COUNTY OF RIVERSIDE
STANDARD SAFETY OPERATIONS MANUAL

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PURPOSE: California Code of Regulations, Title 8, General Industry Safety Orders, Section 5144, requires all employers to provide approved respirator equipment to affected employees when it is clearly impracticable to remove harmful dusts, fumes, mists, vapors, or gases at their source. It further requires that written operating procedures governing the selection and use of respirators shall be established and shall include procedures for selection, instruction and training, cleaning and sanitizing, inspection and maintenance. This program establishes the Riverside County Respiratory Protection Program in compliance with California statutes.

POLICY: County employees will be provided appropriate respirators and equipment when required as emergency back up, where they are recommended by Material Safety Data Sheets, and where engineering controls (ventilation) cannot be made adequate and respiratory protection is necessary.

OBJECTIVE: Maintain employee safety and health, define the guidelines for the respiratory protection program for all County organizations, and assure compliance with regulatory requirements.

SCOPE: All County employees.

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I. GENERAL

A. Where it is suspected that respiratory protection will be needed, the job site will be evaluated as to type and concentration of contaminant, potential for oxygen deficiency, explosive concentrations that may develop and the possibility of IDLH[1] concentrations being generated.

B. Air supplied respirators will be used unless the conditions for use of air purifying respirators are met as specified in Section V of this procedure.

C. When working in IDLH concentrations, at least two persons equipped with approved respiratory equipment shall be on the job. Communication shall be maintained between both individuals. At least one standby person shall be in a location, which shall not be affected by any likely incidents. The standby person shall be trained and have equipment to provide effective emergency rescue, if required.

D. When performing firefighting activities the following additional requirements shall apply if:

1. At least two firefighters shall use the "Buddy System" and enter the IDLH atmosphere and remain in visual or voice contact with each other at all times. Electronic means of communication such as radios cannot be substituted for direct voice or visual contact between the team members in the IDLH atmosphere.

2. Firefighters may perform emergency rescue activities prior to having an entire team assembled.

II. RESPONSIBILITIES

A. Department/Agency/District

1. Determines which job tasks and classifications require the use of respiratory equipment.

2. Appoints a Qualified Program Administrator (QPA) who has the appropriate training or experience in accordance with the programs complexity. This individual must have the status of at least a supervisory level position.

3. Ensures that a Standard Operating Procedure specific for the Department's usage is written for their respiratory protection program.

4. Allows sufficient funding to provide equipment and time for training the QPA and users of the protective equipment.

5. Periodically evaluates the worksite to ensure that the level of respiratory protection is adequate and being properly administered.

[1] Immediately Dangerous to Life and Health

II. RESPONSIBILITIES – continued

6. Maintains the medical reports from the licensed healthcare provider, indicating ability to wear respirators and the exposure assessments of the work place environment to show Cal/OSHA upon demand.

7. Retains medical records of the employees for 30 years.

C. Appointed Qualified Protection Administrator (QPA)

1. Obtains training in respiratory protection.

2. Knows when respiratory protection is required at each worksite within their responsibility.

3. Assists their Organization in writing the standard operating procedures required by California Code of Regulations, Title 8, Section 5144. These procedures, specific to each Organization, must cover the selection, use, cleaning and sanitizing, inspection, and maintenance of respirators, as well as the instruction and training of the respirator users.

4. Ensures that only respirators that are National Institute of Occupational Safety and Health (NIOSH) certified be used, if respiratory equipment if required. The respirator shall be used in compliance with its certification.

5. Coordinates the scheduling of medical evaluations of respirator users.

6. Provides for fit testing of the employees who are to use respiratory equipment. Documents employee fit testing by providing all information required on the Fit Test Record in Appendix A.

7. Trains or provides training for respiratory users to include instructions on the importance, selection, care and limitations of the respiratory equipment. Maintains records of attendance, lesson plan, and records the date of training.

8. Utilizing Appendix F, provides ongoing evaluation of the work environment for changes, which could impact exposures. Ensures that the written program is being properly implemented. This evaluation shall be documented and include consultation with employees.

9. Ensures that respiratory equipment is repaired with parts specifically approved for that respirator.

D. Supervisor

1. Ensures employees are knowledgeable about the respiratory protection requirements of the program in which they work. Ensures that prior to wearing respiratory equipment, employees have received medical clearances and proper training, which is documented.

2. Ensures employees attend scheduled respiratory protection training programs prior to respirator use and at least annually thereafter, and whenever workplace conditions change, new types of respiratory protection is used, or it is discovered that employees

have inadequate knowledge on respiratory protection.

II. RESPONSIBILITIES - continued

3. Ensures that their employees comply with the program of respirator inspection and maintenance. Respirators in use shall be randomly inspected at least yearly. The immediate supervisor will make the following checks:

   a. Proper respirators are being used;

   b. Respirators are being worn properly;

   c. Respirators are being properly maintained and stored;

   d. Consult with wearers regarding items that will inhibit the effectiveness of this program. The following matters must be resolved immediately:

      (1) Discomfort;

      (2) Resistance to breathing;

      (3) Interference with vision;

      (4) Interference with communications;

      (5) Restriction of movement;

      (6) Interference with job performance;

      (7) Confidence in the respirator.

4. Enforces the use of respirators in situations that require respiratory protection.

E. Employee/Respirator User

1. Each employee assigned a respirator is responsible for:

   a. Using the respiratory protective equipment provided to him/her in accordance with instructions provided by supervision;

   b. Checking the respirator for fit after each donning, and prior to use (negative and positive pressure tests) in accordance with Appendix B-1;

   c. Guarding against damaging the respirator;

   d. Discontinuing use and returning malfunctioning respirators;

   e. Bringing any questions or concerns regarding the hazard and the appropriate respiratory protection to the attention of his/her supervisor;

   f. Inspecting and cleaning of respiratory equipment assigned to him/her according to manufacturer's instructions and department policies and monitoring in a proper

manner;

II. RESPONSIBILITIES – continued

g. Immediately informing the supervisor, and turning in the respirator, if he/she becomes unqualified to use it.

F. Safety Office

Monitors and assists organizations in implementing the County's Respiratory Protection Program by performing the following activities:

1. Assists the QPA's to determine the need for respirators.

2. Assists the QPA's on the selection, use, maintenance, and fit testing of respirators.

3. Assist in the assessment of the “Medical Evaluation”.

4. Evaluates Organizational Respiratory Programs periodically by performing announced or unannounced inspections of the work sites.

5. If site inspections show that exposures may have changed, the QPA is informed and further evaluations requested.

6. Periodically review the respiratory protection program as necessary.

III. MEDICAL EVALUATION

A. Employees shall not be assigned to tasks requiring use of respirators, including fit testing, unless the Organization has written approval regarding the employee’s ability to use a respirator from a licensed physician or other licensed healthcare professional.

B. A licensed physician or other licensed healthcare professional shall perform medical evaluations using a medical questionnaire in Appendix C.

C. The medical status of employees assigned the use of respiratory equipment shall be reviewed annually. Additional medical evaluations shall be conducted under the following circumstances:

1. Employee reports medical signs or symptoms related to their ability to use respirator;

2. A licensed physician or other licensed healthcare professional, QPA, or supervisor recommends re-evaluations;

3. Change occurs in the workplace conditions that may substantially increase the physiological burden on employees.

IV. RESTRICTIONS

A. Employees who wear eyeglasses may not wear full-face respirators while wearing their

eyeglasses. Proper sealing effects cannot be established because of temple pieces on eyeglasses;

IV. RESTRICTIONS - continued

B. No respirator with tight fitting face pieces shall be issued to an individual who has facial hair that interferes with the face to face respirator face piece seal.

V. SELECTION OF RESPIRATOR

A. The Organization will identify and evaluate the respiratory hazard(s) in the workplace that will include a reasonable estimate of employee exposures to respiratory hazard(s) and an identification of the contaminant's chemical state and physical form Appendix F. Where exposure cannot be identified or reasonably estimated, the area or location will consider the atmosphere to be immediately dangerous to life or health (IDLH).

B. The Organization will provide the following respirators for employee use in IDLH atmospheres:

1. Full face piece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes, or

2. A combination full-face piece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply.

   a. Compressed air, compressed oxygen, liquid air, and liquid oxygen used for supplied-air respirator (SAR) will be of high purity.

3. Respirators provided only for escape from IDLH atmospheres will be NIOSH-certified for escape from the atmosphere in which they will be used.

4. All oxygen-deficient atmospheres will be considered IDLH. Exception: If it can be demonstrated that, under all foreseeable conditions, the oxygen concentration can be maintained within the acceptable ranges specified in California Code of Regulations, Title 8, GISO, Section 5144 (i.e., for the altitudes set out in the table), then any appropriate atmosphere-supplying respirator approved by the QPA may be used.

C. The Organization will provide a respirator that is adequate to protect the health of the employee and ensure compliance with all other Cal/OSHA statutory and regulatory requirements, under routine and reasonably foreseeable emergency situations. The respirator selected will be appropriate for the chemical state and physical form of the contaminant.

D. Respirators for protection against gases and vapors. The Organization will provide:

1. An atmosphere-supplying respirator, or

2. An air-purifying respirator, provided that the respirator is equipped with an end-of-service-life indicator (ESLI) certified by NIOSH for the contaminant; or if there is no ESLI appropriate for conditions a change schedule for canisters and cartridges will be implemented that is based on objective information or data that will ensure that

canisters and cartridges are changed before the end of their service life. The QPA will describe in the respirator program the information and data relied upon and the basis for the canister and cartridge change schedule and the basis for reliance on the data.

V. SELECTION OF RESPIRATOR - continued

a. Filter cartridges and canisters for air-purifying respirator:

(1) Filter cartridges and canisters will be used and stored according to manufacturers guidelines. Change-out of filters will be done based on the individual job.

(2) The Organization will ensure that all filters, cartridges and canisters used in the workplace are labeled and color coded with the NIOSH approved label and that the label is not removed and remains legible.

E. Respirators for protection against particulates. The Organization will provide:

1. An atmosphere-supplying respirator; or

2. An air-purifying respirator equipped with a filter certified by NIOSH under 30 CFR part 11 as a high efficiency particulate air (HEPA) filter, or an air-purifying respirator equipped with a filter certified for particulates by NIOSH under 42 CFR part 84; or

3. Contaminants consisting primarily of particles with mass median aerodynamic diameters (MMAD) of at least 2 micrometers, an air-purifying respirator equipped with any filter certified for particulates by NIOSH.

F. Written procedures/checklists for specific routine tasks/jobs will be prepared covering safe use of respirators in dangerous atmospheres that might be encountered in normal operations or in emergencies. Personnel will be made familiar with these procedures and the available respirators.

1. In areas where the wearer, with failure of the respirator, could be overcome by a toxic or oxygen-deficient atmosphere, at least one additional person will be present. Communications (visual, voice, or signal line) will be maintained between both or all individuals present. Planning will be such that one individual will be unaffected by any likely incident and have the proper rescue equipment to be able to assist the other(s) in case of emergency.

2. When a self-contained breathing apparatus or hose masks with blowers are used in atmospheres IDLH, standby personnel must be present with suitable rescue equipment.

3. Employees using air line respirators in atmospheres that are IDLH will be equipped with safety harnesses and safety lines for lifting or removing persons from hazardous atmospheres or other equivalent provisions for the rescue of persons from hazardous atmospheres will be used. Standby personnel with suitable self-contained breathing apparatus (SCBA) will be at the nearest fresh air base for emergency rescue.

V. SELECTION OF RESPIRATOR - continued

G. AIR / OXYGEN QUALITY FOR SUPPLIED –AIR RESPIRATORS

1. Oxygen will meet the requirements of the United States Pharmacopoeia for medical or breathing oxygen.

2. Breathing air will meet at least the requirements of the specification for Grade D breathing air as described in Compressed Gas Association Commodity Specification G-7.1-1966.

3. Compressed oxygen will not be used in supplied-air respirators or in open circuit self-contained breathing apparatus that have previously used compressed air. Oxygen must never be used with air line respirators. Breathing air may be supplied to respirators from cylinders or air compressors.

4. Compressed breathing air will meet at least the requirements for Type 1-Grade D breathing air described in ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-1989, to include:

   a. Oxygen content (v/v) of 19.5-23.5%;

   b. Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less;

   c. Carbon monoxide (CO) content of 10 ppm or less;
   .

   d. Carbon dioxide content of 1,000 ppm or less; and

   e. Lack of noticeable odor.

5. Cylinders used to supply breathing air to respirators meet the following requirements:

   a. Cylinders are tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 173 and part 178);

   b. Cylinders of purchased breathing air have a certificate of analysis from the supplier that the breathing air meets the requirements for Type 1--Grade D breathing air;

   c. Moisture content in the cylinder does not exceed a dew point of -50 F (-45.6 C) at 1 atmosphere pressure. Cylinders will be tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 178).

6. Compressors for supplying air will be equipped with the necessary safety and standby devices. A breathing-air type compressor will be used. The type compressor used will be constructed and situated so as to avoid entry of contaminated air into the system and suitable in-line air purifying sorbent beds and filters installed to further assure breathing air quality. A receiver of sufficient capacity to enable the respirator wearer to escape from a contaminated atmosphere in event of compressor failure, and alarms to indicate compressor failure and overheating will be installed in the system.

V. SELECTION OF RESPIRATOR - continued

If an oil-lubricated compressor is used, it will have a high-temperature or carbon monoxide
carbon monoxide alarm, or both. If only a high-temperature alarm is installed in the system, the air from the compressor will be frequently tested for carbon monoxide to ensure that levels are below the exposure limit for carbon monoxide.

a. Air line couplings used will be incompatible with outlets for other gas systems to prevent inadvertent servicing of air line respirators with non-respirable gases or oxygen.

b. Breathing gas containers will be properly marked and stored.

7. The Organization will provide employees using atmosphere-supplying respirators with breathing gases of high purity.

8. Compressors used to supply breathing air to respirators will be constructed and situated so as to:

a. Prevent entry of contaminated air into the air-supply system;

b. Minimize moisture content so that the dew point at 1 atmosphere pressure is 10 degrees F (5.56 deg. C) below the ambient temperature;

c. Have suitable in-line air-purifying sorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters will be maintained and replaced or refurbished periodically following the manufacturer's instructions.

d. Have a tag containing the most recent change date and the signature of the person authorized by this employer to perform the change. The tag will be maintained at the compressor.

e. Ensure that carbon monoxide levels in the breathing air do not exceed 10 ppm for compressors <u>that are not lubricated</u>.

f. Use a high temperature or carbon monoxide alarm, or both, to monitor carbon monoxide levels <u>for oil-lubricated compressors</u>.

g. Ensure that breathing air couplings are incompatible with outlets for nonrespirable worksite air or other gas systems.

h. Ensure that breathing gas containers are marked in accordance with the

NIOSH respirator certification standard, 42 CFR part 84.

VI. FIT TESTING

A. All employees using a negative or positive pressure tight fitting face piece respirator must pass an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT).

VI. FIT TESTING - continued

B. Fit testing is required prior to initial use, whenever a different respirator face piece is used, and at least annually thereafter. An additional fit test is required whenever the employee reports, or the employer or a licensed health care professional makes visual observations of, changes in the employee's physical condition that could affect respirator
fit (facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight).

C. Respiratory fit test shall be administered using Cal/OSHA's accepted QLFT or QNFT protocol, as contained in mandatory Appendix A.

D. The QLFT method may only be used for fit testing of disposable half-face negative pressure air-purifying respirators.

E. Every respirator wearer shall be instructed how to properly fit and test respiratory equipment to ensure protective seal. The user shall be provided the opportunity to wear the respiratory equipment in normal air for an adequate familiarity period, and to wear it in a test atmosphere (bitrex or saccharin for QLFT method);

F. Respirators will not be worn when conditions prevent a good face seal. Such conditions may be growth of beard, sideburns, or a skullcap that interfere with the sealing surface. An employee having any of these conditions shall not wear a tight-fitting respirator. The respirator must make a good physical fit to the employee's face;

G. A negative and positive pressure fit test must be performed each time the respirator is donned.

1. The negative pressure fit test is made by closing off canister openings and inhaling. A vacuum and partial collapse of the mask will result. A vacuum should be maintainable for at least 10 seconds.

2. The positive pressure fit test is made by sealing off the exhalation valve and breathing out gently. A slight positive pressure should be maintained. Air will escape through gaps in the seal.

H. Corrective vision requirements (full-face respirators). Full-face respirators having provisions for optical inserts will be reviewed for use by the Organization's QPA. These inserts when used will be used according to the manufacturer's specification. When employees must wear optical inserts as part of the face piece, the face piece and lenses will be fitted by qualified individuals to provide good vision, comfort, and a

gas-tight seal

1. Conventional eyeglasses. Conventional eye glasses will not be used with full-face respirators. A proper seal cannot be established if the temple bars of eyeglasses extend through the sealing edge of the full-face piece.

2. If corrective spectacles or goggles are required, they will be worn so as not to affect the fit of the face piece. Proper selection of equipment will minimize or avoid this problem.

VII. MAINTENANCE, CLEANING, AND CARE OF RESPIRATORY PROTECTION

A. Cleaning and disinfecting. The Organization will provide each respirator user with a respirator that is clean, sanitary, and in good working order. The Organization will ensure that respirators are cleaned and disinfected using Cal/OSHA approved procedures in Appendix B-2 or procedures recommended by the respirator manufacturer, provided that such procedures are of equivalent effectiveness. The respirators will be cleaned and disinfected at the following intervals:

1. Respirators issued for the exclusive use of an employee will be cleaned and disinfected as often as necessary to be maintained in a sanitary condition.

2. Respirators issued to more than one employee will be cleaned and disinfected before being worn by different individuals.

3. Respirators maintained for emergency use will be cleaned and disinfected after each use.

4. Respirators used in fit testing and/or training will be cleaned and disinfected after each use.

B. Respirators will be stored as follows:

1. All respirators will be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, damaging chemicals and they will be packed or stored to prevent deformation of the face piece and exhalation valve.

C. Emergency respirators will be:

1. Kept accessible to the work area;

2. Stored in compartments or in covers that are clearly marked as containing emergency respirators;

3. Stored in accordance with any applicable manufacturer instructions.

D. Respirators will be inspected as follows:

1. All respirators used in routine situations will be inspected before each use and during cleaning in accordance with manufacturer's specifications.

2. All respirators maintained for use in emergency situations will be inspected at least monthly and in accordance with the manufacturer's recommendations, and will be checked for proper function before and after each use; and

3. Emergency escape-only respirators will be inspected before being carried into the workplace for use.

4. A check of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the face piece, head straps, valves, connecting tube, and cartridges, canisters or filters;

5. A check of elastic parts for pliability and signs of deterioration.

VII. MAINTENANCE, CLEANING, AND CARE OF RESPIRATORY PROTECTION - continued

E. In addition to the requirements above, self-contained breathing apparatus will be inspected monthly. Air and oxygen cylinders will be maintained in a fully charged state and will be recharged when the pressure falls to 90% of the manufacturer's recommended pressure level.

F. Regulator and warning devices will be monitored for proper function.

G. Respirators maintained for emergency use. All respirators will be inspected routinely beforehand and after each use. A respirator that is not routinely used but is kept ready for emergency use will be inspected after each use and at least monthly to assure that it is in satisfactory working condition. This Organization will:

1. Certify the respirator by documenting the following:

- The name (or signature) of the inspector
- The date the inspection was performed
- Notable findings
- Required remedial actions to be taken
- Serial number or other means of identifying the inspected respirator

2. Annotate inspection information on a tag or label that is attached to the storage compartment for the respirator and keep the tag or label with the respirator, or ensure that it is included in inspection reports stored as paper or electronic files. This information will be maintained until replaced following a subsequent certification.

H. Respirators that fail an inspection or are otherwise found to be defective will be removed from service, and discarded, repaired or adjusted only by persons appropriately trained to perform such operations and will use only the respirator manufacturer's NIOSH-approved parts designed for the respirator.

I. Specific procedures for disassembly, cleaning and maintenance of respirators will be done according to the manufacturer’s written instructions.

VIII. TRAINING

A. Each organization will conduct mandatory training, prior to use of any respirator, on the Respirator Protection Program. Training will be repeated annually. Upon completion of

this training, the employee will sign a record of training. The record of training will be placed in the organizational file. This course shall provide training in the proper selection, maintenance, care, storage, and cleaning of respirators, as well as training in positive and negative pressure face piece-fitting tests. During this class, there will be limited "hands on" training as well as an explanation of the following:

1. Reasons for selection of a particular type of respirator.

2. Limitations and capabilities of selected respirators.

3. Methods of donning respirators and checking fit and operation.

4. Proper wearing of the respirator.

VIII. TRAINING - continued

5. Respirator maintenance, inspection, sanitation, and storage.

6. Recognition and procedures for handling emergency situations.

7. The nature of respirator hazards and what may occur if a respirator is not properly used.

8. How to recognize medical signs and symptoms that may limit or prevent effective use of respirators.

B. In addition to the training addressed in A., each organization's QPA shall conduct annual refresher training sessions, covering the following:

1. Positive and negative pressure face piece fitting tests.

2. If applicable, proper operation of self-contained breathing apparatus (SCBA) and tests, which determine proper function of regulator and warning device.

3. Standard respirator inspection which includes a check of tightness of connections and the condition of the face piece, headbands, valves, connecting tube and canisters/cartridges, pliability of rubber or elastomer parts, as well as signs of possible deterioration.

C. Each organization's QPA shall coordinate individual training to users upon request.

D. All employee training shall be documented on the County "Individual Employee Training Document", SOP Form 2004-2 (Appendix E).

IX. INSPECTIONS AND PROGRAM EVALUATION

A. Respirator Inspection Procedure. This procedure shall be performed monthly by each Organization for each individual assigned a respirator. It shall also be used when a respirator is cleaned and before each use by an employee.

1. Examine general condition of mask, straps and valves. There shall be no

damage to materials and parts. Sealing surfaces shall be smooth and pliable;

2. The respirator shall display NIOSH approval;

3. The mask and parts shall be clean;

4. All filters, cartridges and canisters used in the workplace must be labeled and Color-coded with the NIOSH approval label. Additionally, each filter, cartridge and canister must be labeled with the initiation date of use. All labels must be legible and attached to the respirator at all times;

5. Filter elements and cartridges shall be clean and in good condition;

6. Repairs to respirators shall be made by a qualified individual. Repairs are limited to replacement of damaged or worn parts with new parts. Damaged pieces or pieces that cannot be adequately cleaned shall be discarded;

IX. INSPECTIONS AND PROGRAM EVALUATION

7. A completed cleaning/sanitizing log and identification number should be attached to the respirator or to the storage container;

8. Written inspection tags shall be dated and signed by the inspector and kept on file indefinitely at the facility.

B. The Organization will conduct evaluations of the workplaces as necessary to ensure that the provisions of this written program are effectively implemented. This will be accomplished by QPA conducting worksite evaluations and consulting employees required to use respirators.

1. Worksite Evaluations:

   a. The QPA will conduct inspections using the Worksite Evaluations Work Sheet. Through this process the QPA will determine if conditions have changed to create new or different exposures. Different work conditions or chemical substitutions are items which could affect employee exposures. The QPA will also determine whether the proper respiratory protection was selected for the environment(s) encountered.

2. Employees will be consulted in the following areas:

   a. Respirator fit;

   b. Appropriate respirator selection for the hazards to which the employee Is exposed;

   c. Proper respirator use under the workplace conditions the employee encounters;

   d. Proper respirator maintenance

X. MANDATORY RECORD KEEPING

A. Each Organization is required to maintain and/or make available records of respiratory medical clearances, respirator fit testing, and respiratory protection program evaluations.

1. Medical Evaluation: Clearances from a licensed health care provider of employees within the Organization's Respiratory Protection Program must be available to inspecting agencies.

2. Fit Testing: The Organization shall establish a record of the qualitative and quantitative fit tests administered to employees. Fit test records shall be retained for respirator users until the next fit test is administered. Fit test records shall included:

a. Name or identification of the employee tested;

b. Type of fit test performed;

c. Specific make, model, style, and size of respirator tested;

X. MANDATORY RECORD KEEPING - continued

d. Date of test;

e. Pass / fail results for QLFTs or the fit factor and strip charts recording or other recording of the test results for QNFTs.

f. Respiratory Protection Program Evaluation: The Organization will have completed documentation available that the Respiratory Protection Program has been evaluated at least annually.

XI. APPENDICES

A-1. Fit Testing Procedures
A-2. Respirator Qualitative Fit Test Form
B-1. User Seal Check Procedure
B-2. Respirator Cleaning Procedure
C. Medical Evaluation Questionnaire
D. Using Respirators When Not Required Under The Standard
E. Individual Training Document
F. Workplace Evaluation Form
G. Glossary

APPENDIX A-1
FIT TESTING PROCEDURES

Appendix A to Section 5144: Fit Testing Procedures (Mandatory)

Part I. OSHA-Accepted Fit Test Protocols

A. Fit Testing Procedures--General Requirements

The employer shall conduct fit testing using the following procedures. The requirements in this appendix apply to all Cal/OSHA accepted fit test methods, both QLFT and QNFT.

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.

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 face piece up to the face and eliminate those that obviously do not give an acceptable fit.

5. The more acceptable face pieces 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;

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

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 Appendix B-1 of this section or those recommended by the respirator manufacturer which provide equivalent protection to the procedures in Appendix B-1. 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 face piece shall be selected and retested if the test subject fails the user seal check tests.

9. The test shall not be conducted if there is any hair growth between the skin and the face piece 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, he/she shall be referred to a physician or other licensed health care professional, as appropriate, to determine whether the test subject can wear a respirator while performing his/her 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.

14. Test Exercises. (a) The following test exercises are to be performed for all fit testing methods prescribed in this appendix, except for the Controlled Negative Pressure (CNP) method. A separate fit testing exercise regimen is contained in the CNP protocol. The test subject shall perform exercises, in the test environment, in the following manner:

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

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

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

c. 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.

d. 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).

e. 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.

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

g. 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.

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

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

(1) 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.

B. Qualitative Fit Test (QLFT) Protocols

1. General

a. The employer shall ensure that persons administering QLFT are able to prepare test solutions, calibrate equipment and perform tests properly, recognize invalid tests, and ensure that test equipment is in proper working order.

b. The employer shall ensure that QLFT equipment is kept clean and well maintained so as to operate within the parameters for which it was designed.

2. Isoamyl Acetate Protocol

Note: This protocol is not appropriate to use for the fit testing of particulate respirators. If used to fit test particulate respirators, the respirator must be equipped with an organic vapor filter.

a. Odor Threshold Screening

Odor threshold screening, performed without wearing a respirator, is intended to determine if the individual tested can detect the odor of isoamyl acetate at low levels.

(1) Three 1-liter glass jars with metal lids are required.

(2) Odor-free water (e.g., distilled or spring water) at approximately 25 deg. C (77 deg. F) shall be used for the solutions.

(3) The isoamyl acetate (IAA) (also known as isopentyl acetate) stock solution is prepared by adding 1 ml of pure IAA to 800 ml of odor-free water in a 1 liter jar, closing the lid and shaking for 30 seconds. A new solution shall be prepared at least weekly.

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

(4) The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well ventilated to prevent the odor of IAA from becoming evident in the general room air where testing takes place.

(5) The odor test solution is prepared in a second jar by placing 0.4 ml of the stock solution into 500 ml of odor-free water using a clean dropper or pipette. The solution shall be shaken for 30 seconds and allowed to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution shall be used for only one day.

(6) A test blank shall be prepared in a third jar by adding 500 cc of odor-free water.

(7) The odor test and test blank jar lids shall be labeled (e.g., 1 and 2) for jar identification. Labels shall be placed on the lids so that they can be peeled off periodically and switched to maintain the integrity of the test.

(8) The following instruction shall be typed on a card and placed on the table in front of the two test jars (i.e., 1 and 2): "The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, and then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil."

(9) The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.

(10) If the test subject is unable to correctly identify the jar containing the odor test solution, the IAA qualitative fit test shall not be performed.

(11) If the test subject correctly identifies the jar containing the odor test solution, the test subject may proceed to respirator selection and fit testing.

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

b. Isoamyl Acetate Fit Test

(1) The fit test chamber shall be a clear 55-gallon drum liner suspended inverted over a 2-foot diameter frame so that the top of the chamber is about 6 inches above the test subject's head. If no drum liner is available, a similar chamber shall be constructed using plastic sheeting. The inside top center of the chamber shall have a small hook attached.

(2) Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors.

(3) After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.

(4) A copy of the test exercises and any prepared text from which the subject is to read shall be taped to the inside of the test chamber.

(5) Upon entering the test chamber, the test subject shall be given a 6-inch by 5-inch piece of paper towel, or other porous, absorbent, single-ply material, folded in half and wetted with 0.75 ml of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber. An IAA test swab or ampule may be substituted for the IAA wetted paper towel provided it has been demonstrated that the alternative IAA source will generate an IAA test atmosphere with a concentration equivalent to that generated by the paper towel method.

(6) Allow two minutes for the IAA test concentration to stabilize before starting the fit test exercises. This would be an appropriate time to talk with the test subject; to explain the fit test, the importance of his/her cooperation, and the purpose for the test exercises; or to demonstrate some of the exercises.

(7) If at any time during the test, the subject detects the banana-like odor of IAA, the test is failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

(8) If the test is failed, the subject shall return to the selection room and remove the respirator. The test subject shall repeat the odor sensitivity test, select and put on another respirator, return to the test area and again begin the fit test procedure described in (b) (1) through (7) above. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject shall wait at least 5 minutes before retesting. Odor sensitivity will usually have returned by this time.

(9) If the subject passes the test, the efficiency of the test procedure shall be demonstrated by having the subject break the respirator face seal and take a breath before exiting the chamber.

(10) When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test, so that there is no significant IAA concentration buildup in the chamber during subsequent tests. The used towels shall be kept in a self-sealing plastic bag to keep the test area from being contaminated.

3. Saccharin Solution Aerosol Protocol

The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

a. Taste threshold screening. The saccharin taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of saccharin.

Note to paragraph 3. (a): If the test subject eats or drinks something sweet before the screening test, he/she may be unable to taste the weak saccharin solution.

(1) During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches in diameter by 14 inches tall with at least the front portion clear and that allows free movements of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts # FT 14 and # FT 15 combined, is adequate.

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

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

(3) The test subject shall don the test enclosure. Throughout the threshold-screening test, the test subject shall breathe through his/her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a sweet taste.

(4) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the threshold check solution into the enclosure. The nozzle is directed away from the nose and mouth of the person. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

(5) The threshold check solution is prepared by dissolving 0.83 gram of sodium saccharin USP in 100 ml of warm water. It can be prepared by putting 1 ml of the fit test solution (see (b)(5) below) in 100 ml of distilled water.

(6) To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, then released and allowed to fully expand.

(7) Ten squeezes are repeated rapidly and then the test subject is asked whether the saccharin can be tasted. If the test subject reports tasting the sweet taste during the ten squeezes, the screening test is completed. The taste threshold is noted as ten regardless of the number of squeezes actually completed.

(8) If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the second ten squeezes, the screening test is completed. The taste threshold is noted as twenty regardless of the number of squeezes actually completed.

(9) If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the third set of ten squeezes, the screening test is completed. The taste threshold is noted as thirty regardless of the number of squeezes actually completed.

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

(11) If the saccharin is not tasted after 30 squeezes (step 10), the test subject is unable to taste saccharin and

may not perform the saccharin fit test.

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

(12) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

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

(14) The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least each morning and afternoon or at least every four hours.

b. Saccharin solution aerosol fit test procedure.

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

(2) The fit test uses the same enclosure described in 3. (a) above.

(3) The test subject shall don the enclosure while wearing the respirator selected in section I. A. of this appendix. The respirator shall be properly adjusted and equipped with a particulate filter(s).

(4) A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

(5) The fit test solution is prepared by adding 83 grams of sodium saccharin to 100 ml of warm water.

(6) As before, the test subject shall breathe through the slightly open mouth with tongue extended, and report if he/she tastes the sweet taste of saccharin.

(7) The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of saccharin fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test. A minimum of 10 squeezes is required.

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

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

(9) Every 30 seconds the aerosol concentration shall be replenished using one half the original number of squeezes used initially (e.g., 5, 10 or 15).

(10) The test subject shall indicate to the test conductor if at any time during the fit test the taste of saccharin is detected. If the test subject does not report tasting the saccharin, the test is passed.

(11) If the taste of saccharin is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).

(12) Since the nebulizer has a tendency to clog during use, the test operator must make periodic checks of the nebulizer to ensure that it is not clogged. If clogging is found at the end of the test session, the test is invalid.

4. BitrexTM (Denatonium Benzoate) Solution Aerosol Qualitative Fit Test Protocol

The BitrexTM (Denatonium benzoate) solution aerosol QLFT protocol uses the published saccharin test protocol because that protocol is widely accepted. Bitrex is routinely used as a taste aversion agent in household liquids that children should not be drinking and is endorsed by the American Medical Association, the National Safety Council, and the American Association of Poison Control Centers. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

a. Taste Threshold Screening.

The Bitrex taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of Bitrex.

(1) During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches (30.5 cm) in diameter by 14 inches (35.6 cm) tall. The front portion of the enclosure shall be clear from the respirator and allow free movement of the head when a respirator is worn. An enclosure substantially similar to the 3M-hood assembly, parts #14 and #15 combined, is adequate.

(2) The test enclosure shall have a ¾-inch (1.9 cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

(3) The test subject shall don the test enclosure. Throughout the threshold-screening test, the test subject shall breathe through his or her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a bitter taste

(4) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the Threshold Check Solution into the enclosure. This Nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

(5) The Threshold Check Solution is prepared by adding 13.5 milligrams of Bitrex to 100 ml of 5% salt (NaCl) solution in distilled water.

(6) To produce the aerosol, the nebulizer bulb is firmly squeezed so that the bulb collapses completely, and is then released and allowed to fully expand.

(7) An initial ten squeezes are repeated rapidly and then the test subject is asked whether the Bitrex can be tasted. If the test subject reports tasting the bitter taste during the ten squeezes, the screening test is completed. The taste threshold is noted as ten regardless of the number of squeezes actually completed.

(8) If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the second ten squeezes, the screening test is completed. The taste threshold is noted as twenty regardless of the number of squeezes actually completed.

(9) If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the third set of ten squeezes, the screening test is completed. The taste threshold is noted as thirty regardless of the number of squeezes actually completed.

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

(11) If the Bitrex is not tasted after 30 squeezes (step 10), the test subject is unable to taste Bitrex and may not perform the Bitrex fit test.

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

(12) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

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

(14) The nebulizer shall be thoroughly rinsed in water, shaken to dry, and refilled at least each morning and afternoon or at least every four hours.

b. Bitrex Solution Aerosol Fit Test Procedure.

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

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

(3) The test subject shall don the enclosure while wearing the respirator selected according to section I. A. of this appendix. The respirator shall be properly adjusted and equipped with any type particulate filter(s).

(4) A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

(5) The fit test solution is prepared by adding 337.5 mg of Bitrex to 200 ml of a 5% salt (NaCl) solution in warm water.

(6) As before, the test subject shall breathe through his or her slightly open mouth with tongue extended, and be instructed to report if he/she tastes the bitter taste of Bitrex.

(7) The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of the fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test.

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

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

(9) Every 30 seconds the aerosol concentration shall be replenished using one half the number of squeezes used initially (e.g., 5, 10 or 15).

(10) The test subject shall indicate to the test conductor if at any time during the fit test the taste of Bitrex is detected. If the test subject does not report tasting the Bitrex, the test is passed.

(11) If the taste of Bitrex is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).

5. Irritant Smoke (Stannic Chloride) Protocol

This qualitative fit test uses a person's response to the irritating chemicals released in the "smoke" produced by a stannic chloride ventilation smoke tube to detect leakage into the respirator.

a. General Requirements and Precautions

(1) The respirator to be tested shall be equipped with high efficiency particulate air (HEPA) or P100 series filter(s).

(2) Only stannic chloride smoke tubes shall be used for this protocol.

(3) No form of test enclosure or hood for the test subject shall be used.

(4) The smoke can be irritating to the eyes, lungs, and nasal passages. The test conductor shall take precautions to minimize the test subject's exposure to irritant smoke. Sensitivity varies, and certain individuals may respond to a greater degree to irritant smoke. Care shall be taken when performing the sensitivity screening checks that determine whether the test subject can detect irritant smoke to use only the minimum amount of smoke necessary to elicit a response from the test subject.

(5) The fit test shall be performed in an area with adequate ventilation to prevent exposure of the person conducting the fit test or the build-up of irritant smoke in the general atmosphere.

b. Sensitivity Screening Check

The person to be tested must demonstrate his or her ability to detect a weak concentration of the irritant smoke.

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

(1) The test operator shall break both ends of a ventilation smoke tube containing stannic chloride, and attach one end of the smoke tube to a low flow air pump set to deliver 200 milliliters per minute, or an aspirator squeeze bulb. The test operator shall cover the other end of the smoke tube with a short piece of tubing to prevent potential injury from the jagged end of the smoke tube.

(2) The test operator shall advise the test subject that the smoke can be irritating to the eyes, lungs, and nasal passages and instruct the subject to keep his/her eyes closed while the test is performed.

(3) The test subject shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its irritating properties and to determine if he/she can detect the irritating properties of the smoke. The test operator shall carefully direct a small amount of the irritant smoke in the test subject's direction to determine that he/she can detect it.

c. Irritant Smoke Fit Test Procedure

(1) The person being fit tested shall don the respirator without assistance, and perform the required user seal check(s).

(2) The test subject shall be instructed to keep his/her eyes closed.

(3) The test operator shall direct the stream of irritant smoke from the smoke tube toward the face seal area of the test subject, using the low flow pump or the squeeze bulb. The test operator shall begin at least 12 inches from the face piece and move the smoke stream around the whole perimeter of the mask. The operator shall gradually make two more passes around the perimeter of the mask, moving to within six inches of the respirator.

(4) If the person being tested has not had an involuntary response and/or detected the irritant smoke, proceed with the test exercises.

(5) The exercises identified in section I.A. 14. of this appendix shall be performed by the test subject while the respirator seal is being continually challenged by the smoke, directed around the perimeter of the respirator at a distance of six inches.

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

(6) If the person being fit tested reports detecting the irritant smoke at any time, the test is failed. The person being retested must repeat the entire sensitivity check and fit test procedure.

(7) Each test subject passing the irritant smoke test without evidence of a response (involuntary cough, irritation) shall be given a second sensitivity screening check, with the smoke from the same smoke tube used during the fit test, once the respirator has been removed, to determine whether he/she still reacts to the smoke. Failure to evoke a response shall void the fit test.

(8) If a response is produced during this second sensitivity check, then the fit test is passed.

C. Quantitative Fit Test (QNFT) Protocols

The following quantitative fit testing procedures have been demonstrated to be acceptable: Quantitative fit testing using a non- hazardous test aerosol (such as corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl hexyl sebacate [DEHS], or sodium chloride) generated in a test chamber, and employing instrumentation to quantify the fit of the respirator; Quantitative fit testing using ambient aerosol as the test agent and appropriate instrumentation (condensation nuclei counter) to quantify the respirator fit; Quantitative fit testing using controlled negative pressure and appropriate instrumentation to measure the volumetric leak rate of a face piece to quantify the respirator fit.

1. General

a. The employer shall ensure that persons administering QNFT are able to calibrate equipment and perform tests properly, recognize invalid tests, calculate fit factors properly and ensure that test equipment is in proper working order.

b. The employer shall ensure that QNFT equipment is kept clean, and is maintained and calibrated according to the manufacturer's instructions so as to operate at the parameters for which it was designed.

2. Generated Aerosol Quantitative Fit Testing Protocol

a. Apparatus.

(1) Instrumentation. Aerosol generation, dilution, and measurement systems using particulates (corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl hexyl sebacate [DEHS] or sodium chloride) as test aerosols shall be used for quantitative fit testing.

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

(2) Test chamber. The test chamber shall be large enough to permit all test subjects to perform freely all required exercises without disturbing the test agent concentration or the measurement apparatus. The test chamber shall be equipped and constructed so that the test agent is effectively isolated from the ambient air, yet uniform in concentration throughout the chamber.

(3) When testing air-purifying respirators, the normal filter or cartridge element shall be replaced with a high efficiency particulate air (HEPA) or P100 series filter supplied by the same manufacturer.

(4) The sampling instrument shall be selected so that a computer record or strip chart record may be made of the test showing the rise and fall of the test agent concentration with each inspiration and expiration at fit factors of at least 2,000. Integrators or computers that integrate the amount of test agent penetration leakage into the respirator for each exercise may be used provided a record of the readings is made.

(5) The combination of substitute air-purifying elements, test agent and test agent concentration shall be such that the test subject is not exposed in excess of an established exposure limit for the test agent at any time during the testing process, based upon the length of the exposure and the exposure limit duration.

(6) The sampling port on the test specimen respirator shall be placed and constructed so that no leakage occurs around the port (e.g., where the respirator is probed), a free air flow is allowed into the sampling line at all times, and there is no interference with the fit or performance of the respirator. The in-mask sampling device (probe) shall be designed and used so that the air sample is drawn from the breathing zone of the test subject, midway between the nose and mouth and with the probe extending into the face piece cavity at least 1/4 inch.

(7) The test setup shall permit the person administering the test to observe the test subject inside the chamber during the test.

(8) The equipment generating the test atmosphere shall maintain the concentration of test agent constant to within a 10 percent variation for the duration of the test.

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

(9) The time lag (interval between an event and the recording of the event on the strip chart or computer or integrator) shall be kept to a minimum. There shall be a clear association between the occurrence of an event and its being recorded.

(10) The sampling line tubing for the test chamber atmosphere and for the respirator sampling port shall be of equal diameter and of the same material. The length of the two lines shall be equal.

(11) The exhaust flow from the test chamber shall pass through an appropriate filter (i.e., high efficiency particulate or P100 series filter) before release.

(12) When sodium chloride aerosol is used, the relative humidity inside the test chamber shall not exceed 50 percent.

(13) The limitations of instrument detection shall be taken into account when determining the fit factor.

(14) Test respirators shall be maintained in proper working order and be inspected regularly for deficiencies such as cracks or missing valves and gaskets.

b. Procedural Requirements

(1) When performing the initial user seal check using a positive or negative pressure check, the sampling line shall be crimped closed in order to avoid air pressure leakage during either of these pressure checks.

(2) The use of an abbreviated screening QLFT test is optional. Such a test may be utilized in order to quickly identify poor fitting respirators that passed the positive and/or negative pressure test and reduce the amount of QNFT time. The use of the CNC QNFT instrument in the count mode is another optional method to obtain a quick estimate of fit and eliminate poor fitting respirators before going on to perform a full QNFT.

(3) A reasonably stable test agent concentration shall be measured in the test chamber prior to testing. For canopy or shower curtain types of test units, the determination of the test agent's stability may be established after the test subject has entered the test environment.

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

(4) Immediately after the subject enters the test chamber, the test agent concentration inside the respirator shall be measured to ensure that the peak penetration does not exceed 5 percent for a half mask or 1 percent for a full-face piece respirator.

(5) A stable test agent concentration shall be obtained prior to the actual start of testing.

(6) Respirator restraining straps shall not be over-tightened for testing. The wearer shall adjust the straps without assistance from other persons to give a reasonably comfortable fit typical of normal use. The respirator shall not be adjusted once the fit test exercises begin.

(7) The test shall be terminated whenever any single peak penetration exceeds 5 percent for half masks and 1 percent for full-face piece respirators. The test subject shall be refitted and retested.

(8) Calculation of fit factors.

(i) The fit factor shall be determined for the quantitative fit test by taking the ratio of the average chamber concentration to the concentration measured inside the respirator for each test exercise except the grimace exercise.

(ii) The average test chamber concentration shall be calculated as the arithmetic average of the concentration measured before and after each test (i.e., 7 exercises) or the arithmetic average of the concentration measured before and after each exercise or the true average measured continuously during the respirator sample.

(iii) The concentration of the challenge agent inside the respirator shall be determined by one of the following methods:

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

(A) Average peak penetration method means the method of determining test agent penetration into the respirator utilizing a strip chart recorder, integrator, or computer. The agent penetration is determined by an average of the peak heights on the graph or by computer integration, for each exercise except the grimace exercise. Integrators or computers that calculate the actual test agent penetration into the respirator for each exercise will also be considered to meet the requirements of the average peak penetration method.

(B) Maximum peak penetration method means the method of determining test agent penetration in the respirator as determined by strip chart recordings of the test. The highest peak penetration for a given exercise is taken to be representative of average penetration into the respirator for that exercise.

(C) Integration by calculation of the area under the individual peak for each exercise except the grimace exercise. This includes computerized integration.

(D) The calculation of the overall fit factor using individual exercise fit factors involves first converting the exercise fit factors to penetration values, determining the average, and then converting that result back to a fit factor. This procedure is described in the following equation:

Where ff1, ff2, ff3, etc. are the fit factors for exercises 1, 2, 3, etc.

(9) The test subject shall not be permitted to wear a half mask or quarter face piece respirator unless a minimum fit factor of 100 is obtained, or a full-face piece respirator unless a minimum fit factor of 500 is obtained.

(10) Filters used for quantitative fit testing shall be replaced whenever increased breathing resistance is encountered, or when the test agent has altered the integrity of the filter media.

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

3. Ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol.

The ambient aerosol condensation nuclei counter (CNC) quantitative fit testing (Portacount TM) protocol quantitatively fit tests respirators with the use of a probe. The probed respirator is only used for quantitative fit tests. A probed respirator has a special sampling device, installed on the respirator, that allows the probe to sample the air from inside the mask. A probed respirator is required for each make, style, model, and size that the employer uses and can be obtained from the respirator manufacturer or distributor. The CNC instrument manufacturer, TSI Inc., also provides probe attachments (TSI sampling adapters) that permit fit testing in an employee's own respirator. A minimum fit factor pass level of at least 100 is necessary for a half-mask respirator and a minimum fit
factor pass level of at least 500 is required for a full-face piece negative pressure respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

a. Portacount Fit Test Requirements.

(1) Check the respirator to make sure the respirator is fitted with a high-efficiency filter and that the sampling probe and line are properly attached to the face piece.

(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 face piece, 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 test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

(7) After the test exercises, 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.

b. Portacount Test Instrument.

(1) 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.

(2) Since the pass or fail criterion of the Portacount is user programmable, the test operator shall ensure that the pass or fail criterion meet the requirements for minimum respirator performance in this Appendix.

(3) 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. Controlled negative pressure (CNP) quantitative fit testing protocol.

The CNP protocol provides an alternative to aerosol fit test methods. The CNP fit test method technology is based on exhausting air from a temporarily sealed respirator face piece to generate and then maintain a constant negative pressure inside the face piece. The rate of air exhaust is controlled so that a constant negative pressure is maintained in the respirator during the fit test. The level of pressure is selected to replicate the mean aspiratory pressure that causes leakage into the respirator under normal use conditions. With pressure held constant, airflow out of the respirator is equal to air flow into the respirator. Therefore, measurement of the exhaust stream that is required to hold the pressure in the temporarily sealed respirator constant yields a direct measure of leakage airflow into the respirator. The CNP fit test method measures leak rates through the face piece as a method for determining the face piece fit for negative pressure respirators. The CNP instrument manufacturer Dynatech Nevada also provides attachments (sampling manifolds) that replace the filter cartridges to permit fit testing in an employee's own respirator. To perform the test, the test subject closes his or her mouth and holds his/her breath, after which an air pump removes air from the respirator face piece at a pre-selected constant pressure. The face piece fit is expressed as the leak rate through the face piece, expressed as milliliters per minute. The quality and validity of the CNP fit tests are determined by the degree to which the in-mask pressure tracks the test pressure during the system measurement time

of approximately five seconds. Instantaneous feedback in the form of a

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

real-time pressure trace of the in-mask pressure is provided and used to determine test validity and quality. A minimum fit factor pass level of 100 is necessary for a half-mask respirator and a minimum fit factor of at least 500 is required for a full-face piece respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

a. CNP Fit Test Requirements.

(1) The instrument shall have a non-adjustable test pressure of 15.0 mm water pressure.

(2) The CNP system defaults selected for test pressure shall be set at--1.5 mm of water (-0.58 inches of water) and the modeled aspiratory flow rate shall be 53.8 liters per minute for performing fit tests.

(Note: CNP systems have built-in capability to conduct fit testing that is specific to unique work rate, mask, and gender situations that might apply in a specific workplace. Use of system default values, which were selected to represent respirator wear with medium cartridge resistance at a low-moderate work rate, will allow inter- test comparison of the respirator fit.)

(3) The individual who conducts the CNP fit testing shall be thoroughly trained to perform the test.

(4) The respirator filter or cartridge needs to be replaced with the CNP test manifold. The inhalation valve downstream from the manifold either needs to be temporarily removed or propped open.

(5) The test subject shall be trained to hold his or her breath for at least 20 seconds.

(6) The test subject shall don the test respirator without any assistance from the individual who conducts the CNP fit test.

(7) The QNFT protocol shall be followed according to section I. C. 1. of this appendix with an exception for the CNP test exercises.

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

b. CNP Test Exercises.

(1) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally for 1 minute. After the normal breathing exercise, the subject needs to hold head straight ahead and hold his or her breath for 10 seconds during the test measurement.

(2) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply for 1 minute, being careful not to hyperventilate. After the deep breathing exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during test measurement.

(3) Turning head side to side. Standing in place, the subject shall slowly turn his or her head from side to side between the extreme positions on each side for 1 minute. The head shall be held at each extreme momentarily so the subject can inhale at each side. After the turning head side to side exercise, the subject needs to hold head full left and hold his or her breath for 10 seconds during test measurement. Next, the subject needs to hold head full right and hold his or her breath for 10 seconds during test measurement.

(4) Moving head up and down. Standing in place, the subject shall slowly move his or her head up and down for 1 minute. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling). After the moving head up and down exercise, the subject shall hold his or her head full up and hold his or her breath for 10 seconds during test measurement. Next, the subject shall hold his or her head full down and hold his or her breath for 10 seconds during test measurement.

(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 for 1 minute. After the talking exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement.

(6) Grimace. The test subject shall grimace by smiling or frowning for 15 seconds.

Appendix A to Section 5144: Fit Testing Procedures (Mandatory) - continued

(7) Bending Over. The test subject shall bend at the waist as if he or she were to touch his or her toes for 1 minute. Jogging in place shall be substituted for this exercise in those test environments such as shroud-type QNFT units that prohibit bending at the waist. After the bending over exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement. shall remove and re-don the respirator within a one-minute period. Then, in a normal standing position, without talking, the subject shall breathe normally for 1 minute. After the normal breathing exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement. After the test exercises, 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 a respirator shall be tried.

c. CNP Test Instrument.

(1) The test instrument shall have an effective audio warning device when the test subject fails to hold his or her breath during the test. The test shall be terminated whenever the test subject failed to hold his or her breath. The test subject may be refitted and retested.

(2) A record of the test shall 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.

Part II. New Fit Test Protocols

A. Any person may submit to OSHA for approval of a new fit test protocol. If the application meets the following criteria, OSHA will initiate a rulemaking proceeding under section 6(b)(7) of the OSHA Act to determine whether to list the new protocol as an approved protocol in this Appendix A.

C. The application must include a detailed description of the proposed new fit test protocol. This application must be supported by either:

1. A test report prepared by an independent government research laboratory (e.g., Lawrence Livermore National Laboratory, Los Alamos National Laboratory, the National Institute for Standards and Technology) stating that the laboratory has tested the protocol and has found it to be accurate and reliable; or

Part II. New Fit Test Protocols - continued

2. An article that has been published in a peer-reviewed industrial hygiene journal describing the protocol and explaining how test data support the protocol's accuracy and reliability.

    a. If OSHA determines that additional information is required before the Agency commences a rulemaking proceeding under this section, OSHA will so notify the applicant and afford the applicant the opportunity to submit the supplemental information.

    b. Initiation of a rulemaking proceeding will be deferred until OSHA has received and evaluated the supplemental information.

APPENDIX A-2
RESPIRATOR QUALITATIVE FIT TEST FORM

RESPIRATOR QUALITATIVE FIT TEST FORM				
EMPLOYEE INFORMATION				
Employee Name			Date of Test	
Department:			Job Title	
INFORMATION ON FIT TESTER				
Name:			Signature:	
Organization:			Job Title:	
Qualitative Fit Test Selected:		□ Bitrex	□ Saccharin	□
Fit Test Problems:				

SENSITIVITY TEST			
No.	**Procedure**	**Yes**	**No**
1.	Sensitivity test conducted		

RESPIRATOR SELECTION			
No.	**Procedure**	**Yes**	**No**
1.	Respirator selection conducted in different room as fit testing		
2.	Reviewed Respirator donning/fitting techniques with test subject		
3.	Assessed comfort of selected mask by reviewing the following: Positioning mask on the nose; Room for eye protection; Room to talk; Positioning mask on face and cheeks		
4.	Adequacy of respirator fit: Chin properly placed; Snap tension; Fit across nose bridge; Distance from nose to chin; Tendency to slip; Self-observation in mirror		
5.	Test subject selected a respirator from a sufficient selection of appropriate respirators.		
6.	Test subject conducted negative and positive pressure checks		
7.	Test subject questioned again regarding comfort of respirator after passing the fit test (if not comfortable, allow selection of another model)		
8.	Test subject given the opportunity to select a different face piece and be retested if respirator becomes uncomfortable at any time during the test		
9.	After selecting, donning, and properly adjusting a respirator, the test subject wore it to the fit test room. The subject wore the respirator at least 5 minutes before entering the fit test chamber. Once in the fit test chamber, two minutes passed before beginning the fit test exercises listed below		

FIT TEST			
No.	**Test Exercises (length of time for each test is one minute)**	**Pass**	**Fail**
1.	**Breathe normally.**		
2.	**Breathe deeply.** Be certain breaths are deep and regular.		
3.	**Turn head all the way from one side to the other.** Inhale on each side. Be certain movement is complete. Do not bump the respirator against the shoulders.		
4.	**Nod head up-and-down.** Inhale when head is in the full up position. Be certain motions are complete and made about every second. Do not bump the respirator on the chest.		

No.	Procedure	Yes	No
5.	**Talking.** The following is called the "Rainbow Passage." ***Hand a copy of this passage (alternatives can be used) printed on a card and instruct the test subject to read it aloud and slowly***: "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."		
	FIT TEST PASSAGE		
No.	**Criteria for passing/failing fit test**	**Pass**	**Fail**
1.	If at any time during the test, the subject detects the solution, the test has failed. If the test has failed, the test subject must return to the respirator selection room remove the failed respirator, and select a new respirator as described in the respirator selection section of this form.		
	FIT TEST OPTIONS		
No.	**Available options**	**Yes**	**No**
1.	The fit test **cannot** be conducted if there is any hair growth between the skin and the face piece sealing surface. **Did the test subject have any hair growth between the skin and face piece-sealing surface?**		
2.	At least two face pieces must be selected. The test subject must be given the opportunity to wear them for one week to choose the one that is more comfortable to wear. **Did test subject need the opportunity to wear two face pieces for a week?**		
3.	If a person cannot pass the fit test described above wearing a half mask respirator from the available selection, full-face piece models must be used. **Did test subject pass the fit test using a half mask respirator?**		
4.	PAPR to be provided to employees unable to wear a negative-pressure respirator due to medical reasons.		

RESPIRATOR FIT CERTIFICATION

This is to certify that _____ has been successfully fit tested and trained in
Employee
respirator use and care and is qualified to wear the following respirator:

_____ _____
RESPIRATOR BRAND/TYPE SIZE

APPENDIX B-1
USER SEAL CHECK PROCEDURES
(Mandatory)

MANDATORY USER SEAL CHECK PROCEDURES FOR RESPIRATORS

The individual who uses a tight-fitting respirator is to perform a user seal check to ensure that an adequate seal is achieved each time the respirator is put on. Either the positive and negative pressure checks listed, or the respirator manufacturer's recommended user seal check method shall be used. User seal checks are not substitutes for qualitative or quantitative fit tests.

I. Face piece Positive and/or Negative Pressure Checks.

A. Positive pressure check. Close off the exhalation valve and exhale gently into the face piece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the face piece without any evidence of outward leakage of air at the seal. For most respirators this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.

B. Negative pressure check. Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the face piece collapses slightly, and hold the breath for ten seconds. The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove. If the face piece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

II. Manufacturer's Recommended User Seal Check Procedures. The respirator manufacturer's recommended procedures for performing a user seal check may be used instead of the positive and/or negative pressure check procedures provided that the employer demonstrates that the manufacturer's procedures are equally effective.

I certify that I have read and understood the above procedures.

_____	_____
Employee	Date
_____	_____
Organization	Work Location

APPENDIX B-2
RESPIRATOR CLEANING PROCEDURES
(MANDATORY)

RESPIRATOR CLEANING PROCEDURES
(MANDATORY)

Respirator Cleaning Procedures (Mandatory)

These procedures are provided for employee use when cleaning respirators. They are general in nature, and the employee as an alternative may use the cleaning recommendations provided by the manufacturer of the respirators used by the employee, provided such procedures are as effective as those listed in CCR Title 8 GISO 5144 Appendix B-2 (see below). Equivalent effectiveness simply means that the procedures used must accomplish the objectives set forth below.

Procedures for Cleaning Respirators:

A. Remove filters, cartridges, or canisters. Disassemble face pieces by removing speaking diaphragms, demand and pressure - demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.

B. Wash components in warm (43 deg. C [110 deg. F] maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.

C. Rinse components thoroughly in clean, warm (43 deg. C [110 deg. F] maximum), preferably running water. Drain.

D. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in one of the following:

1. Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 43 deg. C (110 deg. F); or,

2. Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6-8 grams ammonium and/or potassium iodide/100 cc of 45% alcohol) to one liter of water at 43 deg. C (110 deg. F); or,

3. Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.

E. Rinse components thoroughly in clean, warm (43 deg. C [110 deg. F] maximum), preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on face pieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.

F. Components should be hand-dried with a clean lint-free cloth or air-dried.

G. Reassemble face piece, replacing filters, cartridges, and canisters where necessary.

H. Test the respirator to ensure that all components work properly.

RESPIRATOR CLEANING RECORD

RESPIRATOR INFORMATION			
TYPE RESPIRATOR			
MANUFACTURE		**MODEL #**	
SIZE		**RESPIRATOR ID NUMBER:**	
DATE OF INSPECTION		**TIME:**	

CLEANING REQUIREMENTS TIGHT FITTING RESPIRATORS						
Estimated Frequency: (Check all that apply)						
☐ Hourly	☐ 2X each Shift	☐ Daily	☐ Weekly	☐ Monthly	☐ Before Use	☐ After Use

COMPONENT:	**CLEANING REQUIREMENTS** (edit in accordance with manufacturers instructions)
Cartridge Holder:	
Cartridge Threads/Fittings:	
Connections:	
Elastomeric Parts Deteriorating?	
Elastomeric Parts Pliable?	
Exhalation Valve Assembly:	
Face piece:	
Gaskets:	
Harness Assembly:	
Headbands:	
Hose Assembly:	
Inhalation Valve:	
Nosecup Valves:	
Speaking Diaphragm:	

COMMENTS:

APPENDIX C
MEDICAL QUESTIONNAIRE
(MANDATORY)

Name_____**Date**_____

MEDICAL EVALUATION QUESTIONNAIRE FOR RESPIRATORY PROTECTION

Please answer all questions:

Can you read (circle one)? Yes No

You must be allowed to answer the questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your Supervisor/Manager must not look at or review your answers. When you have completed the questionnaire, bring it the to the Physician or other Licensed HealthCare Professional (PLHC) for the medical evaluation for use of NIOSH approved tight-fitting respirator.

CONFIDENTIAL

SECTION 1

The following information must be provided by every employee who has been selected to use a respirator (please print).

QUESTIONS	ANSWER
1. Today's date:	
2. Your name:	
3. Your age (to nearest year):	
4. Gender (circle one):	Male / Female
5. Your height:	
6. Your weight:	
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

QUESTIONS	ANSWER
11. Check the type of respirator you will use (you can check more than one category): "N" – Dusts and Non-Oil Based Mists "R" – Dusts and Oil and Non-Oil based mists with time restrictions. "P" – Dust, Oil and Non-Oil Based, extended life for dusts and non-oil based mists.	a. ___ N, R, or P disposable respirator (filter-mask, non-cartridge type only). b. ___ Other type (for example, half- or full-face piece 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):

SECTION 2

Questions 1 through 9 below must be answered by every employee who has been selected to use a respirator (please check the appropriate box to indicated "yes" or "no").

Question	Yes	No
1. Do you currently smoke tobacco, or have you smoked tobacco in the last month:		
2. Have you ever had any of the following conditions?		
a. Seizures (fits):		
b. Diabetes (sugar disease):		
c. Allergic reactions that interfere with your breathing:		
d. Claustrophobia (fear of closed-in places):		
e. Trouble smelling odors:		
3. Have you ever had any of the following pulmonary or lung problems?		
a. Asbestosis:		
b. Asthma:		
c. Chronic bronchitis:		
d. Emphysema:		
e. Pneumonia:		
f. Tuberculosis:		
g. Silicosis:		
h. Pneumothorax (collapsed lung):		
i. Lung cancer:		
j. Broken ribs:		
k. Any chest injuries or surgeries:		
l. Any other lung problem that you've been told about:		

Question	Yes	No
4. Do you currently have any of the following symptoms of pulmonary or lung illness?		
a. Shortness of breath:		
b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline:		
c. Shortness of breath when walking with other people at an ordinary pace on level ground:		
d. Have to stop for breath when walking at your own pace on level ground:		
e. Shortness of breath when washing or dressing yourself:		
f. Shortness of breath that interferes with your job:		
g. Coughing that produces phlegm (thick sputum):		
h. Coughing that wakes you early in the morning:		
i. Coughing that occurs mostly when you are lying down:		
j. Coughing up blood in the last month:		
k. Wheezing:		
l. Wheezing that interferes with your job:		
m. Chest pain when you breathe deeply:		
n. Any other symptoms that you think may be related to lung problems:		
5. Have you ever had any of the following cardiovascular or heart problems?		
a. Heart attack:		
b. Stroke:		
c. Angina:		
d. Heart failure:		
e. Swelling in your legs or feet (not caused by walking):		
f. Heart arrhythmia (heart beating irregularly):		
g. High blood pressure:		
h. Any other heart problem that you've been told about:		
6. Have you ever had any of the following cardiovascular or heart symptoms?		
a. Frequent pain or tightness in your chest:		
b. Pain or tightness in your chest during physical activity:		
c. Pain or tightness in your chest that interferes with your job:		
d. In the past two years, have you noticed your heart skipping or missing a beat:		
e. Heartburn or indigestion that is not related to eating:		
f. Any other symptoms that you think may be related to heart or circulation problems:		

Question	Yes	No
7. Do you currently take medication for any of the following problems?		
a. Breathing or lung problems:		
b. Heart trouble:		
c. Blood pressure:		
d. Seizures (fits):		
8. If you've ever used a respirator, have you ever had any of the following problems? If you've never used a respirator, check the following box and go to question 9: I HAVE NEVER USED A RESPIRATOR. ☐		
a. Eye irritation:		
b. Skin allergies or rashes:		
c. Anxiety:		
d. General weakness or fatigue:		
e. Any other problem that interferes with your use of a respirator:		
9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire:		

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-face piece 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.

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

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

ADMINISTRATIVE USE ONLY

Reviewed By: _____ Date: _____

Pulmonary Function Test (PFT) Results: _____

_____

_____

Referred to Physician for Clearance: _____ Yes _____ No

Physician's Opinion: _____

_____

_____

Employee Cleared to Wear a Respirator: _____ Yes _____ No

Physician Signature: _____ Date: _____

APPENDIX D
INFORMATION FOR EMPLOYEES USING RESPIRATORS WHEN NOT REQUIRED UNDER THE STANDARD (MANDATORY)

MANDATORY INFORMATION FOR EMPLOYEES USING RESPIRATORS WHEN NOT REQUIRED UNDER THE STANDARD

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read 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 designated 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.

I certify that I have read and understood the above procedures.

_____	_____
Employee	Date
_____	_____
Organization	Work Location

APPENDIX E

INDIVIDUAL EMPLOYEE TRAINING DOCUMENTATION

INDIVIDUAL EMPLOYEE TRAINING DOCUMENTATION

NAME OF TRAINER/INSTRUCTOR:_____

TRAINING SUBJECT: Respiratory Protection Program Guidelines i.e., Equipment Selection, Use and Care

TRAINING MATERIALS USED:_____

_____

NAME OF EMPLOYEE:_____

DATE OF HIRE/ASSIGNMENT: _____

I, _____, hereby certify that I received training as described above in the following areas:

[ ] Instruction on the nature of the hazards to be encountered and an appraisal of the potential ill effects if the respirator device is not used or maintained properly.

[ ] Instruction on the need, use, sanitary care, and limitation of such respiratory equipment as any employee may have the occasion to use. Additionally, the use of the respirator in emergency situations.

[ ] Instruction on how to properly fit and test respiratory equipment and how to check the face piece fit and shall be provided the opportunity to wear respiratory equipment.

[ ] Instruction on the recognition of medical signs and symptoms that may limit or prevent effective use of the respirator.

[ ] Recap of program: why respirators are needed, where used, how long they must be used, limitations of the respirators, fitting, cleaning, storing when required, responsibility of employees (this includes disciplinary action for not complying), engineering--why the hazard has not been removed, and factors affecting facial fit and performance.

I fully understand this training; agree to comply with the instructions received, and the Respiratory Equipment--Selection, Use and Care Program.

Employee Name: _____

Employee Signature: _____

Date: _____

APPENDIX F
WORKSITE EVALUATION WORK SHEET

WORKSITE EVALUATION WORK SHEET

Organization:_____ Worksite Location:_____

1. Please identify and evaluate the respiratory hazards:

_____

_____

2. If the employee does generate the contaminants, are the materials that are used the same as the last evaluation?

Yes □ No □ Not Evaluated □

Listed below is a list of things to consider when determining whether the employee's level of exposure could have changed. Please consider these items and if there is a change, please describe in the space below and forward to Environmental Health Services.

EMPLOYEE
Have the work site hours changed to affect time of exposure: Yes □ No □

WORK PROCESS
Are the materials used the same or different than were used during the last evaluation? Less volatile materials could eliminate the need for respirators, as could substitutions of hazardous ingredients for less toxic components.

WORK SITE
Has the area become more confined, more open, or less ventilated to dilute or concentrate the contaminants?

_____

_____

_____

Do you feel that a re-evaluation of the exposures is needed?
Yes □ No □

Signature of Qualified Program Administrator (QPA): _____

Date:_____

SOP Form: 2004-3 (10/31/01)

APPENDIX G
GLOSSARY

GLOSSARY

Air filter - An air-cleaning device to remove light particulate matter from normal atmospheric air.

Air monitoring - The sampling for and measuring of pollutants in the atmosphere.

Air-regulating valve - An adjustable valve used to regulate airflow to the face piece, helmet, or hood of an air line respirator.

Air-supply device - A hand- or motor-operated blower for the hose mask, or a compressor or other source of respirable air for air line and abrasive-blasting respirators.

Breathing tube - A tube through which air or oxygen flows to the face piece, helmet, or hood.

Breathing zone - That zone of the ambient environment in which a person performs the normal respiratory function.

Breathing zone sample - An air sample collected in the breathing area (around the nose) of a worker to assess his exposure to airborne contaminants

Canister (air purifying) - A container filled with sorbents and catalysts that remove gases and vapors from air drawn through the unit. The canister may also contain an aerosol (particulate) filter to remove solid or liquid particles.

Canister (oxygen-generating) - A container filled with a chemical, which generates oxygen, by chemical reaction.

Cartridge - A small container filled with purifying media.

Chemical cartridge - The type of absorption unit used with a respirator for removal of low concentrations of solvent vapors and certain gases.

Detachable coupling - A device by means of which the respirator wearer, without using hand tools, may detach the air-supply line from that part of the respirator worn on the person or from the air-supply source.

Dusts - Solid particles generated by handling, crushing, grinding, rapid impact, detonations, and decrepitation of organic or inorganic materials, such as rock, ore, metal, coal, wood, and grain. Dusts do not tend to flocculate, except under electrostatic forces; they do not diffuse in air but settle under the influence of gravity.

Excursion - Deviation from a definite path. A movement above or below a norm.

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

Eyepiece - Gas-tight, transparent window(s) in a full face piece through which the wearer may see.

Face piece - That portion of a respirator that covers the wearer's nose and mouth in a half-mask face piece or nose, mouth, and eyes in a full-face piece. It is designed to make a gas-tight or dust-tight fit with the face and includes the headbands, exhalation valve(s), and connections for air-purifying device or respirable-gas source or both.

Filter - A fibrous media (canned or uncanned) used in respirators to remove solid or liquid particles from the airstream entering the respirator enclosure.

Filter efficiency - The efficiency of various filters can be established on the basis of entrapped particles; i.e., collection efficiency, or on the basis of particles passed through the filter; i.e., penetration efficiency.

Filter, HEPA - High efficiency particulate air filter that is at least 99.97 percent efficient in removing thermally generated monodisperse dioctylphthalate smoke particles with a diameter of 0.3 um.

Hose mask - In distinction to a filter mask, one supplied with unmodified air through a hose or piping.

IDLH - Immediately Dangerous to Life and Health.

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.

Mists - Suspended liquid droplets generated by condensation from the gaseous to the liquid state or by breaking up a liquid into a dispersed state, such as by splashing, foaming, or atomizing. Mist is formed when a finely divided liquid is suspended in air.

Monitor - To observe closely to determine whether an area is safe for workers.

Particle - A small discrete mass of solid or liquid matter.

Particle concentration - Concentration expressed in terms of number of particles per unit volume of air or other gas. Note: When expressing particle concentrations, the method of determining the concentration should be stated.

Particle size - The measured dimension of liquid or solid particles usually in units of microns.

Particle size distribution - The statistical distribution of the sizes or ranges of size of a population of particles.

Particulate - A particle of solid or liquid matter.

Particulate matter - A suspension of fine solid or liquid particles in air, such as dust, fog, fume, mist, smoke or sprays. Particulate matter suspended in air is commonly known as an aerosol.

Permissible Exposure Limit (PEL) - The employees' permitted exposure to any material listed in Table Z-1, Z-2, or Z-3 of OSHA regulations 1910.1000, Air Contaminants.

ppm - Parts of vapor or gas or other contaminant per million parts of air by volume.

QPA - Respiratory Program Coordinator

Respirable particles - Particles which are present in the breathing zone of an individual and of a size capable of reaching parts of the respiratory tract where they may elicit a toxic response.

Respirable size particulates - Particulates in the size range that permits them to penetrate deep into the lungs upon inhalation.

Respirator - A device to protect the wearer from inhalation of harmful contaminants.

Sorbet - A material which removes toxic gases and vapors from air inhaled through a canister or cartridge.

Supplied-air suit - A one- or two-piece that is impermeable to most particulate and gaseous contaminants and is provided with an adequate supply of respirable air.

Threshold - The level where the first effects occur; also the point at which a person just begins to notice the tone is becoming audible.

Threshold Limit Values (TLV) - The values for airborne toxic materials that are to be used as guides in the control of health hazards, and they represent concentrations that nearly all workers may be exposed 8 hours per day over extended periods of time without adverse effects.

Valve (air or oxygen) - A device which controls the direction of air or fluid flow or the rate and pressure at which air or fluid is delivered, or both.