(12/2/05 - Administratively changed to reflect correct organization name and remove dates in citations under P.4 References)

KENNEDY NASA PROCEDURAL REQUIREMENTS

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**Responsible Office:** **Center Operations**

# KSC RESPIRATORY PROTECTION PROGRAM

National Aeronautics and
**Space Administration**

**John F. Kennedy Space Center**

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PREFACE

## P.1 PURPOSE

This KNPR contains the requirements for the implementation of the KSC Respiratory Protection Program. It provides both general and specific requirements for protective measures to be taken for employees who may be exposed to toxic air contaminants and oxygen deficient atmospheres. This KNPR does not in any way relieve various NASA organizations and their associated contractors of responsibility for the protection of personnel under their cognizance.

It is KSC policy to provide employees with an environment in which occupational health hazards are identified, evaluated, eliminated or controlled in such a manner that personnel do not suffer adverse health effects as a result of their employment. Activities shall be conducted in a manner that conforms to all applicable federal, state and local regulatory requirements. Personnel exposures to chemical and/or physical agents shall at all times be restricted to levels as low as reasonably achievable.

The requirements presented in this KNPR implement Federal OSHA regulations and NASA management policy for industrial hygiene programs. Environmental Health and other operations organizations will supplement the provisions of this Directive by implementation of internal policies and instructions, as needed.

Additional requirements for the KSC Industrial Hygiene Program are contained within KNPD 1800.2, "KSC Hazard Communication Program"; KNPR 1820.3, "KSC Hearing Loss Prevention Program," and KNPR 1840.19, "KSC Industrial Hygiene Programs."

## P.2 APPLICABILITY

This KNPR applies to all NASA organizational elements located at Kennedy Space Center (KSC), the United States Air Force (USAF) 45th Space Wing, and NASA/KSC facilities and operations at other locations; including associated contractors, to the extent specified in their respective contracts; carrier and payload organizations; and other Government agencies, their contractors, and tenants.

## P.3 AUTHORITY

a. Title 29, Code of Federal Regulations, Part 1960.
b. Executive Order 12196, "Occupational Safety and Health Programs for Federal Employees."
c. NPD 1820.1 (as revised), “Environmental Health Program
d. NPR 8715.1 (as revised), "Safety and Health Handbook - Occupational Safety and Health Programs"

## P.4 REFERENCES

a. Title 29 Code of Federal Regulation (CFR), 1910.94, 1910.134, 1910.139, and 1910.1000 - End

b. Title 42 CFR Part 84

c. Privacy Act of 1974 (5 USC 522. (i)(1))

d. KNPR 8715.3 (as revised), “NASA Safety Policy and Procedures Document”

e. KNPD 1800.1 (as revised), “Hazard Communication Program”

f. KNPR 1840.19 (as revised), KSC Industrial Hygiene Programs”

g. KBM-ST-2.1A, “Medical Standards for the John F. Kennedy Space Center and Cape Canaveral Air Force Station”

h. Air Force Occupational Safety and Health Standard 48-137, February 10, 2005, Respiratory Protection Program

i. ANSI/CGA G-7.1- 2004, “Commodity Specification for Air”

j. ANSI/CGA C-7-2004, “Guide to the Preparation of Precautionary Labeling and Marking of Compressed Gas Containers”

k. ANSI Z88.2-1992 (as revised), “American National Standard for Respiratory Protection”

l. Federal Specification BB-A-1034B, as revised, “Compressed Air, Breathing”

m. American Conference of Governmental Industrial Hygienists, “Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices” (current edition)

n. National Institute for Occupational Safety and Health (NIOSH), Guide to Industrial Respiratory Protection

o. U.S. Air Force technical Order 42B-1-22, February 27, 2004, “Quality Control of Compressed and Liquid Breathing Air”

## P.5 CANCELLATION/SUPERSESSION

This document supersedes KNPR 1820.4, Rev. Basic, KSC Respiratory Protection Program.

## P.6 DEFINITIONS

a. Action Level: a measured airborne concentration of an air contaminant that is equal to one-half the Occupational Exposure Limit for the contaminant, or other concentration where specified by OSHA substance-specific standard.

b. Adequate warning properties: detectable characteristics of a hazardous air contaminant including odor, taste, and/or irritation effects that are detectable and persistent at concentrations at or below the Occupational Exposure Limit and do not cause olfactory fatigue.

c. Assigned Protection Factor: a value assigned by the Occupational Safety and Health Administration as the achievable ratio of average concentration of an air contaminant in the workplace air to the average concentration of that contaminant measured inside the respirator facepiece for a specific class of respirators. For example, a respirator with an assigned protection factor of 10 will have an air contaminant concentration inside the facepiece at least 10 times lower than the concentration outside the facepiece.

d. Demand: a mode of operation for supplied air respirators in which air flows into the respirator only when inspiration creates a lower pressure within the facepiece than the ambient atmospheric pressure.

e. Maximum Use Concentration (MUC): the maximum concentration of an air contaminant in which a particular cartridge, canister, or filter respirator can be used. The MUC can be determined by multiplying the assigned protection factor for the respirator by the permissible exposure limit for the air contaminant in question. However, the MUC cannot exceed the lowest of either 1000ppm; or the concentration of 10 times the Occupational Exposure Limit; or as specified by a substance-specific OSHA standard; or where the IDLH concentration for the chemical is lower than the calculated MUC.

f. Occupational Exposure Limit: The more stringent of:

(1) the Permissible exposure level (PEL) for the hazardous chemical as listed in 29 CFR Part 1910, Subpart Z; or
(2) the Threshold Limit Value (TLV) for the hazardous chemical assigned by the American Conference of Governmental Industrial Hygienists (ACGIH) in the latest edition of "Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment"; or
(3) a NASA Permissible Exposure Level when published as a NASA Health Standard; or
(4) where there is no PEL, TLV or NASA standard for the chemical, an exposure level based on available published scientific information such as Material Safety Data Sheets.

g. Resident: an employee who is employed by a Federal or contractor organization that is a tenant of KSC/CCAFS.

h. Respirator: any device worn by an individual and intended to provide the wearer with respiratory protection against inhalation of airborne contaminants or oxygen deficient atmospheres.

i. User Organization: any NASA, contractor, or tenant organization at KSC/CCAFS who calibrates air sampling equipment, performs air sampling, and/or provides

for the analysis of air samples for industrial hygiene purposes.

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Director, Center Operations

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## CHAPTER 1: RESPONSIBILITIES

1.1 Heads of Primary Organizations and Heads of Contractor Organizations to the extent provided by their contracts will:

a. Provide operational implementation of the requirements of this KNPR.

b. Ensure personnel:

(1) Are notified of hazards and protective measures governing work with hazardous chemical agents.

(2) Are provided appropriate training and orientation to identify hazards associated with chemical agents in their work places and to use respiratory protective equipment provided for their safety.

(3) Are notified of any changes or modifications to systems used to control exposure to these agents.

c. Implement and maintain control measures required preventing or otherwise reducing employee potential exposure to hazardous chemical agents.

d. Observe applicable provisions of KNPR 1840.19, "KSC Industrial Hygiene Programs" and KNPD 1800.2, "Hazard Communication Program."

e. Ensure assessment plans, processes, and operations are reviewed for elimination or control of air contaminant hazards.

f. Designate organization representatives to the KSC Respiratory Protection panel.

1.2 The KSC Occupational Medicine Officer, or his/her designated representative, will:

a. Provide medical evaluations to personnel identified by their organizations as respirator users.

b. Provide medical screening and surveillance examinations for those employees who may be occupationally exposed to certain hazardous chemical agents, as required by 29 CFR Part 1910, 29 CFR Part 1926, and/or other applicable NASA/AF requirements.

c. Provide, on a case basis, special physical evaluations to personnel identified as being exposed or potentially exposed to hazardous chemical agents as the result of an accident, mishap, or other unusual circumstance.

d. Ensure that physical examination criteria as defined in KBM-ST-2.1A is implemented to conform to the protocols defined by OSHA, where required, and other nationally recognized standards as applicable.

e. Maintain records of all Occupational Medicine activities associated with support to the KSC Respiratory Protection Program as defined by Federal Regulation; i.e., OSHA, NASA Health Standards.

f. Provide employee access to medical records in accordance with 29 CFR 1910.1020 and the Privacy Act of 1974, as amended (5 USC 522.a).

1.3 The J-BOSC Technical Training Office, or other contractor training organizations will, to the extent provided by contract, provide respirator fit testing, training and certification, and maintain associated employee training and certification records.

1.4 The J-BOSC Industrial Hygiene Office will:

a. Provide baseline surveys of operations, tasks, or procedures, which possess the potential to create harmful air contamination.

b. Provide Health Hazard Evaluations of operations, tasks, or procedures where baseline surveys have shown the presence of harmful air contaminants at concentrations, which may pose a health hazard to personnel.

c. Provide area and/or personal exposure monitoring which represent the exposure of employees where previous surveys have shown the presence of air contaminants at concentrations in excess of the action level.

d. Provide the Occupational Medicine Officer or his designated representative access to exposure monitoring records.

e. Provide to supervisors, site managers, or responsible safety organizations in the affected work area the:

(1) Results of surveys and recommendations.

(2) Recommended methods for the control or elimination of air contaminant hazards.

(3) Requirements for employees to participate in the Respiratory Protection Program.

(4) Recommendations on the selection of respiratory protective equipment.

f. Notify employers of exposure monitoring results for affected employees.

g. Review facility plans and operational procedures to assess the adequacy

of precautions taken to control workplace air contaminants.

h. Provide technical assistance in the selection and design of engineering controls and work practices used to control or eliminate air contaminants.

i. Perform inspections of breathing air compressors and associated air filtration systems.

j. Chair the KSC Respiratory Protection Panel.

1.5 The KSC Respiratory Protection Officer, or his/her designated representative, will:

a. Administer the KSC Respiratory Protection Program for NASA Civil Service personnel.

b. Coordinate development of Respiratory Protection Program Training courses with The Chief, Human Resources Development Branch.

c. Provide technical assistance in the selection and use of respiratory protection equipment.

1.6 The Respiratory Protection Panel (RPP) serves as a government/contractor forum for the implementation of respiratory protection programs. Membership consists of the KSC Respiratory Protection Program Officer, designated representatives of NASA and resident Kennedy Space Center (KSC) contractor organizations representing; Occupational Medicine, Environmental Health, Life Support, Fire Services, Safety, and Training, as well as each contractor respiratory protection program administrator. The panel will:

a. Provide consultative services to KSC Management and contractors on items related to respiratory protection.

b. Coordinate actions to resolve problems or rectify deficiencies in the selection, use, and maintenance of respirators.

c. Provide a forum for discussion and resolution of issues related to industrial hygiene, life support, occupational medicine, fire, and training services provided by NASA to its contractors in support of their respiratory protection programs.

d. Assist the KSC Respiratory Protection Officer in the development and maintenance of respiratory protection policies, requirements, and general practices of the KSC Respiratory Protection Program.

e. Coordinate permanent deployment/removal of Breathing Escape Units as outlined in Chapter 2, paragraph 2.4.

1.7 The J-BOSC Life Support will:

a. Service all respirators assigned to Life Support to include inspection, testing, cleaning, sanitizing, repair, and refilling of cylinders and maintain records of all elements performed.

b. Act as the main point of procurement initiation and issuance for supplied air respiratory protective devices in coordination with the KSC Respiratory Protection Officer and Propellants and Life Support Sustaining Engineering.

c. Perform periodic preventive maintenance procedures on all assigned respirators and maintain records of these inspections on a recurring basis at frequencies determined by Life Support Systems and Sustaining Engineering as detailed in Operational Maintenance Requirements and Specifications Documents (OMRSD's).

d. Ensure appropriate manufacturer's certification for Life Support technicians who perform respirator maintenance. Ensure periodic recertification to maintain and upgrade technicians' capabilities. Maintain records of all such training, certification and recertification.

e. Prepare and update as required, Operation and Maintenance Instructions (OMIs) for the use, servicing, and repair of all used respirators in accordance with OMRSDs and manufacturers' recommendations.

f. Provide consultative support to the KSC Respiratory Protection Panel on all aspects of respiratory protective equipment.

g. Provide training with information and documentation relative to changes in procedures or configuration of respiratory protective equipment that could affect the respiratory training program.

1.8 Civil Service Line Management and Contract Employers will:

a. Coordinate with appropriate safety and environmental health personnel to request workplace health hazard assessment of operations with suspected air contaminant generation.

b. Develop written operations specific requirements for the use of respiratory protection equipment, as identified in the health hazard evaluation.

c. Ensure that there is proper completion and submittal of KSC forms: 16-539 "KSC/CCAFS RESPIRATOR USAGE QUESTIONAIRE" (completed by employer); 16-540 "KSC/CCAFS RESPIRATOR MEDICAL EVALUATION QUESTIONAIRE" (completed by employee) and 13-116 "PHYSICAL EXAMINATION REQUEST/REPORT FORM", which are required for the medical evaluation.

d. Ensure employees who have a medical evaluation by a Physician or other Licensed Health Care Professional (PLHCP) outside of the KSC/CCAFS Occupational Medicine Services will have the appropriate documentation

on file with their employer that states conformity and compliance with OSHA's medical evaluation guidelines.

e. Ensure that employees seeking certification to use respiratory protective equipment are medically certified to use such equipment and attend, Respiratory Protection Program training, and respirator fit testing, as required.

f. Ensure that employees are provided with the proper visual correction devices that are compatible with proper and effective respirator use, when visual correction has been determined necessary by the PLHCP.

g. Attend the Respiratory Protection Program training provided for their employees.

h. Verify that employees are issued the correct type and size respirator for which they have been fitted and certified.

i. Ensure the proper use of respiratory protection equipment, engineering controls, and work practices established to reduce workplace exposure to harmful air contaminants.

j. Ensure that employees are not assigned to tasks requiring the use of respirators when they have facial hair, scars, missing dentures, etc., which have the potential for causing leakage in the sealing surface of the respirator.

k. Notify their affected employees of the results of Health Hazard Evaluations and exposure monitoring surveys, as defined in Section 2.7 of this KNPR.

l. Ensure the proper care and maintenance of respirators issued to their employees.

m. Maintain a current list of employees having respirator use certifications.

n. Review work assignments/work area hazards to determine potential need for use of respiratory protection equipment.

o. When respiratory protection must be worn for protection from hazardous materials, review Material Safety Data Sheets for those materials with the affected employees.

p. Assist in the development of strategies to control or eliminate exposure to hazardous air contaminants.

1.9 Individual Employees will:

a. Use control procedures established to maintain air contaminant control,

including wearing and maintaining respiratory protective devices, as instructed.

b. Cooperate with supervisory, medical, environmental health, and safety personnel in activities to evaluate and control air contaminant hazards.

c. Notify supervisors of areas, operations, or equipment that may be a source of air contaminants.

d. Report any suspected chemical exposures to their supervisors.

e. Complete a KSC/CCAFS Respirator Medical Evaluation Questionnaire Form (KSC Form 16-540) and submit to Occupational Medicine for evaluation.

f. Notify supervisors of changes in their health status that may affect their ability to safely use respiratory protection and resubmit the KSC Form 16-540.

## CHAPTER 2: RESPIRATORY PROTECTION PROGRAM

### 2.1 General

This Section establishes guidelines for the use of respiratory protective equipment at the Kennedy Space Center and the Cape Canaveral Air Force Station (KSC/CCAFS). These guidelines establish practices and procedures where the use of such equipment is required to perform tasks that are inherently hazardous because of the presence of toxic air contaminants and/or oxygen deficient atmospheres. These guidelines are applicable to all NASA civil service and contractor organizations as well as their subcontractors. Mandatory requirements for compliance with the OSHA Respiratory Protection Standard are not repeated in this KNPR, but may be found in 29 CFR 1910.134.

### 2.2 Written Operating Procedures

Operating procedures that require the use of respiratory protective equipment are considered hazardous and must meet the requirements of KNPR 8715.3, Attachment B.

### 2.3 Respiratory Protective Equipment

a. Adequate respiratory protection will be provided whenever;

(1) Personnel are required to work in hazardous atmospheres where the action level of the hazardous air contaminant is exceeded or oxygen deficient atmospheres are present.

(2) Personnel are involved in the handling, transfer, or use of hazardous chemicals where the toxicity of the chemical is of such a nature as to place those personnel at significant risk of serious illness or injury in the event of a leak, spill, or other release of the chemical.

(3) Personnel are required to enter atmospheres which have unknown concentrations of oxygen and/or air contaminants.

(4) An Industrial Hygienist or Safety Professional determines that personnel exposure(s) could exceed the action level.

b. The selection of respiratory protection equipment will take into consideration:

(1) The nature of the hazard(s) associated with the operation or process;

(2) The nature of the work operation or process;

(3) The physical and chemical properties and additive effects of the air contaminant(s); (additional general considerations are sorbent efficiencies, odor warning properties, irritation potential, and lower flammability limit);

(4) The adverse health effects of the air contaminant(s);

(5) Warning properties of the hazardous air contaminant(s);

(6) The relevant Occupational Exposure Limits (OEL);

(7) The measured concentration(s) of hazardous air contaminant(s);

(8) Worker activities in the area of the operation and the potential stress of work conditions on employees wearing the respirators;

(9) The period of time respiratory protection will be worn by employees during the work shift;

(10) The physical characteristics, functional capabilities, and limitations of the respirator; and

(11) The substance specific OSHA standard.

c. Selection of appropriate respiratory protection equipment will take into account the Assigned Protection Factor (APF) for each type of respirator as listed in the Appendix and OSHA specific substance standards.

d. Selection of air purifying respirators is limited to the lowest of:

(1) The IDLH Concentration

(2) The APF X OEL

(3) The MUCs listed in 42 CFR 84 Subpart L, Section 84.190

e. For selection and use limitations of particulate respirators, consult 42 CFR Part 84.

2.4 Breathing Escape Units

a. Breathing Escape Units (BEUs) are required in work areas where:

(1) A potential exists for the rapid development of an Immediately Dangerous to Life or Health (IDLH) atmosphere, and

(2) There is no immediate means for the affected employees to egress the IDLH area to a safe atmosphere.

b. Requests for permanent deployments/removal of BEUs will be made to

the KSC Respiratory Protection Panel. The Panel will make an evaluation as to whether the above criteria are met. The Panel will appoint a team to evaluate the request. The evaluation team will include representatives of:

(1) The responsible contractor Safety and Health Organization (Team Lead, responsible for coordinating the assessment)

(2) NASA Safety

(3) Life Support

(4) Environmental Health

(5) The requesting organization

c. On completion of the evaluation, the Chair of the KSC Respiratory Protection Panel will prepare a written report for concurrence by the members of the evaluation team. The report will:

(1) Evaluate the toxic properties of the hazardous commodities in question

(2) Evaluate accident scenarios in which an IDLH atmosphere could rapidly develop

(3) Identify operations in the affected area and the number of employees potentially exposed to the hazardous condition

(4) Identify the availability of rapid egress routes for affected employees to take in the event of an emergency and time required for the egress

(5) List other mitigating factors, as applicable

d. Upon distribution of the report, Life Support will provide recommended BEUs based upon availability. The requesting organization is responsible for coordinating with Life Support for the deployment/removal of BEUs.

e. It is the responsibility of the requesting organization to revise all documentation (e.g., OMIs, KPRD, and Facility Drawings) needed to assure the proper scheduling and deployment of the requested BEUs. When additional BEUs are required, but are not available for support from the existing Life Support inventory, it is the responsibility of the requesting organization to coordinate their procurement and maintenance with NASA Spaceport Services and Life Support.

2.5 Respirator Care and Maintenance

Cleaning and disinfection of respirators will be in accordance with 29 CFR 1910.134, Appendix B-2.

2.6 Breathing Air

a. Compressed breathing air shall meet the requirements in 29 CFR 1910.134 paragraph (i).

b. Testing of compressor-supplied breathing air will be in accordance with Table 3 in the Appendix.

2.7 Health Hazard Evaluation

a. An initial Health Hazard Evaluation of potentially hazardous operations will be conducted when any information, observation, or calculation shows that an employee may be exposed to oxygen-deficient atmospheres and/or air contaminants above their action levels. This includes, but is not limited to, data from monitoring of similar operations, procedure reviews, potential for skin and eye contact, and employee complaints of unusual odors, irritations, or other signs or symptoms of potential exposures.

(1) The Health Hazard Evaluation will evaluate and describe:

(a) the operation, process, and/or equipment generating the air contaminant(s),
(b) their approximate concentrations,
(c) other operations in the area,
(d) the number of potentially exposed employees,
(e) the duration and frequency of the exposure,
(f) respiratory protection requirements,
(g) associated Personal Protective Equipment (PPE), and
(h) any regulatory requirements applicable to the operation.

(2) Health hazard evaluations will be repeated annually, or whenever any changes to facilities, equipment, work practices, procedures, and/or engineering control measures are made.

b. Employees and/or their representatives will be provided an opportunity to observe area and personal exposure monitoring.

c. Results of Health Hazard evaluations will be posted in the affected employees' work areas or otherwise provided to affected employees for their review.

2.8 Medical Screening and Surveillance Examinations

a. Medical evaluation is required for every employee who is to be assigned to tasks requiring the use of respiratory protective equipment.

b. Specific requirements for medical evaluation are defined in 29 CFR 1910.134, Appendix C, or as otherwise directed by the Occupational Medicine Officer.

c. For employees who are not resident at the Kennedy Space Center, the Occupational Medicine Officer may accept an already existing medical examination or written opinion from a licensed physician stating whether the employee has any detected medical condition which would place the employee's health at increased risk from respirator use and any recommended limitations on the use of respirators.

2.9 Employee Training and Respirator Fit Testing

a. Respirator training and fit testing will be in accordance with 29 CFR 1910.134.

b. Upon completion of fit testing and verification of employees' medical certifications, each employee will be issued a certification card (KSC Form 31-81NS) which identifies the employee, and the manufacturer(s), model(s), size(s), expiration date, protection factor(s) of the respirator(s), and fit tester’s initials for which the employee has been fit tested.

c. Qualitative (QLFT) and quantitative (QNFT) fit tests will be performed only by qualified individuals specifically trained and assigned responsibility for providing respirator fit tests.

d. Fit-test results shall be related to Assigned Protection Factors as follows:

(1) Quarter-facepiece and half-mask, air-purifying respirators may be worn in atmospheres no greater than 10 times the established exposure limit, when the respirator user passes the qualitative fit test; or when the respirator user passes a quantitative fit test with a minimum fit factor of greater than 100.

(2) Full-facepiece, air-purifying respirators may be worn in atmospheres no greater than 50 times the established exposure limit when the respirator user passes a quantitative fit test with a minimum fit factor greater than 500.

(3) Powered air-purifying respirators and supplied-air respirators with tight-fitting facepieces require fit testing. They may be used in atmospheres no greater than allowed by the Assigned Protection Factor for that respirator listed in the Appendix, Tables 1 and 2.

2.10 Records

a. Access to employee exposure and medical records will be in accordance with 29 CFR 1910.1020 and the Privacy Act of 1974, as amended (5 USC 522.a). Employee exposure and medical records will be maintained in

accordance with the requirements of 29 CFR 1910.1020.

b. Copies of this KNPR, 29 CFR 1910.134 (OSHA Respiratory Protection Standard), other applicable OSHA regulations, and any appropriate records required by this KNPR will be provided, upon request, to employees, former employees, representatives of employees, representatives of the U.S. Department of Labor, and NASA Headquarters personnel. Copies of this KNPR and other current NASA issuance's are available electronically at the KSC Business World web site (http://businessworld/Businessworld/html/ksc_directives.html) under KSC Directives).

Appendix

Table 1

RESPIRATOR SELECTION CRITERIA FOR
AIR-PURIFYING RESPIRATORS

| Air Purifying Respirator[1] | Assigned Protection Factor |
|---|---|
| Half Mask or Quarter Facepiece[2] | 10 |
| Full Facepiece | 50[3] |
| Filtering Facepiece (Dust Mask)[4] | 5 |
| Powered Air-Purifying | |
| Tight Fitting Full Facepiece | 50 |
| Tight Fitting half mask[2] | 50 |
| Loose Fitting hood or helmet | 25 |

Notes:

1. Air-purifying respirators may not be used in oxygen deficient atmospheres.

2. Only full-facepiece respirators are to be used in contaminant concentrations that produce eye irritation.

3. An APF of 50 is permitted only when QNFT is performed; when QLFT is performed an APF of 10 is permitted.

4. Nuisance dusts only.

Table 2

RESPIRATOR SELECTION CRITERIA FOR
ATMOSPHERE SUPPLYING RESPIRATORS

| Supplied Air-Respirator (SAR)[1] | Assigned Protection Factor |
|---|---|
| Negative Pressure (demand) | |
| - Half mask | 10 |
| - Full facepiece | 50 |
| Continuous flow | |
| - Hood or helmet | 25 |
| - Half mask | 50 |
| - Full facepiece | 50 |
| Pressure Demand | |
| - Half mask | 50 |
| - Full facepiece | 1000 |
| Combination Full Facepiece Pressure Demand SAR with Auxiliary Self-Contained Breathing Apparatus | greater than 1000, and IDLH, or unknown concentrations |
| Self-Contained Breathing Apparatus(SCBA)[2] | |
| - demand | 50 |
| - pressure demand | greater than 1000, and IDLH, or unknown concentrations |

Notes:

1. Any supplied-air respirator may be used in an oxygen deficient atmosphere where the oxygen content is above the oxygen deficient IDLH limits.

2. Only a full facepiece pressure demand SCBA or combination full facepiece pressure demand SAR with auxiliary self-contained air supply may be used in unknown IDLH or oxygen deficient IDLH atmospheres.

TABLE 3

| COMPRESSOR BREATHING AIR EVALUATIONS | | | |
|---|---|---|---|
| COMPRESSOR TYPE | CO ALARM | HIGH TEMP ALARM | EVALUATE |
| OIL LUBRICATED | Yes | Yes | 90 Days |
| | Yes | No | 90 Days |
| | No | Yes | 45 Days |
| | No | No | 45 days |
| OIL-FREE | Yes | Yes | 90 Days |
| | Yes | No | 90 Days |
| | No | Yes* | 90 Days |
| | No | No | 45 Days |

*Auto shutoff device installed. Historic evaluations are satisfactory.