

**RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
RESPIRATOR POLICY AND PROGRAM**

**7D-1**

PURPOSE

SCOPE

RESPONSIBILITIES

- Employee
- Site Manger
- Office Program Administrator
- Department Program Administrator
- Office of Human Resources

CONDITIONS FOR APR USE

- Oxygen
- Knowledge of The Material
- Selection of Cartridges For APRs
- IDLH Levels
- Warning Properties
- Air Monitoring
  - Monitor Action Levels
  - Photo Ionization Vapor Detectors
  - Colorimetric Indicator Tubes
  - Combustible Gas Indicator
  - Radiation Detector

EMERGENCY SITUATIONS

- Buddy System
- Escape Masks

CLEANING, STORAGE, AND INSPECTION

TRAINING

FIT TESTING

IMPEDIMENTS

MEDICAL MONITORING

SCBA INFORMATION

GLOSSARY

- APF – Assigned Protection Factor
- APR – Air-Purifying Respirator
- Department Program Administrator
- Immediately Dangerous To Life and Health (IDLH)
- Inhalation Hazard
- Office and “Relevant Office”
- Office Program Administrator
- PAPR – Powered Air-Purifying Respirator
- SAR – Supplied-Air Respirator
- SCBA – Self-Contained Breath Apparatus
- Site Manager

**7D-2**

PROTOCOLS (SOPs)

- Orientation Program On Respirator Training and Fit Testing (7D-2-1)
- Respirator Fit Test Protocol (7D-2-2)
- Selection of a Respirator for Comfort (7D-2-3)
- Respirator Face Piece Fit Testing (7D-2-4)

Sensitivity Check (7D-2-5)  
Test Chamber Design (7D-2-6)  
Qualitative Fit Test -- Isoamyl Acetate Test (7D-2-7)  
Qualitative Fit Test – Stannic Oxychloride Irritant Smoke Test (7D-2-8)  
Functional Fit Test -- Positive Pressure Test (7D-2-9)  
Functional Fit Test -- Negative Pressure Test (7D-2-10)  
Proper Cleaning and Storing of Respirators (7D-2-11)

### **7D-3**

#### **FORMS**

Respirator Medical Recertification Request (7D-3-1)  
Employee Respirator Use Profile (7D-3-2)  
Physician's Opinion Letter -- Medical Respirator Certification (7D-3-3)  
Respirator Fit Test Data Collection Form (7D-3-4)  
Respiratory Equipment Inspection Checklist (7D-3-5)  
Required Information For Employees Using Respirators When Not Required Under The Standard (7D-3-6)

### **7D-4**

#### **APPENDIX – RESPIRATOR PROGRAMS OF RELEVANT RI DEM OFFICES**

Respirator Plan For Office of Emergency Response (7D-4-1)

## **PURPOSE**

It is the policy of the Rhode Island Department of Environmental Management (RI DEM) to control exposure to hazardous chemicals and conditions through engineered design, whenever feasible. When adequate protection can be achieved only with the use of respiratory equipment, such equipment must be properly selected, maintained, and used. This "RI DEM Respirator Policy and Program" addresses the federal requirement (29CFR 1910.134) that employers develop and implement a respirator protection program, with specific procedures and worksite requirements for respirator use.

Each Office of RI DEM will implement a respirator program that ensures:

- Compliance with this "RI DEM Respirator Policy and Program"
- Development of a list of tasks for which specific types of respirators are required.
- Consultation with the Department Respirator Program Administrator or designee to ensure proper selection of respirators.
- Annual employee training in the proper use of respirators
- Health evaluation of each employee before wearing a respirator.
- Periodic fit testing.
- Control of impediments (e.g., facial hair) that might interfere with proper respirator fit.

This policy is intended to insure respiratory protective equipment and procedures are uniform and effective for all RIDEM Offices.

The following sections survey principles and required, standard procedures in the selection, usage, monitoring, inspection, and maintenance of respirators. They cover only the most important, minimal requirements. Yet more specific procedures and worksite requirements for each relevant office of RI DEM as well as Forms and Standard Operating Procedures (SOPs) are included at the end of this "RI DEM Respirator Policy and Program."

## **SCOPE**

This policy applies to all DEM employees and, insofar as possible, to non-DEM personnel -- such as visitors, contract personnel, and vendors – if they enter a DEM site where respirators are required.

## RESPONSIBILITIES

- **Employee** -- Individual employees share with supervisors the responsibility for fulfilling all applicable requirements of this policy. When appropriate, RI DEM will issue a respirator to an employee, but its proper care and use remain the responsibility of the employee. In particular:
  - The employee is responsible for properly storing, maintaining, and using the respirator.
  - Before using a respirator, the employee must ensure that it fits and functions properly through testing at least once per year.
  
- **Site Manager** -- Site managers (or their equivalent, as designated by a supervisor) are responsible for ensuring that the following minimum requirements are met in the field.
  - Prepare and maintain a list of all areas, jobs, or tasks for which respirators are required on-site. Such assessment may be included as part of a personal protective equipment (PPE) hazard assessment.
  - Ensure that personnel are informed about inhalation hazards and the proper use of respiratory protection.
  - Ensure that respirators are used under appropriate conditions. They should be the sole means of protection only when other changes in work conditions (e.g., substituting less hazardous material or ventilating the site) would be impossible or ineffective in controlling inhalation hazards. Reliance on respirators may be appropriate in an emergency, during the time necessary to implement other controls, or in specific construction, spraying, maintenance, repair, or decontamination operations. Whether or not a respirator is appropriate to use must be determined on a case-by-case basis. (As a discretionary precaution, respirators may be required even though an inhalation hazard has not been conclusively demonstrated.) In general, respirators should be used only when:
    - An inhalation hazard exists or is likely to exist.
    - Alternative protection is infeasible.
  - Ensure proper respirator selection. In consultation with the Program Administrator, select the respiratory protective equipment to be worn in operations likely to occur for Office personnel. The following must be considered:
    - the type and degree of inhalation hazard;
    - the characteristics of the operation or process;
    - the level of protection afforded by the respirator;
    - the uses for which the respirator is approved.
  - Periodically inspect respirators to ensure that they are properly maintained, cleaned, and stored.
  - Periodically reassess air quality on-site, and advise personnel to adjust respirator use accordingly.
  
- **Office Program Administrator** – The chief of each relevant RI DEM Office will assign an individual to manage its respirator program and ensure compliance among Office personnel. Office Administrators are required to:
  - Provide and maintain a written Respirator Program for each relevant Office. It should include a list of standard procedures and protections for Office tasks that are apt to require a respirator. The Respirator Program of each relevant Office will be included in the Appendix to this “RI DEM Respirator Policy and Program.”
  - Supervise training of Office personnel on the proper use, storage, and maintenance of respirators.
  - Once per year, conduct or arrange a formal training program for the Office’s respirator users and supervisors.
  - Provide the Office of Human Resources a record of the relevant training sessions and identify the employees who participated.

- ❑ Maintain a record of respirator certification and inspections (visual and functional, regularly and before a respirator is worn).
  - ❑ Assist with periodic reviews of implementation of this “RI DEM Respirator Policy and Program.”
- **Department Program Administrator** – The Department Program Administrator will oversee the the respirator policies and programs of the RI DEM as a whole. The Department Program Administrator is required to:
  - ❑ Coordinate the Program Administrators of each relevant DEM Office
  - ❑ Continuously monitor compliance with this “RI DEM Respirator Policy and Program”
- **Office of Human Resources** – The Office of Human Resources will maintain records of training and certification among employees of RI DEM. The Office of Human Resources is required to:
  - ❑ Make copies of respiratory policy, SOPs, and appropriate forms available to employees upon their request.
  - ❑ In accordance with standard protocols for maintaining personnel records, keep up-to-date records of respirator training, fit testing, and medical certification among RI DEM employees.
  - ❑ Upon request of the Site Manager, Office Program Administrator, and/or Department Program Administrator, verify the documented respirator training, testing, and certification of employees.

## CONDITIONS FOR APR USE

Before using an APR, an employee must consult with the site manager to ensure that the following conditions are met (see following discussion):

- The employee has requested, received, and recorded medical certification by a qualified physician or other health care professional (See attached forms)
- Sufficient oxygen exists -- a minimum of 19.5% oxygen in the atmosphere to be breathed.
- The material is known -- including identification and evaluation of the inhalation hazard present. When the employee cannot identify the potential exposure, the employee shall consider the atmosphere to be IDLH.
- Air is monitored for suspected contaminants, flammable atmosphere, and oxygen.
- A fit test has been conducted and passed for the respirator being used.
- The employee must be medically approved to use a respirator, adequately trained, and clean-shaven.

## OXYGEN

When the concentration of atmospheric oxygen falls below 19.5%, people can become susceptible to a range of ill effects, from dizziness and lightheadedness to death. The symptoms may not even be very noticeable to the victim. To ensure that >19.5% oxygen is available, either an oxygen monitor is needed, or sufficient information must be available to make this conclusion; otherwise, an SCBA is needed. The vast majority of situations in which an employee might need a respirator occur outdoors, which almost always ensures that >19.5% oxygen is present. Some potential areas where the level may drop to <19.5% are confined spaces such as enclosed vaults or rooms, sewers, tractor trailers, etc.

DEM employees should never enter a confined spaced unless they have been properly trained to do so. Other areas where a depressed oxygen level may be present are vapor or gas clouds, valleys, or other depressions. An SCBA is needed for those situations.

## KNOWLEDGE OF THE MATERIAL

In order to use an APR, some knowledge of the nature and suspected identity of the material is needed for the following purposes:

- To select the appropriate type of respirator cartridge;
- To ensure that no levels are present that could be Immediately Dangerous to Life and Health (IDLH), and
- To ensure that the material has sufficient "warning properties" – features that would alert the wearer of the respirator that there are leaks in the protection or that the cartridge has become spent.

These criteria are discussed below.

Since the materials that employees encounter may be initially unknown (e.g., abandoned drums), a DEM responder or a fire department normally handles them with Level B protection. A lower level of protection might be used after learning more about the material, as determined by field tests, reliable witness statements, drum labels confirmed by the samples, or the like. An APR may then be justified for further work, such as field testing, drum handling, soil removal, and possibly additional sampling. First, though, the three criteria above must be addressed. *The NIOSH Pocket Guide to Chemical Hazards* is recommended for learning more about chemical hazards and precautionary measures to be taken.

## SELECTION OF CARTRIDGES FOR APRs

Respirator "cartridges" are the main part of an APR. (The term cartridge includes "canisters" in this plan.) They contain a packing material that traps the airborne contaminant while allowing oxygen to pass through for breathing. The process of trapping may be absorption, adsorption, and even neutralization. An example of a packing material is activated carbon, which is probably the most common material used.

The main types of cartridges are shown below, along with the contaminants that they can protect against.

CARTRIDGE	PROTECTS AGAINST
Organic Vapor	Organic vapors, such as solvents, hydrocarbons, many pesticides, etc.
Acid Gas	Acid gases such as chlorine, hydrogen chloride, sulfur dioxide.
Organic vapor/acid gas	A combination cartridge that covers both of the above.
Paint spray/pesticide	Paint spray and fumes, many pesticides (but not fumigants).
Ammonia/methylamine	Ammonia and amine compounds
Dusts and mists	Nuisance dusts

There are other types, many with very specific uses, but these are the main types. Respirator manufacturers also publish reference materials that can aid in choosing the proper cartridges for use in various situations. DEM employees mainly use organic vapor cartridges; acid-gas cartridges, more occasionally. The materials that employees most frequently encounter are dust and mist, solvents, oils, paints, and fuels, all of which can regularly be handled using an organic vapor cartridge.

An employee would be unlikely to have an exposure that exceeded an OSHA Permissible Exposure Limit [PEL] or a Threshold Limit Value [TLV, or sometimes referred to, on an 8-hour time-weighted average, as TWA], while using an APR, and would be even less likely with an SCBA. In addition, a DEM employee would only be using a respirator for a short duration thus minimizing the potential exposure.

All cartridges have a finite service life, the length of which depends on the mass of the cartridge, the length of use, and the concentration of the contaminants. The Site Manager must ensure that all of

the on-site, in-service respirator cartridges have an end-of-service-life indicator (ESLI) certified by NIOSH. Before using the cartridge, employees must ensure that their cartridges have not exceeded their service life. Cartridges should be discarded after use, not saved or cleaned for reuse.

If the material is unknown or if the proper type of cartridge is unavailable, then an APR should not be used. Entry should not be attempted; the employee should take a "fall back" position, use an SCBA, or wait until an additional resource can be deployed with appropriate entry equipment and personnel. If the material is judged to be of a particular category but not precisely known, then the Site Manager must use judgment and experience to decide if the available equipment is appropriate. For example, if a Site Manager judges that a material is a solvent but is unsure whether it is toluene or acetone, an organic vapor cartridge would be appropriate for both.

## **IDLH LEVELS**

An IDLH Level (Immediately Dangerous to Life and Health) is a condition that poses a threat of exposure to airborne contaminants that are likely to cause death or permanent adverse health effects or to prevent escape from such an environment. An employee is not authorized to enter an area that is known or suspected to have a level near IDLH, unless SCBAs and a buddy system are used. (Such areas require the use of SCBAs, not just respirators.) If the situation is unknown or if the Site Manager has reason to suspect that an IDLH Level may be present, the situation should be handled as a Hazard Level B or A, until further information indicates otherwise.

IDLH Levels vary, depending on the identity of the substance. The nature of the material must be known in order to assess the presence or absence of an IDLH level. However, sometimes this can be done by considering the situation and using experience. For example, the exact nature of a drum of paint solvent dumped on a roadside may not be certain, but a Site Manager may be able to judge confidently that the contaminant levels are below the IDLH Level of the suspected constituents, and that the open air and wind provide sufficient dilution to below IDLH levels. (Air monitoring instruments or detector tubes can help with this assessment.) If the Site Manager cannot make such a conclusion, then the situation should be treated as a Hazard Level B or A.

## **WARNING PROPERTIES**

In order for an APR to be used safely, the wearer must have a means of discovering that the respirator or cartridge is leaking or is spent. The most common means is the use of the warning properties of the material. Warning properties are characteristics of the material that enable a person's senses to detect exposure to the material. Odor is the most common property used, but eye irritation, taste, and respiratory irritation are also warning properties. Further information concerning specific chemical warning properties can be found in *The NIOSH Pocket Guide to Chemical Hazards and Odor Thresholds, for Chemicals with Established Occupational Health Standards* or chemical MSDS. The wearer must be able to sense the property at a level that does not cause impairment while the wearer is exiting the area to change equipment.

Note that there is a wide range of responses to these properties. Some people are very sensitive to a particular property and hence easily warned, while others are insensitive to that property and hence not easily warned. An area should not be entered unless the Site Manager is confident that the material will provide a sufficiently reliable warning property for that individual. For example, if an employee does not have a reliable sense of smell for solvents, then he/she should not enter an area where solvents are likely to be present. Therefore, it is recommended that an employee only use a respirator (whether APR or SCBA) in situations where the Site Manager is confident of the warning properties and personal ability to detect them. Employees should immediately retreat and remedy the situation when a warning property is first detected.

## AIR MONITORING

The Site Manager (or his/her designee) should evaluate the incident area from a distance first, before entering at all. This evaluation should utilize the employee's training, experience, and available knowledge of the situation to make an initial determination of the appropriate level of protection.

**Air monitoring** is a valuable method for assessing conditions that are present at a given time. It should be conducted when the approach is made and at the beginning of each new site activity (e.g., skimming oil, collecting hazardous chemicals, or excavating hazardous material) or at the onset of changes in site conditions or weather. The use of air monitoring will help the Site Manager assess the level of protection appropriate to current and future conditions.

### MONITOR ACTION LEVELS

Monitor	Reading	Action/Protection
Combustible Gas Monitor	Greater than 10% LEL	<ul style="list-style-type: none"> <li>Suspend all spark producing activities; <u>and</u></li> <li>Leave the incident area</li> </ul>
Oxygen Meter	>19.5% Oxygen	No action necessary
	< or = 19.5% Oxygen	<ul style="list-style-type: none"> <li>Use NIOSH/MSHA-approved supplied-air respirator/SCBA; <u>or</u></li> <li>Evacuate personnel from the work area</li> </ul>
Photoionization Detector (Petroleum hydrocarbons reading for at least 5 minutes in breathing zone)	Background to 30 ppm	<ul style="list-style-type: none"> <li>Level D Protection</li> </ul>
	30 – 60 ppm	<ul style="list-style-type: none"> <li>Upgrade to Level C <u>and</u></li> <li>Notify incident Safety Officer</li> </ul>
	Above 60 ppm	<ul style="list-style-type: none"> <li>Upgrade to Level B <u>and</u></li> <li>Notify incident Safety Officer</li> </ul>
	Off-scale	<ul style="list-style-type: none"> <li>Evacuate the area <u>and</u></li> <li>Call the Incident Safety Officer</li> </ul>

For making such determinations, DEM OSCs have been provided with photo ionization vapor detectors and oxygen/combustible gas detectors. The OSCs also have certain colorimetric indicator tubes in the HazCat kits and are encouraged to supplement these tubes with tubes for detecting additional compounds.

**Photo Ionization Vapor Detectors (PIDs)** detect and estimate the concentration of a wide variety of compounds that are ionizable by 10.2 eV of ultraviolet light, which includes many, but not all, hazardous vapors. A common misconception is that a PID can identify and measure the concentration of a chemical. However, PIDs do not identify compounds. A PID can accurately measure the concentration of a material only if it has been calibrated for that specific material and only if there are no other ionizable materials present. Vapor detectors such as PIDs and OVAs are thus limited in their abilities. PIDs and OVAs are basically "sniffers" that give an approximate concentration of "stuff" in the air and are used to take the place of a person's nose. But they can still be useful if the OSC can make a good judgment on the identity of the material. For example, if the Site Manager judges that the material is paint thinner, the reading can be used to evaluate the total concentration of the combined suspected paint thinner constituents. Such information may help the Site Manager decide if an IDLH level is likely to be present and choose the appropriate type of breathing protection.

**Colorimetric Indicator Tubes** (Draeger detector tubes) use a chemical reaction to detect the presence of specific chemical groups and to estimate the concentration. For example, an acetone tube will detect and measure acetone vapors, but will also simultaneously detect other ketones such as methyl ethyl ketone. However, an acetone tube will not alert a person to the presence of non-ketone vapors such as benzene. So, although they have certain advantages over a PID, they also have the disadvantage of not giving a "total" concentration of mixtures in the air. The tubes can also have interferences (although the interferences are mostly from similar chemicals in that group). The tubes are used to screen for a specific chemical group only.

The use of a **Combustible Gas Indicator** (explosimeter) for detecting flammable atmospheres is also recommended, as well as the use of a **Radiation Detector**.

## EMERGENCY SITUATIONS

If an emergency situation arises while wearing a respirator, the wearer must immediately retreat to fresh air. The respirator should generally not be removed while in the contaminated area (except for donning an escape mask, and only if necessary), since premature removal could increase exposure, and the respirator might still be protecting against some of the contaminants. Any leakage, notice of a warning property, physiological symptoms such as dizziness, shortness of breath, or any other abnormality constitute an emergency and need immediate attention. The overall situation may need to be re-evaluated. At a minimum, the cartridges of an APR should be replaced. The changing of cartridges and the washing of the employee's face and respirator should be done outside of the respirator use area (Hot Zone).

If a spill or vapor cloud occurs in a work area, the area should be immediately vacated and the use of a respirator re-evaluated (in addition to other response actions). In such a situation the concentrations present may have risen drastically and could exceed the capacity of a respirator (especially an APR).

OSHA regulations [29CFR 1910.134(g)(3)] state that in areas where the failure of a respirator could cause the wearer to be overcome by a toxic or oxygen-deficient atmosphere, there must be at least one additional person who is:

- within good communication range (visual, voice or signal) of the wearer;
- equipped with retrieval and protective gear;
- located in an area where he/she will be unaffected by any likely incident; and
- able to provide assistance

In an IDLH atmosphere, the regulations also state that at least one trained and equipped (with retrieval gear and SCBA) individual be outside of the IDLH area, ready to assist. This individual shall have communication with the wearer in the IDLH. Furthermore, employees shall notify their "buddy" before entering the IDLH. The use of this **buddy system** is strongly recommended for most work, and is mandatory if the situation is one in which the person could be overcome.

An **escape mask** should always be carried when an APR or no respiratory protection (Level D) is used; in case the employee detects exposure to airborne chemicals and needs to retreat. When the employee is using supplied air, the escape mask need not be carried. Escape masks must always be inspected prior to their use and at least once per month, regardless of how often they are used.

## CLEANING, STORAGE. AND INSPECTION

Each employee who is issued a respirator shall be responsible for its maintenance, cleaning, storage and repair. (See attached SOP: "Proper Cleaning and Storing of Respirators" and form: "Respiratory Equipment Inspection Checklist.") If parts are needed for the respirator to function as designed, the Office Program Administrator must be informed immediately. No employee shall be required to wear a respirator that is in disrepair. The Office Program Administrator will make regular (at least monthly) visual and functional inspections of respirators and keep a record of their certification. On-RI DEM Respirator Policy & Program



site, the Site Manager will conduct routine inspections to ensure maintenance, cleaning, and storage are conducted properly.

All respirators must be cleaned and properly stored to ensure a full service life and to prevent exposure to any contaminants that might be present on the respirator or parts. At a minimum, the manufacturers cleaning procedures should be followed. Cleaning is especially important if (contrary to policy) more than one person uses a particular respirator.

The label on the inside lid of most respirator cases gives detailed information on the handling of respirators, and should be treated as the main source of care information for that brand of respirator. However, the following guidelines apply to nearly all respirators:

- **Clean and disinfect** the respirator and parts after each use, using detergent and water (or a specially designed commercial cleaner), and allow to dry. Wear gloves while cleaning, in case contaminants are present. The waste water may have to be placed in a drum for proper disposal, if contaminated and unacceptable for ground or sewer disposal.
- **Inspect** the respirator before each use and during cleaning, and at least monthly. A check of respirator function, tightness of connections, and condition of the parts including the straps, valves, connect tube, and rubber parts. Check for signs of visible deterioration, cracks, pliability of rubber parts, and any other signs of damage. Stretch and manipulate rubber parts to maintain pliability. Air cylinders shall be maintained in a fully charged state and be recharged when the pressure falls to 90% of the manufacturer's recommended pressure level. Warning devices must function properly.
- **Store** the respirator in a box or its case. It may be wrapped in a plastic bag. The face piece and exhalation valve should rest in a normal position and be stored in such a manner as to prevent deformation. The respirator must be protected from damage, dust, sunlight, extreme heat and cold, excessive moisture, and chemicals.

The Office Program Administrator must keep a record of the inspections for each respirator. The Office Program Administrator shall certify each respirator by documenting the date of its inspection, the name of person who conducted it, the findings, the required remedial actions, and the serial number (or other identifying number). This certification will be attached as a tag or label to the storage compartment of the respirator and be kept with the respirator as well documented in the Office Program Administrator's record.

If defects are noted, the respirator shall immediately be removed from service and labeled as defective. Repairs will be performed only by a qualified person and shall be made according to the manufacturer's recommendations and specifications for the type and extent of repairs to be performed. If the respirator is defective and beyond repair, it shall be taken out of service and discarded.

## TRAINING

A respirator shall only be used by personnel trained in its use. All potential users should know:

- Why a respirator is necessary.
- How improper fit, usage or maintenance can compromise the protective effect of the respirator.
- What the limitations and capabilities of the respirator are.
- How to use the respirator effectively in emergency situations.
- How to inspect the respirator and check the seals.
- How to properly maintain and store the respirator.
- How to recognize medical signs and symptoms that may limit or prevent the effective use of the respirator.

It is strongly recommended and DEM policy that a wearer become familiar with the respirator to be used by wearing it in clean air first before using it in a contaminated area.

## **FIT TESTING**

To ensure that a respirator will provide the intended protection, it must be fit tested to each wearer to verify that it provides a tight seal before the respirator is used. Fit tests must be conducted at least annually. They should also be conducted when the Site Manager or a Program Administrator changes the type/model of respirator in use, or if the employee has physical changes that may prohibit a correct fit (change in weight, glasses, facial scarring, or dental changes). See attached SOP: "Respirator Fit Test Protocol")

A qualitative fit test (QLFT) using banana oil (Isoamyl Acetate, IAA) or irritant smoke or both shall be conducted according to the attached standard operating procedures when an individual is assigned an APR and at least once per year thereafter. (See attached SOPs for "Qualitative Fit Test".) Prior to each use, a respirator wearer will also conduct a positive and/or negative pressure check in accordance with the manufacturer's instructions. (See also the attached SOPs for "Functional Fit Test".) However, employees should recognize there are no perfect fit tests, and some individuals may not discover a poor fit by any fit-test procedure.

In addition to the required test protocols, another quick method of ensuring a tight fit is to don the respirator and tightly place a hand over the hose (or cartridge) opening and gently breathe in. A securely tight respirator fit will make it impossible to breathe in while the hose is covered and will not allow air to enter or escape the mask. Another method is to close the hose, place a hand over the exhalation valve, exhale to build up pressure in the mask; and hold breath for 10 seconds. A tight fit will not allow the pressure to drop (i.e., not allow air to escape through the edges of the mask).

## **IMPEDIMENTS**

Respirators shall not be worn when there is a physical impediment to continuous contact between the sealing surface of the respirator and the wearer's face. This may include temple pieces on glasses, dentures, a skullcap that projects under the face piece, or other impediments, as specified in OSHA Standard 29 CFR 1910.134

Anyone required to wear a respirator shall not have visible facial hair if that hair

- may interfere with the functioning of respirator valves;
- Will come in contact with the sealing surface of a respirator that relies on a face-to-face piece seal for proper operation.

If a tight seal cannot be maintained, the person must not enter a contaminated area and may not be able to use a respirator at all. The same applies to people with dentures

Those who need corrective lenses while wearing a respirator may need to obtain special glasses and/or a special respirator adapter part. If so, the person should contact their Office Program Administrator so that such items can be purchased for them.

## **MEDICAL CERTIFICATION**

All employees who wear a respirator shall receive periodic medical examination to check for possible exposure to contaminants and to verify that they are physically able to continue wearing a respirator. Certain DEM employees, including emergency response personnel, receive such periodic medical examination (approximately annually). However, these tests may be conducted more frequently if needed (e.g., due to a change in workplace conditions, signs or symptoms indicating a need for a reevaluation, etc.) The examination includes a thorough physical exam, blood and urine testing, lung capacity evaluation, blood pressure test, and periodic chest x-rays and heart evaluation/stress tests. The bodily fluid tests include key parameters that indicate toxic exposures.

## **SCBA INFORMATION**

All oxygen-deficient atmospheres shall be considered IDLH.

Employees who must enter an IDLH atmosphere must use a full facepiece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes or use a combination full facepiece  
RI DEM Respirator Policy & Program

pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply.

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

Compressed breathing air shall meet at least the following requirements:

- oxygen content (v/v) of 19.5 – 23.5%;
- condensed hydrocarbon content of 5 milligrams per cubic meter of air or less;
- carbon monoxide content of 10ppm or less; and
- no noticeable odor.

Also, compressed oxygen is not to be used in atmosphere-supplying respirators that have previously used compressed air.

The SCBA cylinders shall be hydrostatically tested per the manufacturer's specifications. As a rule of thumb, steel tanks and aluminum tanks (not wrapped in fiber) should be hydrostatically tested once every five years. These types of tanks have no shelf life. Fiber wrapped or partially wrapped tanks should be hydrostatically tested every three years. These types of cylinders have a shelf life of fifteen years.

Cylinders of purchased breathing air shall have a certificate of analysis from the supplier that the breathing air meets the requirements for Type 1—Grade D breathing air. Furthermore, the moisture content in the cylinder shall not have a dew point in excess of –50 deg. F (-45.6 deg. C) at 1 atmospheric pressure.

## GLOSSARY

APF – The Assigned Protection Factor (APF) of a respirator is a measure of the level of protection that a respirator is expected to provide, when properly used. The measure is based on the probable difference in concentration of selected contaminants inside versus outside the respirator. For example, the APF for an APR is typically about 50-100 (i.e., concentration inside the respirator is 50-100 times less than outside), and the APF for a positive pressure SCBA is about 10,000.

APR – An Air-Purifying Respirator (APR) consists of a facepiece that is connected to an air-purifying device. It operates on the principle of selectively removing contaminants from the atmosphere prior to inhalation. The purifying device (a cartridge or canister) is either attached directly to the facepiece or worn on a harness with a hose running to the facepiece. Purification is accomplished by absorption, adsorption, or chemical reaction in the cartridge. An APR is suitable when ambient air is known to contain specific chemicals in specific concentrations -- not in IDLH situations. Respirators used by DEM personnel must be NIOSH certified. They shall also be labeled and color-coded with NIOSH-approved labels.

Department Program Administrator – The person responsible for overseeing the respirator program within the RI DEM as a whole.

Immediately Dangerous to Life and Health (IDLH) – Air quality that poses an immediate threat to human health. IDLH atmospheres include those that are deficient in oxygen (less than 19.5%) or that contain contaminants (e.g., toxins or radioactive material) that are likely to have adverse cumulative, instantaneous, or delayed effects. Air-supplied respirators (SCBA or air line respirators with emergency air supply) shall be permitted only under IDLH conditions.

Inhalation Hazard -- Exposure to oxygen deficient atmospheres or to air contaminants in concentrations exceeding OSHA permissible exposure limits (PEL), threshold limit values (TLV), or industry designated control levels (DCL).

Office – An organizational unit of RI DEM (whether officially titled "Division" or "Office") that reports through its chief to the director of RI DEM. In this document a "relevant Office" is an Office with responsibilities that routinely entail potential exposure to inhalation hazards and/or respirator use.

Office Program Administrator – The person responsible for managing the respirator program and ensuring compliance within each relevant Office of RI DEM. In small Offices, the Office chief may serve as Office Program Administrator.

PAPR – A Powered Air-Purifying Respirator (PAPR) is an APR with a blower attached to the air-supply line. If health conditions of an employee warrant, a PAPR may be issued to that employee. The certifying physician or other health care professional shall determine on a case by case basis if a PAPR is necessary.

SAR – A Supplied-Air Respirator (SAR) provides air to the user through a hose connected to a supply that is a safe distance away. It provides a longer work time and is less bulky than an SCBA, but the length of air-supply line limits mobility. An SAR cannot be used in IDLH situations, unless the wearer is also fitted with escape SCBA.

SCBA – A Self-Contained Breath Apparatus (SCBA) supplies pure air from a container carried by the user. Clean, breathable air is compressed and stored under pressure in a bottle, and through a regulator slowly fed into the mask for inhalation. Hence, minimal, potentially contaminated ambient air is inhaled, but the air supply is limited and the device is heavy and bulky. An SCBA provides a much higher level of protection than an APRs.

Site Manager -- The person responsible for supervising respirator use in the field, among the members of RI DEM work group or among all workers at a RI DEM facility. In small Offices, the Office chief may serve as Site Manager.