

Chapter 8.4

Respiratory Protection

1910.134

Quick Reference

- 1.0 Purpose..... 1
- 2.0 Scope and Applicability ..... 2
- 3.0 Reference ..... 2
- 4.0 Policy ..... 3
- 5.0 General Responsibilities ..... 3
- 6.0 Procedure ..... 4
  - 6.1 Definitions..... 4
  - 6.2 General Provisions ..... 7
    - 6.2.1 Training.....8
    - 6.2.2 Written Respiratory Protection Program.....9
    - 6.2.3 Hazard Assessment .....10
    - 6.2.4 Selection of Respirators .....10
    - 6.2.5 Use of Respirators .....12
    - 6.2.6 Maintenance and Care of Respirators .....14
    - 6.2.7 Breathing Air Quality and Use.....15
    - 6.2.8 Fit Testing .....17
    - 6.2.9 Recordkeeping.....17
    - 6.2.10 Medical.....18
    - 6.2.11 Evaluation of Respiratory Protection Program .....18
  - 6.3 Specific Responsibilities ..... 19
    - 6.3.1 Directors and Chiefs.....19
    - 6.3.2 Managers, Superintendents, Foremen, and Leads .....19
    - 6.3.3 Employees .....20
    - 6.3.4 Qualified Persons .....20
    - 6.3.5 Safety Officers .....20
- Appendix A: ADOT&PF Respirator Documentation Form ..... 22

1.0 Purpose

The purpose of this Safety Program is to establish guidelines for using Respiratory Protection to protect the health of Alaska Department of Transportation & Public Facilities (ADOT&PF) employees from airborne hazards.

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## **2.0 Scope and Applicability**

The human respiratory system is the quickest and most direct avenue of material entry into the human body. Toxic materials can enter the body through the lungs and present serious health risks.

This Safety Program presents guidelines for the use of Respiratory Protection to protect ADOT&PF employees from airborne hazards. It includes provisions for training and discussion on the requirements for a written respirator program. Details are presented on the administration requirements of a Respiratory Protection program, the need for hazard assessments and respirator selection guidelines. Additionally, discussion is presented on recordkeeping, purchasing, and medical requirements associated with Respiratory Protection.

This document also details the areas of responsibility for Management, Safety Officers, and Workers within ADOT&PF.

This Safety Program affects any employee who, as a result of his or her job duties, is exposed to air contaminants or hazardous environments where contaminants exceed a Permissible Exposure Limit (PEL) or are immediately dangerous to life and health.

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## **3.0 Reference**

This Safety Program is established in accordance with Occupational Safety and Health Standards for General Industry (29 CFR 1910.134) and Occupational Safety and Health Standards for Construction Industry (29 CFR 1926.103). In addition, this Safety Program is established in accordance with Title 8 of the Alaska Administrative Code (AAC) Chapter 61 Section 1030 (Additional Respiratory Protection Standards).

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## **4.0 Policy**

It is the policy of ADOT&PF to provide a place of employment in which the recognized hazards that cause or are likely to cause death or serious physical harm to employees are eliminated to the extent reasonably possible. If those hazards cannot be reasonably eliminated, then employees shall be removed or reasonably protected from such hazards. In that case, administrative practices, engineering practices, safe work practices, Personal Protective Equipment (PPE), and proper training will be implemented to neutralize those hazards to ensure the safety of employees.

It is recognized that ADOT&PF Directors, Chiefs and Managers have discretion in the amount of human and financial resources that are or will be devoted to safety training in the units for which they are responsible. Financial and budgetary constraints of various units within ADOT&PF are acknowledged. Nevertheless, safety and training standards required by OSHA regulations will be met to assure the health and safety of all ADOT&PF employees.

Therefore, ADOT&PF employees will use respirators when engineering and administrative controls are unable to reduce air contaminants below the PEL or fail to eliminate conditions immediately dangerous to life or health (IDLH). When respiratory hazards exist that cannot be eliminated, safe work practices and employee training regarding Respiratory Protection will be implemented to reduce exposures below the PEL.

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## **5.0 General Responsibilities**

It is the responsibility of all employees to ensure implementation of this ADOT&PF Safety Program on Respiratory Protection. It is also the responsibility of each ADOT&PF Worker to immediately report any unsafe act or condition to his or her supervisor. Specific responsibilities are found in **Section 6.3**.

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## **6.0 Procedure**

This section provides applicable definitions, establishes general provisions, and identifies specific responsibilities required by this ADOT&PF Safety Program on Respiratory Protection.

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### **6.1 Definitions**

#### **Aerosol**

Particles, solid or liquid, suspended in air.

#### **Airline Respirator**

An atmosphere-supplying respirator in which the source of breathing air is not designed to be worn or carried by the wearer.

#### **Air-purifying Respirator (APR)**

A respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

#### **Approved**

Evaluated and listed as permissible by National Institute for Occupational Safety and Health (NIOSH) for the respirator's intended use.

#### **Contaminant**

A harmful, irritating, or nuisance airborne material.

#### **Disposable Respirator**

A respirator for which maintenance is not intended and that is designed to be discarded after excessive resistance, sorbent exhaustion, physical damage, or end-of-use-service-life renders it unsuitable for its intended use.

**Dust**

An aerosol consisting of mechanically produced solid particles derived from the breaking up of larger particles.

**Employee**

All personnel employed by the ADOT&PF, regardless of classification.

**Exposure Limit**

The maximum allowable concentration of a contaminant in the air to which an individual may be exposed. These may be time-weighted averages, excursion limits, ceiling limits and short-term limits.

**Filter**

A component used in respirators to remove solid or liquid aerosols from the inspired air.

**Filtering Facepiece (Dust Mask)**

A negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.

**Fit Factor**

A quantitative measure of the fit of a particular respirator to a particular individual that typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside a respirator when worn.

**Fit Test**

The use a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual.

**Fume**

Solid aerosols formed by the condensation of gas or vapor.

**Hazardous Atmosphere**

An atmosphere that contains a contaminant(s) in excess of the exposure limit or is oxygen deficient.

**High-Efficiency Filter**

A filter that removes from the air 99.97 percent or more of the aerosols having a diameter of 0.3 micrometers.

**Immediately Dangerous to Life or Health (IDLH)**

Any atmosphere that poses an immediate hazard to life or poses immediate irreversible debilitating effects on health.

**Permissible Exposure Limit (PEL)**

Regulatory limits for airborne contaminants that include:

- 8-hour time weighted average (TWA);
- Short Term Exposure Limit (STEL);
- Ceiling (c);
- Excursion Limits.

**Powered Air-purifying Respirator (PAPR)**

An air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering of the respirator.

**Qualified Person**

A Safety Officer who has training and experience in air monitoring, exposure assessment, and workplace evaluations.

**Qualitative Fit Test**

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

**Quantitative Fit Test**

An assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

**Supplied-Air Respirator**

See definition for airline respirator.

**User Seal Checks**

Tests conducted by the wearer to determine if the respirator is properly sealed to the face. Tests include a positive pressure and negative pressure user seal check.

**Workers**

Non-supervisory personnel within the department.

**Workplace Exposure Evaluation**

Air monitoring for contaminants in the workplace that is performed by a qualified person (Safety Officer, Industrial Hygienist, etc.).

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**6.2 General Provisions**

This section details the provisions of this Safety Program with each provision discussed in a separate subsection. These provisions are:

- Training;
- Written Respiratory Protection Program;
- Administration;

- Hazard Assessment;
- Selection of Respirators;
- Use of Respirators;
- Maintenance and Care of Respirators;
- Breathing Air Quality and Use;
- Recordkeeping;
- Supply;
- Medical;
- Evaluation of Respiratory Protection Program.

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### **6.2.1 Training**

Employees who use or who are assigned respirators shall be trained in:

- Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;
- Respirator limitations and capabilities under various conditions;
- How to use the respirator effectively in emergency situations including situations in which the respirator malfunctions;
- How to inspect, put on and remove, use, and check the seals of a respirator;
- What the procedures are for maintenance and storage of the respirator;
- The general requirements of 29 CFR 1910.134 and this Safety Program.

This training shall be provided upon initial job assignments requiring the use of respirators. Training shall be repeated at least annually. Training shall also be repeated when changes in the workplace or the type of Respiratory Protection worn occur that renders the previous training obsolete, when inadequacies in an employee's knowledge or use of Respiratory Protection are observed, or when any other situation arises in which refresher training appears necessary to ensure safe respirator use.

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### **6.2.2 Written Respiratory Protection Program**

This Safety Program serves as the ADOT&PF written Respiratory Protection Program. The key elements of this program are:

- Procedures for selecting respirators for use in a workplace;
- Medical evaluations for employees required to use Respiratory Protection;
- Procedures for the proper use of respirators in routine and reasonably foreseeable emergency situations;
- Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators;
- Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators;
- Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations;
- Training of employees in the proper use of respirators, including putting on and removing them, any limitations on their use, and their maintenance;

- Procedures for regularly evaluating the effectiveness of the Respiratory Protection program.
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### **6.2.3 Hazard Assessment**

A qualified person shall assess Worker exposures to airborne contaminants prior to the employee using a respirator. Based on the assessment, the proper respirator shall be selected to control the exposure. Exposure assessments shall be based on air monitoring data, process information, work environment, historical data, and work practices relative to the type of contaminant.

The PEL of an air contaminant does not have to be exceeded for an employee to use a respirator. The Worker may request the use of a respirator because of a nuisance exposure or for personal reasons. These circumstances should be evaluated by a Safety Officer and respirator use approved if the circumstances favor the use of a respirator. Refer to 29 CFR 1910.134 for additional requirements that must be met when voluntary use of Respiratory Protection is approved by ADOT&PF.

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### **6.2.4 Selection of Respirators**

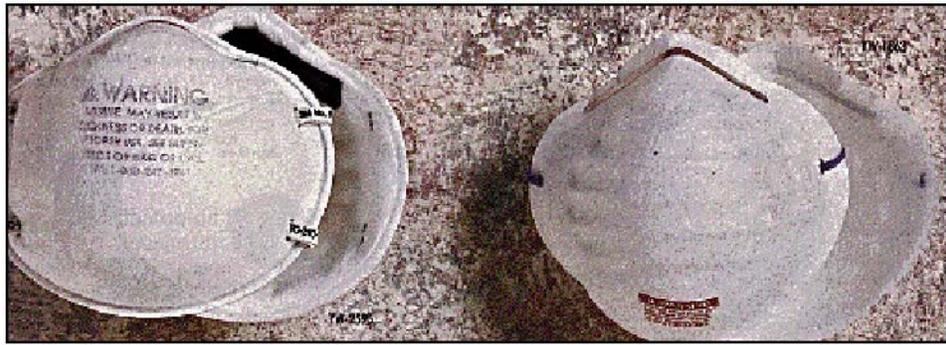
ADOT&PF shall select and provide appropriate respirators based on the respiratory hazard(s) to which Workers are exposed. Considerations shall be given to workplace conditions and user factors that could affect the performance and reliability of the respirator. Respirators selected for use within ADOT&PF shall be certified by the National Institute for Occupational Safety and Health (NIOSH) and used in compliance with the conditions of its certification. In addition, respirators shall be selected from a sufficient number of respirator models and sizes so that the respirators are acceptable to and correctly fit the users.

The types of respirators used in ADOT&PF are:

- Disposable or single use filtering facepieces (dust masks);

- Half facepiece or full facepiece negative pressure air-purifying respirators (APR);
- Powered air-purifying respirators (PAPR);
- Airline respirators;
- Self-contained breathing apparatus (SCBA).

**Figures 1, 2, 3, 4, and 5** illustrate examples of disposable, negative pressure APR, PAPR, airline, and SCBA respirators respectively.



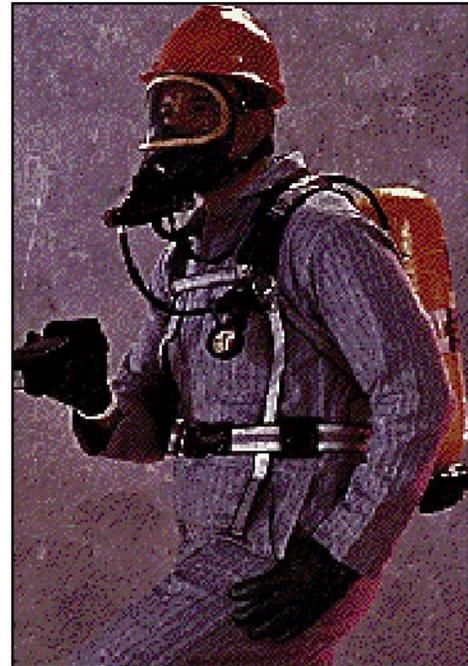
**Figure 1 Disposable/Filtering Facepiece Respirators**



**Figure 2: Half Facepiece Negative Pressure APR**



**Figure 3: PAPR**

**Figure 4: Airline Respirator****Figure 5: SCBA**

Air-purifying respirators used for protection against gases and vapors shall be equipped with an end-of-service-life indicator (ESLI) certified by NIOSH for the contaminant. If an ESLI is not available for a specific contaminant, a change out schedule, based on objective data, shall be developed for respirator canisters/cartridges that will ensure they are not used beyond their service life. An area or regional Safety Officer shall be contacted to determine a canister/cartridge change out schedule for specific contaminants of concern.

Air-purifying respirators used for protection against particulates shall be certified by NIOSH for particulate protection under 42 CFR Part 84.

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### 6.2.5 Use of Respirators

Procedures for the correct use of respirators include prohibiting conditions that may result in facepiece seal leakage, preventing employees from removing respirators in hazardous

environments, taking actions to ensure continued effective respirator operation throughout the work shift, and establishing procedures for the use of respirators in immediately dangerous to life or health (IDLH) atmospheres. The following procedures shall be adhered to by all ADOT&PF employees who are required to wear respirators during the performance of their job duties.

Respirators with tight-fitting facepieces shall not be worn by employees who have facial hair or any other condition that comes between the sealing surface of the facepiece and the face or that interferes with valve function. In addition, employees who wear corrective glasses or goggles or other PPE shall not wear the PPE in such a manner that it does not interfere with the face to facepiece seal.

When Respiratory Protection is required in a work area, respirator users shall perform a positive pressure and negative pressure user seal check prior to entering the area where Respiratory Protection is required.

Employees shall be instructed and permitted to leave an area where Respiratory Protection is required to wash their faces and respirator facepieces as necessary to prevent eye or skin irritation associated with respiratory use. In addition, employees shall be instructed and permitted to leave a respirator area if they detect gas or vapor breakthrough, changes in breathing resistance, or leakage of the facepiece. If an employee leaves a work area due to gas or vapor breakthrough, changes in breathing resistance, or leakage of the facepiece, the respirator shall be replaced or repaired prior to the employee returning to the work area.

The use of Respiratory Protection for entering an IDLH atmosphere is not authorized under this Safety Program. In the event an IDLH atmosphere must be entered by ADOT&PF employees, the regional Director or Chief and the area or regional Safety Officer shall be contacted for guidance and approval.

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### **6.2.6 Maintenance and Care of Respirators**

Respirators issued to employees shall be clean, sanitary, and in good working order. Respirators assigned to the exclusive use of one individual shall be cleaned and disinfected as often as necessary to maintain the respirator in a sanitary condition. Respirators assigned to more than one employee shall be cleaned and disinfected before being worn by different individuals. Respirators maintained for emergency use and used in fit testing and training shall be cleaned and disinfected after each use.

Cleaning procedures shall include a warm water detergent wash, warm water rinse, warm water disinfectant wash, and an additional warm water rinse. For more detailed cleaning procedures, refer to 29 CFR 1910.134, Appendix B-2.

Respirators shall be stored to protect them from damage, contamination, dust, sunlight, temperature extremes, excessive moisture, and damaging chemicals. In addition, respirators shall be stored in a manner to prevent deformation of the facepiece and exhalation valve. Respirators designated for emergency use shall be kept accessible to the work area and stored in compartments or in covers that are clearly marked as containing emergency respirators. In addition, emergency respirators shall be stored in accordance with any applicable manufacturer instructions.

Respirators used in routine operations shall be inspected before each use and during cleaning. Respirators designated for emergency use shall be inspected at least monthly and checked for proper function before and after each use. Emergency escape-only respirators shall be inspected before being carried into the workplace for use. Respirator inspections shall include a check of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the facepiece, head straps, valves, connecting tube, and cartridges/canisters/filters. Respirator inspections shall also include a check of elastomeric parts for pliability and signs of

deterioration. The inspection of emergency use respirators shall be certified by documenting the date of inspection, name of the inspector, inspection findings, required remedial action, and a serial number or other means of identifying the inspected respirator. Emergency use respirator documentation forms shall be maintained until being replaced following a subsequent certification. The certification shall be attached to the storage compartment for the respirator, kept with the respirator, or maintained in paper or electronic files of inspection reports.

Respirators that fail an inspection or are otherwise found to be defective shall be immediately removed from service until they can be replaced, repaired, or adjusted. Repairs or adjustments shall be made only by persons appropriately trained to perform such repairs or adjustments. Replacement parts shall be purchased from the respirator manufacturer's NIOSH-approved parts designed for that specific respirator. Repairs shall be made according to the manufacturer's recommendations and specifications for the type and extent of repairs to be performed. Reducing and admission valves, regulators, and alarms shall be adjusted or repaired only by the manufacturer or by a technician trained by the manufacturer.

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### **6.2.7 Breathing Air Quality and Use**

When supplied-air respirators (airline and SCBA) are used, compressed breathing air sources shall be of high purity. ADOT&PF shall ensure that compressed air breathing sources meet, at a minimum, the requirements for Grade D breathing air described in the American National Standards Institute (ANSI)/Compressed Gas Association (CGA) Commodity Specification for Air (Publication No. G-7.1-1989). These requirements include an oxygen concentration between 19.5% and 23.5%, hydrocarbon content of 5 milligrams per cubic meter of air or less, carbon monoxide content of 10 parts per million or less, carbon dioxide content of 1,000 parts per million or less, and no noticeable odors. The use of compressed oxygen, liquid

air, and liquid oxygen is not authorized under this Safety Program.

Cylinders used in compressed breathing air systems shall be tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation. In addition, cylinders of purchased breathing air shall include a certificate from the supplier that the breathing air meets the requirements of Grade D breathing air, and that the moisture content in the cylinder does not exceed a dew point of -50 degrees Fahrenheit at 1 atmosphere pressure.

Compressors used to supply breathing air to respirators shall be positioned to prevent entry of contaminated air into the air-supply system and to minimize moisture content so that the dew point at 1 atmosphere pressure is 10 degrees Fahrenheit below the ambient temperature. Compressors shall have in-line air-purifying sorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters shall be refurbished or replaced in accordance with manufacturer instructions. A tag indicating the most recent change date and the signature of the person authorized to perform the change shall be maintained at the compressor. Breathing air supplied by compressors that are not oil-lubricated shall be tested to ensure that carbon monoxide levels do not exceed 10 parts per million. For oil-lubricated compressors, high temperature, compressor failure, and carbon monoxide alarms must be installed. The monitoring equipment, alarms, and filters must be checked before use to ensure they are working properly. Alarms must be capable of being heard up to 300 feet away from the compressor or alert respirator users remotely.

Compressor systems that do not include high temperature, compressor failure, and carbon monoxide alarms shall be monitored by a competent person. The competent person must be trained in supplied air systems and receive instruction in the function and maintenance of the particular supplied air system being used at the worksite. The competent person must be able to

demonstrate the ability to respond appropriately to a malfunction of the system.

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### **6.2.8 Fit Testing**

Prior to the initial use of any respirator with a negative or positive pressure tight-fitting facepiece, an employee must be fit tested with the same make, model, style, and size or respirator that he or she will use. If the respirator to be used is a positive pressure respirator, the fit test shall be performed with the respirator operated in a negative pressure mode. Fit test procedures can include qualitative or quantitative methods accepted by OSHA (see Appendix A of 29 CFR 1910.134).

Fit test procedures must be repeated annually and whenever a different respirator facepiece (size, style, model, or make) is used by an employee. Additionally, a fit test shall be repeated whenever a change in an employee's physical condition (i.e., body weight, dental changes, facial scarring, or cosmetic surgery) is reported or observed.

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### **6.2.9 Recordkeeping**

Recordkeeping activities shall include records for employee medical evaluations, employee training, fit tests, and the written Respiratory Protection program.

Employee medical records related to this Safety Program shall be retained by ADOT&PF for the duration of employment plus 30 years. Employee training records shall be retained for the duration of employment.

Fit test procedures shall be documented and shall include the employee's name or unique identification number; type of fit test performed; specific make, model, style and size of respirator tested; date of the test; and the pass/fail results for qualitative fit tests or the fit factor and strip chart recording (or other recording) of the test results for quantitative fit tests. Fit test

documentation records shall be maintained for employees until the next fit test is administered.

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#### **6.2.10 Medical**

All employees who are candidates for a respirator shall receive a medical evaluation by a physician or other licensed health care professional prior to being fit tested or required to wear a respirator in the workplace. A work and personal medical history questionnaire form shall be provided to the physician at the time of evaluation. The physician (or licensed health care professional) will determine if the employee is capable of wearing the selected respirator.

ADOT&PF may discontinue an employee's medical evaluations when the employee is no longer required to wear a respirator.

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#### **6.2.11 Evaluation of Respiratory Protection Program**

The effectiveness of this Safety Program shall be evaluated periodically to ensure the program is being implemented properly and to consult employees to ensure that they are using respirators properly. Evaluations shall be performed at least annually or more frequently as required to ensure the continued effectiveness of this program.

Consultation with employees shall be performed regularly to assess employee views on the effectiveness of this program and to identify any problems. Problems that are identified during this assessment shall be corrected. Factors to be assessed include, but are not limited to, respirator fit (including the ability to use the respirator without interfering with effective workplace performance), appropriate respirator selection for the hazards to which the employee is exposed, proper respirator use under the workplace conditions the employee encounters, and proper respirator maintenance.

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## **6.3 Specific Responsibilities**

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### **6.3.1 Directors and Chiefs**

Directors and Chiefs are responsible for:

- Prioritizing, locating and seeking funding and budgeting for the purchase of Respiratory Protection equipment and related supplies;
  - Ensuring compliance with this Safety Program through their auditing process.
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### **6.3.2 Managers, Superintendents, Foremen, and Leads**

Managers, Superintendents, Foremen, and Leads will be responsible for:

- Identifying the employees affected by this Safety Program and that those employees are provided a medical evaluation and fit testing before being issued a respirator;
- Obtaining and coordinating the appropriate training for the affected employees;
- Not allowing any employee who has not received the appropriate training or medical evaluation to perform any of the tasks or activities requiring Respiratory Protection;
- Ensuring that respirators are properly worn and maintained;
- Communicating appropriate needs to Directors and Chiefs;
- Ensuring that an adequate supply of respirators, cartridges, and replacement parts are available.

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### **6.3.3 Employees**

Employees shall:

- Comply with all applicable guidelines contained in this Safety Program;
- Clean the respirator assigned to them and properly store the respirator when not in use.

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### **6.3.4 Qualified Persons**

Qualified Persons shall:

- Be responsible for conducting air monitoring where there is suspicion of air contamination;
- Perform exposure assessments, workplace evaluation, and recommend exposure controls.

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### **6.3.5 Safety Officers**

Safety Officers will:

- Provide prompt assistance to Management, or others as applicable on any matter concerning this Safety Program;
- Assist in developing or securing the appropriate training;
- Provide assistance to Management, and others as necessary on respirator fit testing, Respiratory Protection program review, and appropriate training;
- Maintain a quality assurance program for Respiratory Protection through field evaluations;
- Be responsible for respirator selection and assist with record keeping requirements of this Safety Program;

- Contract the services of an Industrial Hygienist to provide training, expertise, and guidance on air monitoring, exposure control, and risk assessment strategies. Air monitoring data, as applicable, will be evaluated by an Industrial Hygienist for completeness, accuracy, and precision.

**Appendix A: ADOT&PF Respirator Documentation Form**

Name: \_\_\_\_\_ SSN (Optional): \_\_\_\_\_  
Job Title: \_\_\_\_\_ Date: \_\_\_\_\_  
Division: \_\_\_\_\_ District: \_\_\_\_\_ Unit: \_\_\_\_\_  
Name of Immediate Supervisor: \_\_\_\_\_  
Air Contaminant(s): \_\_\_\_\_

**Respirator Type (Check all that apply)**

**Negative Pressure Air-Purifying Respirator:**

- Disposable
- Half facepiece
- Full facepiece

**Atmosphere-Supplying Respirator**

- Half Facepiece
- Full Facepiece
- Hood
- Supplied Air
- Combined Airline/SCBA
- Open Circuit SCBA
- Closed Circuit SCBA
- Continuous Flow

**Powered Air-Purifying Respirator:**

- Half Facepiece
- Full Facepiece
- Hood

**Work Effort Level**

- Light
- Strenuous
- Moderate
- Heavy

**Frequency of Use**

- Daily
- Rarely
- Occasional – more than once per week
- Rescue

Length of use when worn: \_\_\_\_\_ Hours

**Work Conditions**

- Outside
- Inside
- Confined Space

**Special Work Conditions**

- High Temperature
- Protective Clothing
- High Humidity
- Heights
- Cold

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signature \_\_\_\_\_ Title \_\_\_\_\_

SO/Mgr/Super/Foreman/Lead