in employee's facial features or weigh change of 20+/- pounds). HWS uses only full facemasks (AV-2000 by Scott) this device will serve as the facemask for both APR and SCBA. HWS will use a qualitative PortaCount fit testing system to ensure proper protection.

4.1 General Information and Portacount Fit Test Requirements.

(1) Check the respirator to make sure the sampling probe and line are properly attached to the facepiece and that the respirator is fitted with a particulate filter capable of preventing significant penetration by the ambient particles used for the fit test (e.g., NIOSH 42 CFR 84 series 100, series 99, or series 95 particulate filter) per manufacturer's instruction.

(2) Instruct the person to be tested to don the respirator for five minutes before the fit test starts. This purges the ambient particles trapped inside the respirator and permits the wearer to make certain the respirator is comfortable. This individual shall already have been trained on how to wear the respirator properly.

(3) Check the following conditions for the adequacy of the respirator fit: Chin properly placed; Adequate strap tension, not overly tightened; Fit across nose bridge; Respirator of proper size to span distance from nose to chin; Tendency of the respirator to slip; Self-observation in a mirror to evaluate fit and respirator position.

(4) Have the person wearing the respirator do a user seal check. If leakage is detected, determine the cause. If leakage is from a poorly fitting facepiece, try another size of the same model respirator, or another model of respirator.

(5) Follow the manufacturer's instructions for operating the Portacount and proceed with the test.

(6) The Portacount will automatically stop and calculate the overall fit factor for the entire set of exercises. The overall fit factor is what counts. The Pass or Fail message will indicate whether or not the test was successful. If the test was a Pass, the fit test is over.

(7) Since the pass or fail criterion of the Portacount is user programmable, the test operator shall ensure that the pass or fail criterion meets the requirements for minimum respirator performance.

(8) A record of the test needs to be kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style, and size of respirator used; and date tested.

4.3 Procedures for Respiratory Fit Testing

1. The test subject shall be allowed to pick the most acceptable respirator from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user. (Scott AV-2000 small, medium, large, extra-large).
2. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine an acceptable fit. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This instruction may not constitute the subject's formal training on respirator use, because it is only a review.
3. The test subject shall be informed that he/she is being asked to select the respirator that provides the most acceptable fit. Each respirator represents a different size and shape, and if fitted and used properly, will provide adequate protection.
4. The test subject shall be instructed to hold each chosen facepiece up to the face and eliminate those that obviously do not give an acceptable fit.
5. The more acceptable size are noted in case the one selected proves unacceptable; the most comfortable mask is donned and worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in the following item A.6. If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.
6. Assessment of comfort shall include a review of the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator:
 - (a) Position of the mask on the nose
 - (b) Room for eye protection
 - (c) Room to talk
 - (d) Position of mask on face and cheeks
7. The following criteria shall be used to help determine the adequacy of the respirator fit:
 - (a) Chin properly placed;
 - (b) Adequate strap tension, not overly tightened;
 - (c) Fit across nose bridge;
 - (d) Respirator of proper size to span distance from nose to chin;
 - (e) Tendency of respirator to slip.
 - (f) Self-observation in mirror to evaluate fit and respirator position.

8. The test subject shall conduct a user seal check, either the negative and positive pressure seal checks described in information provided by the respirator manufacturer. Before conducting the negative and positive pressure checks, the subject shall be told to seat the mask on the face by moving the head from side-to-side and up and down slowly while taking in a few slow deep breaths. Another facepiece shall be selected and retested if the test subject fails the user seal check tests.

Positive Pressure Check:

Close off the exhalation valve and exhale gently into the facepiece. The face fit is considered satisfactory if a slight positive pressure can be built up without any evidence of outward leakage of air at the seal.

Negative Pressure Check:

Close off the inlet opening of the canister or cartridge by covering with the palm of the hand or by replacing the filter seal(s), inhale gently so that the facepiece collapses slightly, and hold the breath for ten seconds.

9. The test shall not be conducted if there is any hair growth between the skin and the facepiece-sealing surface, such as stubble beard growth, beard, mustache or sideburns which cross the respirator-sealing surface. Any type of apparel, which interferes with a satisfactory fit, shall be altered or removed.
10. If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to Duke Occupational or OCCU MED to determine whether the test subject can wear a respirator while performing her or his duties.
11. If the employee finds the fit of the respirator unacceptable, the test subject shall be given the opportunity to select a different respirator and to be retested.
12. Exercise regimen. Prior to the commencement of the fit test, the test subject shall be given a description of the fit test and the test subject's responsibilities during the test procedure. The description of the process shall include a description of the test exercises that the subject will be performing. The respirator to be tested shall be worn for at least 5 minutes before the start of the fit test.
13. The fit test shall be performed while the test subject is wearing any applicable safety equipment that may be worn during actual respirator use, which could interfere with respirator fit to include hard hat and SCBA tank
14. Test Exercises. (a) The following test exercises are to be performed for all fit testing methods. The test subject shall perform exercises, in the test environment, in the following manner:

(1) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally.

(2) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply, taking caution so as not to hyperventilate.

(3) Turning head side to side. Standing in place, the subject shall slowly turn his/her head from side to side between the extreme positions on each side. The head shall be held at each extreme momentarily so the subject can inhale at each side.

(4) Moving head up and down. Standing in place, the subject shall slowly move his/her head up and down. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling).

(5) Talking. The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song.

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.

(6) Grimace. The test subject shall grimace by smiling or frowning. (This applies only to QNFT testing; it is not performed for QLFT)

(7) Bending over. The test subject shall bend at the waist as if he/she were to touch his/her toes. Jogging in place shall be substituted for this exercise in those test environments such as shroud type QNFT or QLFT units that do not permit bending over at the waist.

(8) Normal breathing. Same as exercise (1).

15. Each test exercise shall be performed for one minute except for the grimace exercise which shall be performed for 15 seconds. The test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried. The respirator shall not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated.

Because HWS uses the same face piece for APR as is does for SCBA, there is no need to retest for SCBA providing the employee has been medically approved to wear a SCBA.

4.1 Field testing of the Seal of a Respirator:

When using RPE in the field, follow the User Seal Check to ensure proper protection.

All Fit Testing will be conducted by the Health and Safety Officer and records maintained in the employee's safety file (see Record Keeping 9.0).

5.0 Procedures for Maintenance and Cleaning

All RPE will be stored at Tillery Place. Monthly inspection will be conducted to ensure devices are of working condition.

5.1 Storage of RPE

All RPE shall be stored according to manufacturer instructions. All RPE should be stored to provide protection from damage, dust, sunlight, extreme heat or cold, and other conditions that may bring harm to the equipment. Each facepiece shall be stored in a sealed bag with the decon date and the initials of the person decontaminating the facepiece.

5.1 Monthly Inspection of APR:

The following shall be inspected:

1. Tightness of connections and the condition of the facepiece.
2. Headbands, valves, connecting tube and cartage (should be sealed in package).
3. Check for pliability and signs of deterioration. Move all parts to prevent the device from setting.
4. Records are maintained in the Comprehensive Health and Safety Manual.

5.2 Monthly inspections of SCBA (tanks and pack):

Each SCBA is marked individually and an inspection of each is required. The following shall be inspected:

1. Air level (at least 90%) in tanks and Hydrostatic test dates if appropriate.
2. Low level air alarms and lights should be sounded.
3. Airlines and regulator shall be inspected for defects.
4. Overall condition of pack shall be ensured.
5. Records are maintained in the Comprehensive Health and Safety Manual.

5.3 Cleaning and Inspection after Use

Following each use, the respirator shall be cleaned, sanitized and inspected by the user using these guidelines:

1. Separate all components before to cleaning.
2. Wash the facepiece body and adapter in warm (110F) water using Alconox. A brush (not wire) may be used to remove foreign debris.
3. Rinse all parts in 110F water.
4. Allow facepiece and adapter to dry.
5. Once device is dry (hand dry with lint free cloth), reassemble, check all parts for damage (cracks in seal, etc.) and place in bag or other container.
6. Facepiece shall be stored in a sealed bag with the date and the initials of the person decontaminating the facepiece.

5.4 Repairing of RPE

If upon inspection, any unit is found to be faulty, it will be discarded or returned to the manufacturer for repair.

6.0 Breathing Air Quality:

All SCBA tanks used by HWS will be filled with high quality air from a compressor certified to do so. The air shall be Grade D. See Appendix 3 for certification.

7.0 Training

Training shall occur annually during Hazwoper Updates and other times deemed by the Health and Safety Officer for those needing respiratory protection. The Health and Safety Manual outlines the Hazwoper curriculum. Topics in section 7.1 and 7.2 will also be covered.

7.1 APR

Employees wearing APR shall be trained on the following:

1. When the respirator is necessary and how improper fit or maintenance may compromise protection.
2. Limitations and capabilities of the respirators in all expected situations including emergencies.
3. How to inspect respirator, don and remove, and check the seals of the unit.
4. Guidelines for maintenance and storage
5. Recognizing medical signs and symptoms that may limit or prevent use of respirator.
6. Other requirements of 1910.134 and topics from Scott.

7.2 SCBA

For employees using SCBA will be trained in the following in addition to the above topics:

1. Limitations when wearing a SCBA
2. How to properly don and remove a SCBA
3. Inspection of SCBA
4. Recognizing medical signs and symptoms that may limit or prevent use of SCBA.
5. NFPA guidelines on use of SCBA.

8.0 Program Effectiveness and Evaluation:

The Health and Safety Officer shall conduct a yearly program evaluation. Additionally, the Health and Safety Officer should consult with wearers to learn of any discomfort with devices or concerns. The following shall also be evaluated:

1. Fit of devices- ensuring the device still maintains protection from workplace hazards.
2. Review of records.

9.0 Record Keeping

HWS will maintain medical and fit test records and other data related to the RPP.

RECORD

1. Medical Evaluation
2. Fit Testing
3. Written Copy of the Program
4. Any other required material
5. Air Sampling data
6. APR selection information

LOCATION

Employee Safety File-Red folder
Employee Safety File-Red folder
Programs File- RPP folder / I:Drive
under HWS Health and Safety.
Programs File- plainly marked
Site Safety Plan file
Site Safety Plan file

